Appendix A. Detailed Project Description

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Sites Reservoir Project
Preliminary Project Description and Alternatives

February 2021

This Preliminary Project Description has been prepared as a preliminary draft document in support of preparing a Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) for the Sites Reservoir Project (Project). The purpose for circulating this document at this time is to facilitate early coordination on initial approaches currently under consideration by the Authority. Therefore, the content of this document will be subject to continued discussions and modifications, and it may not be included in its entirety in the RDEIR/SDEIS. The Authority is not soliciting comments on this Preliminary Project Description and formal responses will not be provided for any comments received. As required by CEQA and NEPA, a public review and comment period will be provided upon publication of the RDEIR/SDEIS, which is currently anticipated to be released in late summer 2021.

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Chapter 2 Project Description and Alternatives

This chapter describes the proposed Sites Reservoir Project (Project) and alternatives analyzed in this Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS). The alternatives were developed in light of the California Environmental Quality Act (CEQA) objectives and the National Environmental Policy Act (NEPA) purpose and need as described in Chapter 1, Introduction. This chapter is supported by Appendices 2A, 2B, 2C, and 2D which provide additional detail on the alternatives screening, construction means and methods and best management practices (BMPs).

2.1 Alternatives Development Process

The range of alternatives evaluated in this RDEIR/SDEIS is the product of an extensive screening process, that has included public input and involvement, occurring over several decades and involving multiple distinct water resource planning efforts. Those planning efforts considered a wide variety of factors, including feasibility and opportunities for reducing significant impacts while meeting applicable program and project objectives and purpose and need. See Appendix 2A, *Alternatives Screening and Evaluation*, and Appendix 2B, *Additional Alternatives Screening and Evaluation*, for information on alternatives considered but eliminated and the alternatives that are evaluated in this document.

2.1.1 Evaluated Prior to 2019

Beginning in 1995, the CALFED Bay-Delta Program (CALFED) initiated the evaluation of expanded surface water storage in the Sacramento and San Joaquin Valleys as part of a long-term comprehensive plan to restore the ecological health and improve water management to protect beneficial uses in the Sacramento–San Joaquin Delta (Delta) and the Delta watershed. During preparation of the CALFED Environmental Impact Report/Environmental Impact Statement (EIR/EIS), the CALFED Program initially identified 52 potential surface storage locations and retained 12 reservoir locations statewide for further study. The screening criteria applied indicated a preference for offstream over onstream surface water storage to avoid redirected impacts on aquatic species in the primary tributaries of the Delta.

Following the CALFED Programmatic Record of Decision (CALFED ROD) in 2000, the California Department of Water Resources (DWR) and the Bureau of Reclamation (Reclamation) continued to evaluate potential locations for a reservoir on the western side of the Sacramento Valley as part of the Surface Water Storage Investigation (Reclamation and DWR, 2006). The objectives of this effort were to formulate a project that would enhance water management flexibility in the Sacramento Valley, increase the reliability of water supplies in California, and provide storage and operational benefits to enhance water supply reliability and improve water quality and ecosystems. The results of the analysis identified four potential alternatives: Red Bank (Dippingvat and Schoenfield Reservoirs), Newville Reservoir, Colusa Reservoir, and Sites Reservoir. These four reservoir alternatives were evaluated against

additional screening criteria. This secondary screening conducted after the CALFED ROD found the Sites Reservoir location most able to meet the goals and objectives of the Surface Water Storage Investigation, while minimizing environmental impacts and providing the greatest potential benefits.

The Surface Water Storage Investigation also evaluated a variety of water sources (and associated conveyance options) including diversions from the Colusa Basin Drain (CBD), Sacramento River, and local tributaries. The evaluation process culminated in selection of the existing Tehama-Colusa Canal (TC Canal) and GCID diversion and conveyance facilities in addition to a new pipeline from the Sacramento River near the Moulton Weir (the Delevan Pipeline). These facilities were determined to be the most reliable and capable of meeting the goals and objectives of the study effort conducted after the CALFED ROD.

The 2017 Public Draft Environmental Impact Report/Environmental Impact Statement (2017 Draft EIR/EIS) for the Project evaluated four surface water reservoir size and conveyance options, and another alternative that would not include proposed power generation at the Delevan release structure. All alternatives included a Sites Reservoir to be filled using existing Sacramento River diversion facilities and the new Delevan Pumping Plant on the Sacramento River to allow for diversion and release of flows to the Sacramento River. Associated facilities for all alternatives were similar but varied in location and size. Appendix 2B, Additional Alternatives Screening and Evaluation, provides a more detailed table of differences between the Action Alternatives in this RDEIR/SDEIS and those in the 2017 Draft EIR/EIS.

In August 2017, the Authority submitted a Water Storage Investment Program (WSIP) application to the California Water Commission (CWC) to determine the Project's eligibility for funding under Proposition 1. The WSIP application evaluated the technical, economic, financial, and environmental feasibility of the Project. The CWC made nine specific determinations, including determining that the Project provides a net ecosystem improvement, provides measurable improvements to the Delta ecosystem, and that the Project would advance the long-term objectives of restoring the ecological health and water management beneficial uses of the Delta. The CWC conditionally approved $816 million in funding for the Project (California Water Commission undated).

2.1.2 Value Planning Process and Alternatives Post-2019

In October 2019, the Authority pursued a value planning process to determine if further refinements to the Project were warranted. Between October 2019 and April 2020, the Authority considered previous input from state and federal agencies, non-governmental organizations, elected officials, landowners, and local communities, and decided to "right size" the Project to better meet the needs of Sites Storage Partners[1], the statewide water supply and the environment. Multiple alternatives were considered during the value planning process that took into

[1] The governmental agencies, water organizations and others who have funded and received a storage allocation in Sites Reservoir and the resulting water supply or water supply related environmental benefits from the Project. Storage Partners could include local agencies, the State of California, and the Federal Government.

consideration the public and agency comments received on the 2017 Draft EIR/EIS (Sites Project Authority 2020). The primary objectives of this process were to:

- Improve water supply and water supply reliability;
- Provide Incremental Level 4 water supply for refuges;
- Improve the survival of anadromous fish; and
- Enhance the Delta ecosystem.

The secondary objectives of the value planning process were to provide opportunities for flood damage reduction and recreation.

Value planning alternatives combined different types and sizes of diversion, release, reservoir, road, and bridge facilities. The Authority analyzed operational, environmental, and permitting considerations for different alternatives. For example, operational considerations included the ability of several reservoir sizes and conveyance capacities to meet participant subscriptions and participation by the State of California through WSIP. Environmental considerations included reducing the footprints of facilities or eliminating facilities to avoid or minimize impacts and reducing the amount of water diverted to storage. In addition, the Authority evaluated the costs of facilities proposed for each alternative to understand whether each alternative achieved a reasonable cost-per-acre-foot that the Sites Storage Partners could support.

The value planning process identified three recommended alternatives. Alternative Value Planning (VP) 5 involved a 1.3 million-acre-feet (MAF) reservoir and used an existing regulating reservoir (Funks Reservoir) and a new regulating reservoir (the Terminal Regulating Reservoir [TRR]) to fill Sites Reservoir with releases (1,000 cubic feet per second [cfs]) from the southern end of the TC Canal through a pipeline that went to the CBD. Alternative VP 6 was similar to Alternative VP 5, but the releases from the southern end of the TC Canal were conveyed through a pipeline that extended to the Sacramento River. Alternative VP 7 was similar to Alternative VP 5 but included a 1.5-MAF reservoir. The value planning process culminated in a Value Planning Report that was adopted by the Authority in April 2020 (Sites Project Authority 2020). The alternatives in this RDEIR/SDEIS are based on VP 5, VP 6, and VP 7 in the Value Planning Report.

2.2 CEQA and NEPA Requirements

2.2.1 CEQA Requirements

The Authority, as the State lead agency, is responsible for the development of alternatives that meet CEQA requirements. Section 15126.6 of the State CEQA Guidelines requires that:

- An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of

potentially feasible alternatives that will foster informed decision-making and public participation. An EIR is not required to consider alternatives which are infeasible.

- The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects.
- The specific alternative of "no project" shall also be evaluated along with its impact.
- The EIR should briefly discuss the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination…. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are:
    - Failure to meet most of the basic project objectives.
    - Infeasibility.
    - Inability to avoid significant environmental impacts.

This RDEIR/SDEIS is prepared in accordance with both NEPA and CEQA, with the Action Alternatives analyzed at an equal level of analysis (consistent with NEPA standards).

2.2.2 NEPA Requirements

Reclamation, as the Federal lead agency, is responsible for the development of alternatives that meet NEPA requirements. For the Project alternatives, including the proposed action, NEPA requires that Federal government agencies shall (40 CFR Section 1502.14):

(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

(b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

(c) Include reasonable alternatives not within the jurisdiction of the lead agency.

(d) Include the alternative of no action.

(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

(f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

2.3 Overview of Alternatives

The Project would utilize existing infrastructure to divert unregulated and unappropriated flow from the Sacramento River at Red Bluff and Hamilton City and convey water to a new off-

stream reservoir west of Maxwell, California. New and existing facilities would move water into and out of the reservoir, with ultimate release back to the Sacramento River system via existing canals and a new pipeline located near Dunnigan. Construction of the reservoir would necessitate construction of a bridge or bypass road to connect Maxwell with the community of Lodoga. Additional components would include future development of new recreation facilities at the reservoir. This RDEIR/SDEIS presents the No Project Alternative and three Action Alternatives to implement the Project. Project alternatives include:

- No Project Alternative
- Alternative 1, 1.5 MAF reservoir, bridge, release to the CBD, and a range of Reclamation investment up to 7 percent of the Project costs
- Alternative 2, 1.3 MAF reservoir, South Road, partial release to the CBD and Sacramento River, and no Reclamation investment
- Alternative 3, 1.5 MAF reservoir, bridge, release to the CBD, and Reclamation investment up to 25 percent of the Project costs

The Action Alternatives analyzed in this RDEIR/SDEIS are generally based on the results of the value planning process. Alternative 1 is based on Alternative VP 7, and Alternative 2 is based on Alternatives VP 5 and VP 6. Alternative 3 is generally based on VP 7 with increased federal participation of up to 25 percent of the Project costs. Project facilities for the Action Alternatives are shown in Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4. Table 2-1 provides a summary of the Action Alternatives. Alternative 1 is the Authority's proposed Project under CEQA.

Table 2-1. Summary of Action Alternatives

Facilities/Operations	Alternative 1	Alternative 2	Alternative 3
Diversion/Reservoir Infrastructure Details			
Reservoir Size	1.5 MAF	1.3 MAF	Same as Alternative 1
Dams [Scaled to the size of the reservoir]	Golden Gate and Sites Dams; 7 saddle dams; 2 saddle dikes	Golden Gate and Sites Dams; 4 saddle dams; 3 saddle dikes	Same as Alternative 1
Spillway	One spillway on Saddle Dam 8B	Similar to Alternative 1	Same as Alternative 1
Funks Reservoir (existing)	New Funks Pump Generating Plant (PGP) and Funks pipelines	Similar to Alternative 1	Same as Alternative 1
Terminal Regulating Reservoir (TRR)	Construction of TRR PGP and TRR pipelines	Same as Alternative 1	Same as Alternative 1
Hydropower	Incidental power generation up to 40 megawatts each at Funks PGP and TRR PGP	Same as Alternative 1	Same as Alternative 1
Diversion(s)	Diversion from Sacramento River into	Same as Alternative 1	Same as Alternative 1

Facilities/Operations	Alternative 1	Alternative 2	Alternative 3
	existing TC Canal at Red Bluff and the existing GCID Main Canal at Hamilton City		
Emergency Release Flow	Releases into Funks Creek and Stone Corral Creek via Inlet/Outlet Works, Sites Dam; structures in Saddle Dams 3 and 5 to release north to Hunters Creek watershed; Release from spillway on Saddle Dam 8B north to Hunters Creek watershed	Similar releases via Inlet/Outlet Works, Sites Dam, and spillway on Saddle Dam 8B; No emergency release structures on Saddle Dams 3 and 5	Same as Alternative 1
Recreation			
Multiple Facilities Consistent with the Authority's WSIP Application	Two primary areas with infrastructure: 1. Peninsula Hills Recreation Area 2. Stone Corral Creek Recreation Area An additional day-use boat ramp	Same as Alternative 1	Same as Alternative 1
Transportation/Circulation			
Provide Route to West Side of Reservoir	Permanent bridge crossing the reservoir and relocation of a portion of Huffmaster Road with gravel road to residents at the south end of the reservoir	Paved roadway including the relocated segment of Huffmaster Road and a new South Road on the west side of the reservoir	Same as Alternative 1
Operations			
Diversion Criteria	Bypass flows; Pulse flow protection measure to be applied	Same as Alternative 1	Same as Alternative 1
Reclamation Involvement	1. Funding Partner (up to 7% investment) with operational exchanges; or, 2. Operational Exchanges Only	Operational Exchanges Only a. Within Year Exchanges b. Real-time Exchanges	Funding Partner, up to 25% investment, and Operational Exchanges: a. Within Year Exchanges b. Real-time Exchanges

Facilities/Operations	Alternative 1	Alternative 2	Alternative 3
	a. Within Year Exchanges b. Real-time Exchanges		
Department of Water Resources (DWR) Involvement	Operational Exchanges with Oroville and use of SWP facilities South-of-Delta	Same as Alternative 1 (volumes may vary, however)	Similar to Alternative 1 (volumes may vary, however)
Releases into Funks Creek and Stone Corral Creek	Specific flow criteria to maintain flows to protect downstream water right holders and ecological function	Same as Alternative 1	Same as Alternative 1
Conveyance Dunnigan Release	Release 1,000 cfs into new pipeline to CBD	Release into new pipeline to Sacramento River, partial release to the CBD	Same as Alternative 1

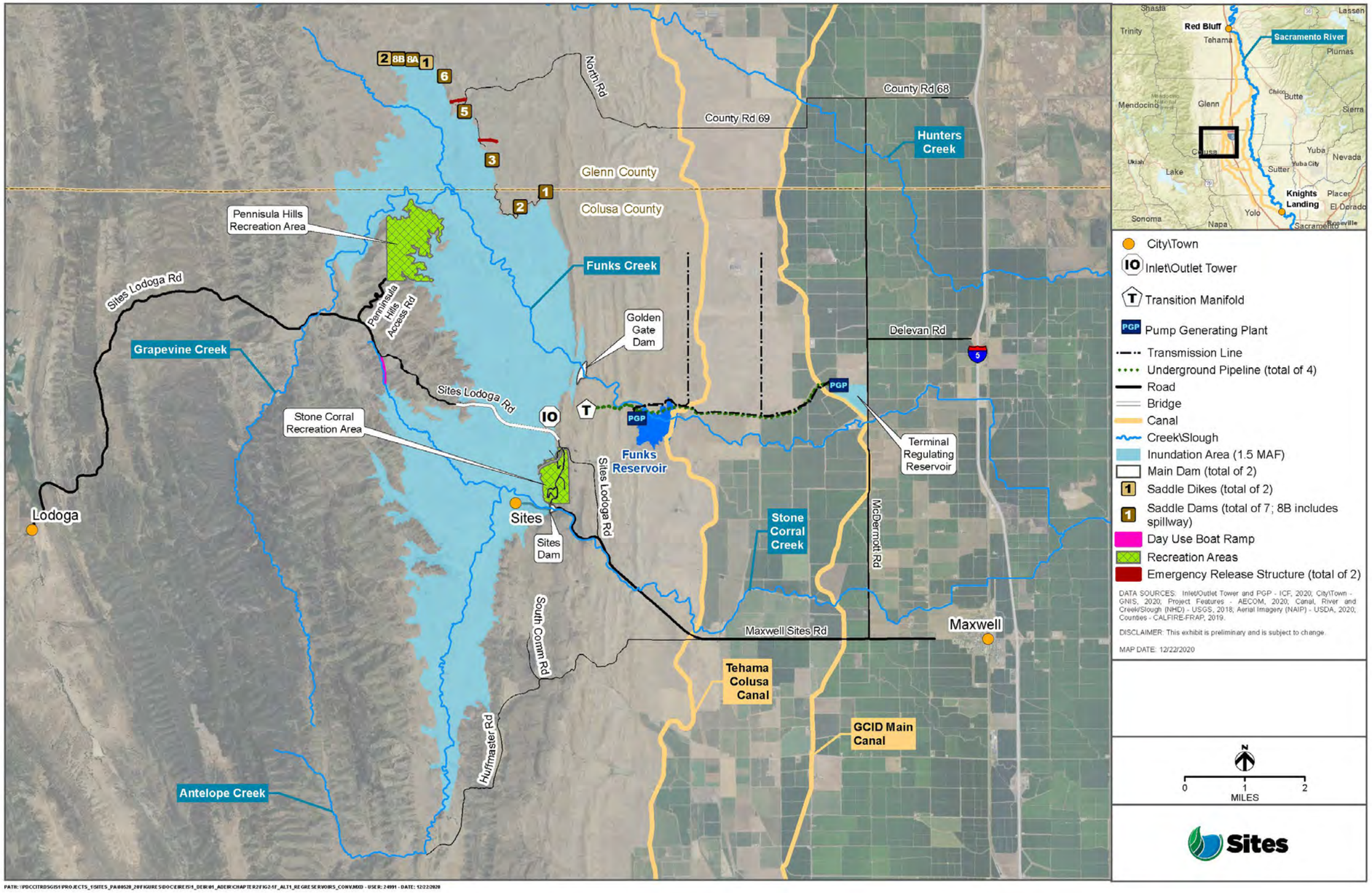


Figure 2-1. Alternatives 1 and 3 Regulating Reservoirs and Conveyance and Sites Reservoir Facilities

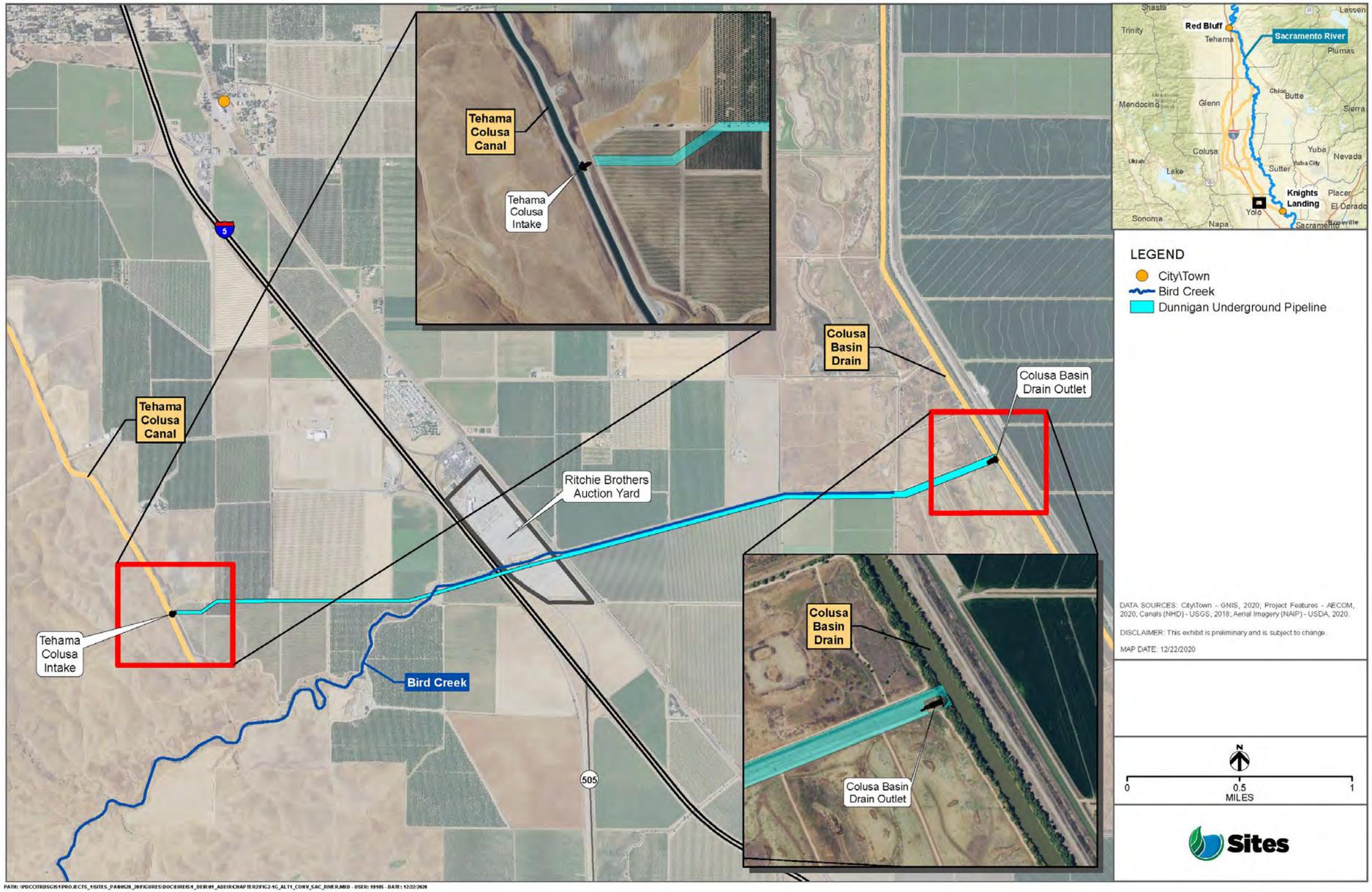


Figure 2-2. Alternatives 1 and 3 Conveyance to Sacramento River Components

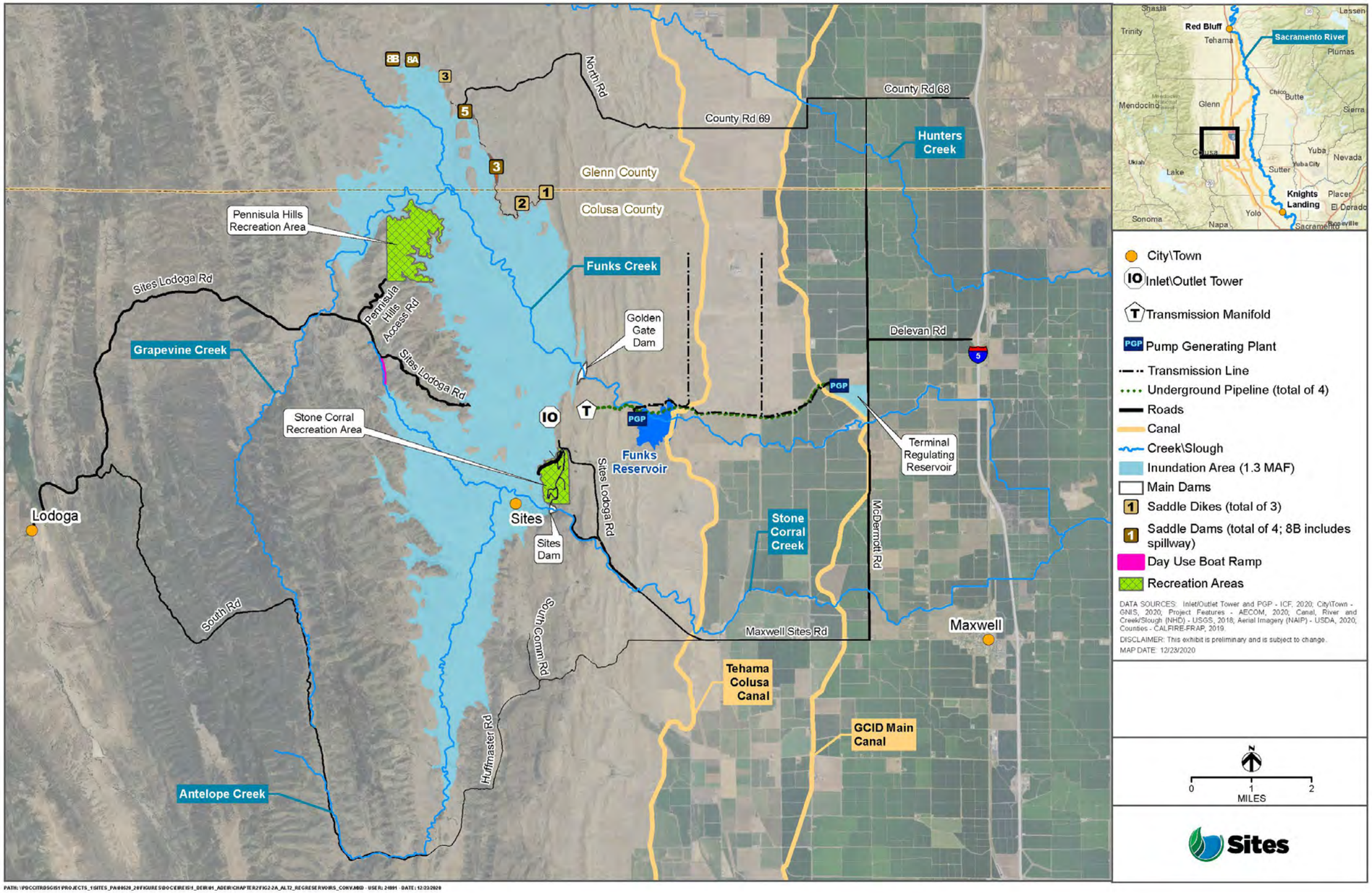


Figure 2-3. Alternative 2 Regulating Reservoirs and Conveyance and Sites Reservoir Facilities

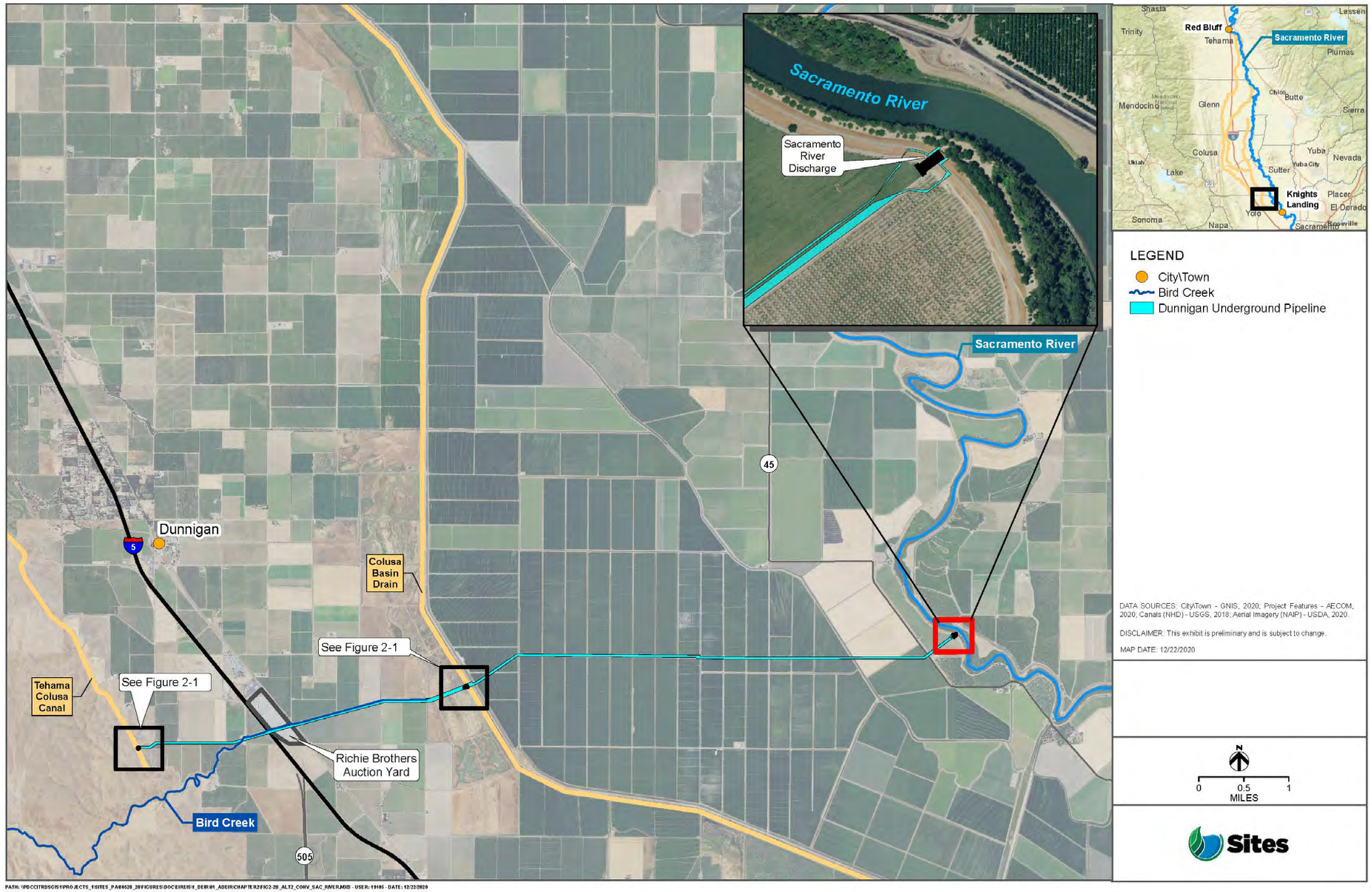


Figure 2-4. Alternative 2 Conveyance to Sacramento River Components

It should be noted that the Authority could decide to approve a version of Alternative 2 (with a 1.3-MAF reservoir) that incorporates the bridge component of Alternative 1, or the CBD release component of Alternative 1 instead of release to the Sacramento River, or both of these distinct components. Similarly, the Authority could decide to approve a version of Alternative 1 (with a 1.5-MAF reservoir), or a version of Alternative 3, that incorporates the roadway improvements without the bridge as contemplated by Alternative 2, or the Sacramento River release component of Alternative 2 instead of the CBD release, or both of these distinct components. In this way, the evaluation of Alternatives 1, 2 and 3 actually incorporates a spectrum of multiple options for the decision-makers about the Project facilities and components.

2.4 No Project/Action Alternative

The CEQA Guidelines require that an EIR analyze the No Project Alternative. Evaluation of the No Project Alternative allows decision makers to compare the impacts of approving a proposed project with the impacts of not approving the proposed project. This RDEIR/SDEIS evaluates a No Project Alternative that assumes the Project would not be implemented and considers what would be reasonably expected to occur in the foreseeable future if the Project were not approved, based on current plans and consistent with available infrastructure and community services.

NEPA similarly requires an analysis of an alternative in which the project is not implemented assuming continuation of existing policies and management direction into the future. Under NEPA, the No Action Alternative accounts for reasonably foreseeable changes in existing conditions. Existing conditions includes changes that would reasonably be expected to occur in the foreseeable future if the Project were not approved, based on current plans and consistent with available infrastructure and community services.

For this RDEIR/SDEIS, the term *No Project Alternative* describes both the No Project Alternative and No Action Alternative for CEQA and NEPA purposes, respectively. Because none of the proposed facilities would be constructed or operated, the No Project Alternative would not materially change conditions as compared to existing conditions. The No Project Alternative assumes the same regulatory criteria as existing conditions. This is because reasonably foreseeable programs and projects included within the No Project Alternative affect water supply, water quality, or anadromous fisheries conditions and are part of existing conditions. For example, the implementation of the 2019 Biological Opinions from the U.S. Fish and Wildlife Service and National Marine Fishery Service for the Reinitiation of Consultation on the Coordinated Operations of the CVP and SWP (ROC on LTO; USFWS 2019 and NMFS 2019) and the Incidental Take Permit for Long-term Operations of the State Water Project in the Sacramento-San Joaquin Delta (SWP ITP; CDFW 2020) are included in both existing conditions and the No Project Alternative.

In addition, DWR's projected future land use and water use are typically included as fundamental assumptions in the CALSIM II model (see Appendix 1A, Introduction to Appendices and Modeling Information, and Chapter 5, Surface Hydrology Resources, for more information regarding CALSIM) as part of the impact evaluation process. These 2030 water demand conditions indicate that the vast majority of the CVP and SWP water contractors would

use their total contract amounts and that most senior water rights users also would fully use most of their water rights, depending on the hydrologic condition. The Sites Project Authority (Authority) has accepted this assumption for this analysis. This increased demand in addition to the projects currently under construction and those that have received approvals and permits at the time of preparation of the RDEIR/SDEIS constitute the No Project Alternative. Furthermore, the rural nature of the area and limited potential for growth and development in Colusa, Glenn and Yolo Counties within the 2030 study period used for this RDEIR/SDEIS supports similarities between the No Project Alternative and existing conditions.

Under the No Project Alternative, existing conditions outlined in the following resource chapters would not be altered by the Project. However, Project benefits would also not be achieved. Under the No Project Alternative, flood control, ecosystem improvement, and recreation benefits that are part of the Project would not be funded and implemented as part of WSIP. The No Project Alternative would also not provide water supply reliability, operational flexibility, benefits to anadromous fish, water supply for refuges and Delta ecosystem benefits sought with potential Reclamation investment. Finally, the No Project Alternative would eliminate one opportunity to provide a multi-benefit project consistent with the Governor's Water Resilience Portfolio. The No Project Alternative would not meet the Project objectives and purpose and need stated in Chapter 1 but is analyzed in this RDEIR/SDEIS, consistent with CEQA and NEPA requirements.

2.5 Elements Common to All Action Alternatives

Project facilities, operations and maintenance, construction considerations, commitments and BMPs, and Proposition 1 benefits common to all of the Action Alternatives are described below.

2.5.1 Facilities Common to All Action Alternatives

The facilities common to all the Action Alternatives are described below. Design and construction considerations for these facilities are also described. Additional detail for construction means and methods are described in Appendix 2C, Construction Means, Methods, and Assumptions.

2.5.1.1 Sacramento River Diversion and Conveyance to Regulating Reservoirs

All Action Alternatives include the diversion of water from the Sacramento River at the existing RBPP into the existing TC Canal and at the existing Hamilton City Pump Station into the existing GCID Main Canal. The RBPP and TC Canal are owned by Reclamation and operated by the Tehama Colusa Canal Authority. The RBPP has an existing fish screen that meets NMFS and CDFW fish screen criteria. The Hamilton City Pump Station and GCID Main Canal are owned and operated by GCID. The Hamilton City Pump Station has an existing fish screen that meets NMFS and CDFW fish screen criteria. Some improvements would be made to these facilities to allow for Project operations concurrent with these facilities continuing to meet their intended purposes. The location of these improvements is shown in Figure 2-5 and these improvements are described below.

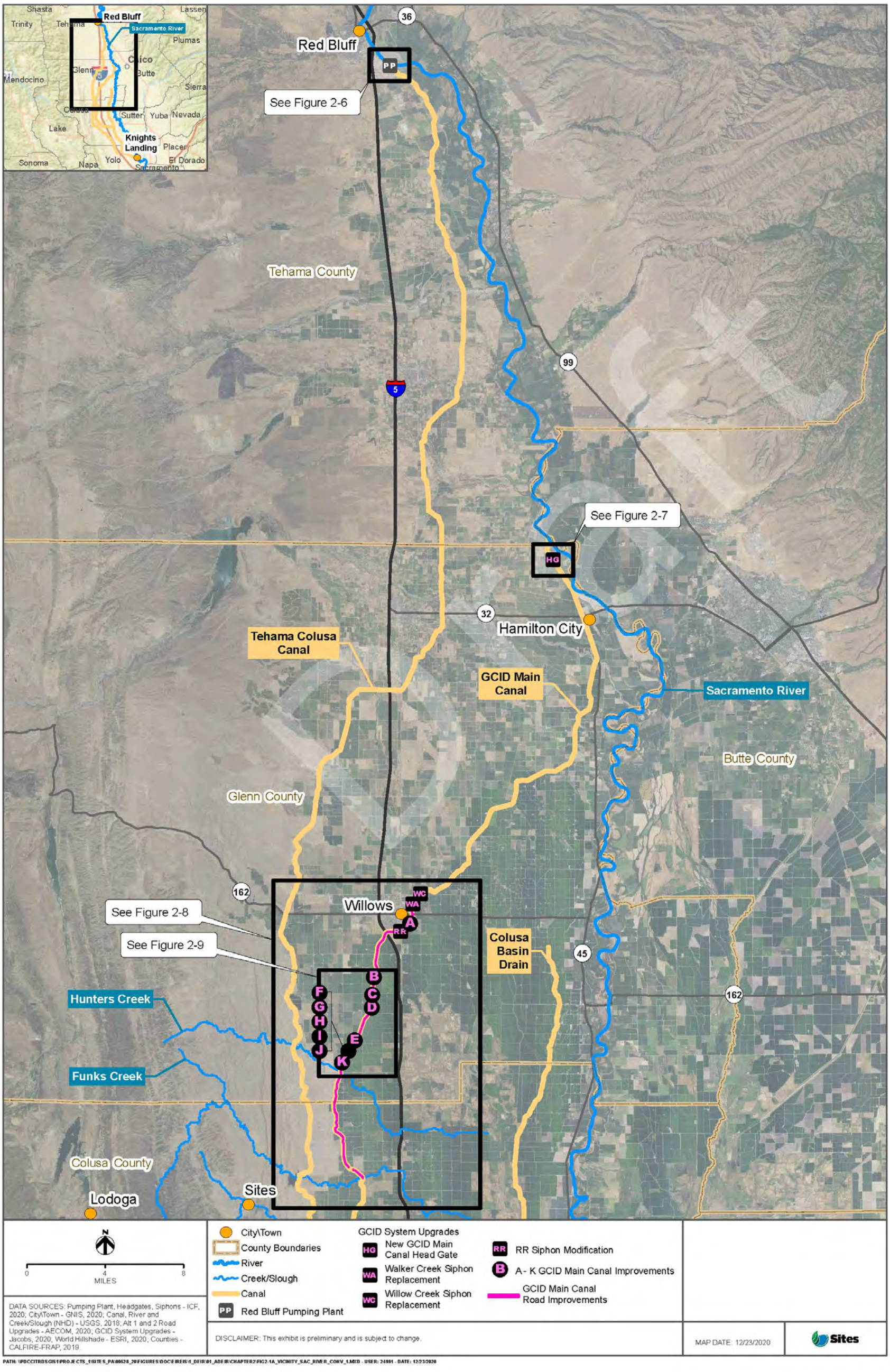


Figure 2-5. Sacramento River Conveyance Components

Tehama-Colusa Canal Diversion

All Action Alternatives include the installation of two additional 250-cfs vertical axial-flow pumps into existing concrete pump bays at the RBPP. The addition of these two pumps would increase the capacity from 2,000 to 2,500 cfs, as well as provide redundancy. See Figure 2-6 for a vicinity map of the RBPP and see Appendix 2C for plan and profile views of the proposed pumps.

The installation of the additional pumps at the RBPP under all of the Action Alternatives would occur at existing facilities and would require limited construction equipment and personnel over a period of approximately 2 months.

GCID Main Canal Diversion and System Upgrades

The GCID system may require several different upgrades to support the operation of Sites Reservoir. The specific details of these upgrades would be confirmed during future hydraulic modeling and assessment of conditions. However, for the purposes of this document and the impact analyses contained herein, it is assumed construction would be performed at various locations along the GCID Main Canal, as described below.

All Action Alternatives would require a new 3,000-cfs Main Canal head gate structure about 0.25 mile downstream of Hamilton City Pump Station (Figure 2-7). This new structure is required because the existing head gate structure would not be adequate for proposed winter operation due to the decrease in water elevation across the structure during high river levels. The existing head gate structure would be left in place to continue to serve as a bridge between County Road 203 and County Road 205 in Glenn County. This structure would continue to operate during construction of the new head gate structure and diversion activities would continue throughout construction. The new head gate structure would be constructed upstream of the existing structure and would include eight automated gates. The water level and flow control functions would involve operating conditions that would result in water surface drops across the head gate of between 3 and 15 feet. The canal reach immediately downstream of the new head gate structure would be lined with concrete for approximately 35 feet to prevent erosion.

GCID typically dewaters their Main Canal for up to 6 weeks each year between early January and late February for maintenance activities. This is the time of year that the Project seeking to utilize the GCID Hamilton City Pump Station and GCID Main Canal to divert and convey under the Project. To reduce this current winter shutdown period from 6 weeks to 2 weeks, other improvements would be required to integrate Sites Reservoir into the GCID system. All Action Alternatives would involve replacing the Walker Creek siphon (MP 24.48) and Willow Creek siphon (MP 24.68) on the Main Canal to allow for increased capacity (Figure 2-8 and Figure 2-9). The siphon under the Union Pacific Railroad (i.e., railroad siphon) at MP 26.6 would be improved by adding an additional barrel to allow for increased capacity.

Figure 2-6. Red Bluff Pumping Plant

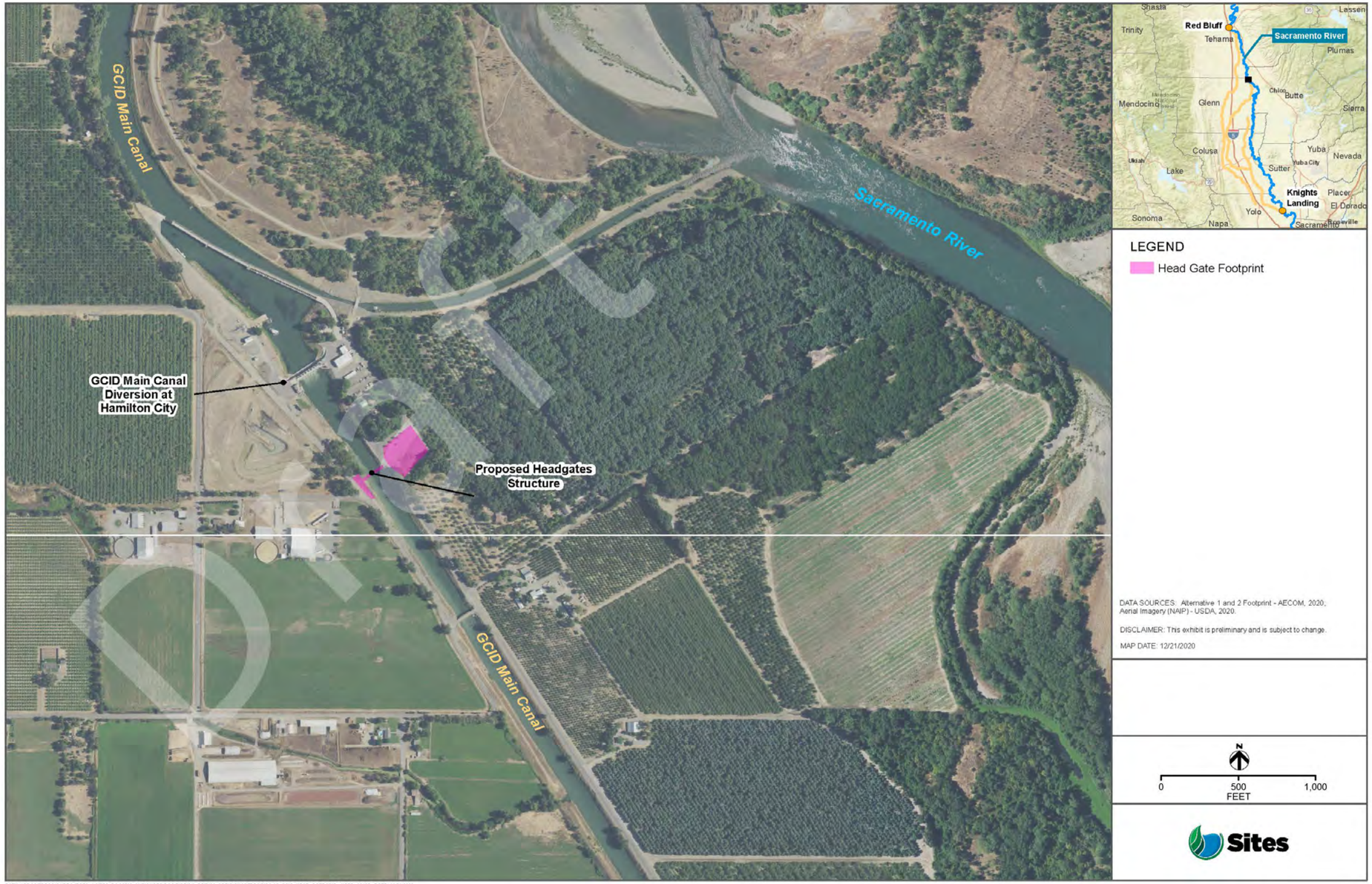


Figure 2-7. GCID Main Canal Head Gate Structure

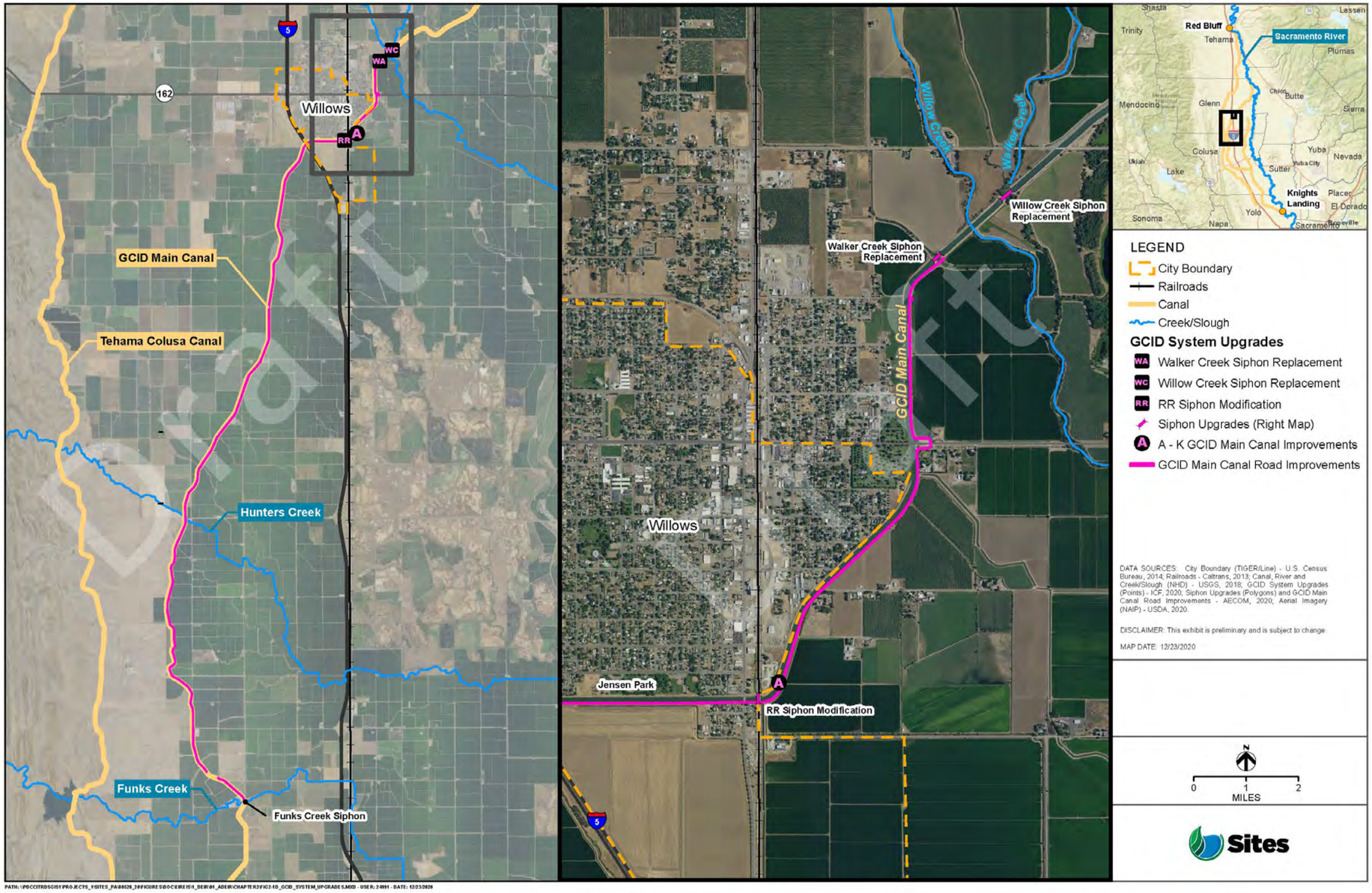


Figure 2-8. GCID System Upgrades

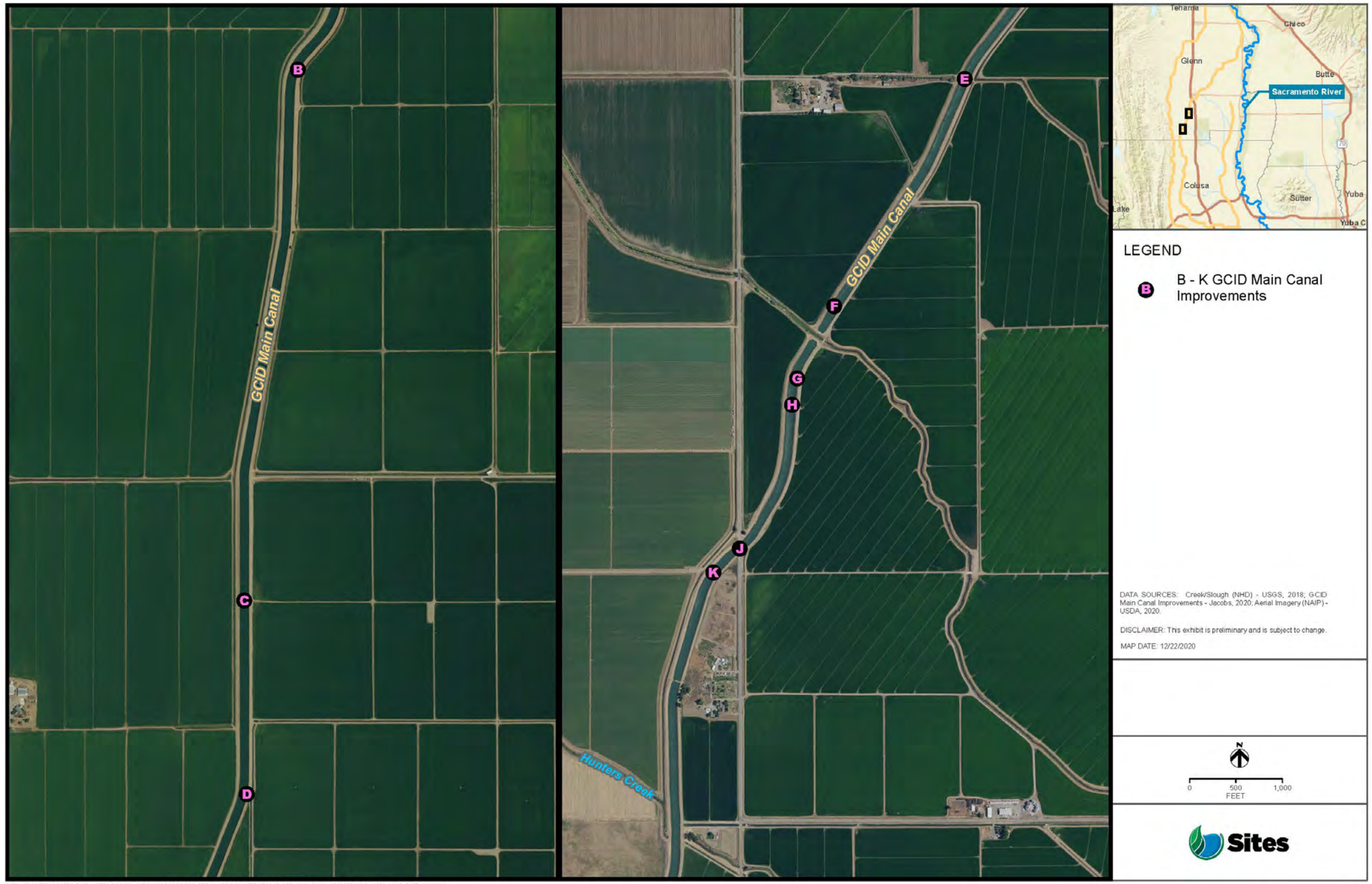


Figure 2-9. GCID System Upgrades Continued

All Action Alternatives would entail Main Canal improvements between MP 26 and MP 41.3 to increase the freeboard between Willows and the TRR to a standard 2.5 feet; under existing conditions the freeboard range is 1 to 2 feet. All Action Alternatives would also require road improvements to approximately 17 miles of left bank canal road between the existing Willow Creek siphon and the existing Funks Creek siphon to ensure an all-weather road surface (see Figure 2-8). These road improvements would primarily consist of adding approximately 6 inches of aggregate base material. GCID would manage the facility upgrades using an approach consistent with their existing management practices.

Construction of improvements along with GCID Main Canal would occur in the winter during the regular shutdown period. For the additional siphons on the Main Canal, a portion of the canal around the siphon would be dewatered using an earth coffer dam lined with geomembrane and sump pumps. Using a bore-and-jack procedure a new barrel would be installed, and new headwalls on the upstream and downstream end would be installed to approximately match the existing headwall. Construction staging areas would be in the immediate area of the improvements. The proposed upgrade of the railroad siphon would require coordination and planning with the railroad owners. Construction restrictions may exist regarding minimizing interference with regular railroad operations. To the extent possible, upgrades to the railroad siphon would take place during periods of lowest train traffic, and railroad shutdown time would be minimized.

Earthwork related to the GCID Main Canal to increase the freeboard to 2.5 feet would require a total fill of 5,000 cubic yards. There would be no excavation and only minor reshaping and addition of fill to the sides of the canal. The fill would be sourced from other project spoils and there would be no net import. Construction related to roughly 17 miles of road improvements would require approximately 27,000 cubic yards of aggregate base. It is anticipated the aggregate would be imported from a rock plant within 20 miles of the GCID Main Canal. The GCID improvements along the Main Canal and the existing road would occur within existing rights-of-way and construction would not permanently remove any existing crops.

2.5.1.2 Regulating Reservoirs and Conveyance Complex

Multiple facilities would be required to control the conveyance of water between Sites Reservoir and the TC Canal and GCID Main Canal. These facilities would include regulating reservoirs, pipelines, pumping generating plants (PGPs), switchyards, and administration and maintenance buildings. These facilities are described below.

Terminal Regulating Reservoir

Pumping from the GCID Main Canal to Sites Reservoir would require construction of the TRR facilities. There would be four primary facilities: the TRR, the TRR PGP, an electrical substation, and TRR pipelines. The TRR facilities would be located in Colusa County north of the GCID Main Canal and west of McDermott Road. The approximately 150-acre site would be accessed by an asphalt concrete paved road off McDermott Road. Paved parking would be provided near the PGP. Asphalt concrete paved roads would provide onsite vehicle access between the TRR PGP and electrical substation, with facility spacing to accommodate an operational crane. The proposed TRR PGP and electrical substation would encompass approximately 7 acres and would be enclosed with security fence with access gates on the south

and east sides. See Figure 2-10, Terminal Regulating Reservoir Facilities Site Plan, for the locations of the proposed TRR-related facilities.

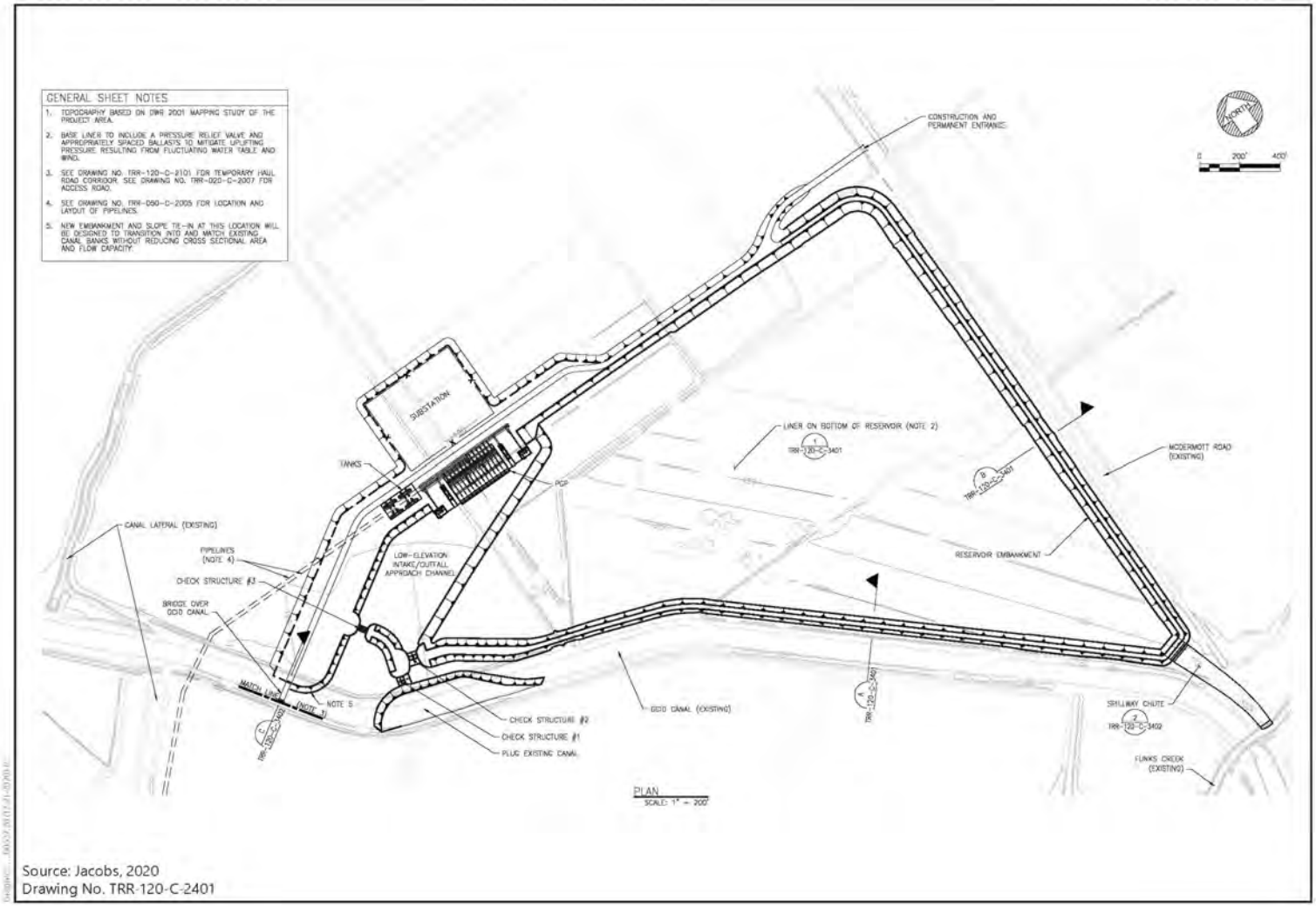
The TRR facilities are within a designated Federal Emergency Management Agency (FEMA) Special Flood Hazard Area, Zone A, Without Based Flood Elevation. Site drainage would be conveyed offsite to the existing GCID Main Canal or directly into the TRR through shallow swales or overland flow.

The new TRR would encompass approximately 100 acres immediately east of the GCID Main Canal and have a storage capacity of approximately 600 acre-feet (AF). The TRR would have earthen embankments around its perimeter and an impermeable lining consisting of a geomembrane overlying geocomposite placed over compacted earth. The TRR would be hydraulically connected to the GCID Main Canal to allow water to be conveyed to and from the Sites Reservoir. The TRR would accommodate inflows of up to 1,800 cfs. The GCID Main Canal would be the conveyance source of water for the TRR and its PGP to pump water to Sites Reservoir. The canal would also be the primary conveyance for releases of water from the TRR and its PGP from Sites Reservoir. The spillway for the TRR would be located at the southernmost corner of the reservoir and discharge into Funks Creek.

Access between the east and west sides of the GCID Main Canal adjacent to the TRR would be over a new bridge between the TRR embankment near the gate structures and the west side of the GCID Main Canal. The bridge is anticipated to consist of a pre-cast concrete span between the banks of the GCID Main Canal with concrete abutments founded on piles.

TRR Pumping Generating Plant

A TRR PGP would pump water from the TRR to Sites Reservoir; the PGP would include hydroelectric turbines to generate electricity when water was released from Sites Reservoir to the TRR. The PGP would include the following three facilities in five buildings: one pump station, two turbine generator buildings, and two energy dissipating structures (Figure 2-11, TRR Pump Generating Plant Facilities). The pumping plant would have a design capacity of 1,800 cfs, the generating plant 1,000 cfs, and the energy dissipation 1,000 cfs.



Source: Jacobs, 2020
Drawing No. TRR-120-C-2401

Figure 2-10. Terminal Regulating Reservoir Facilities Site Plan

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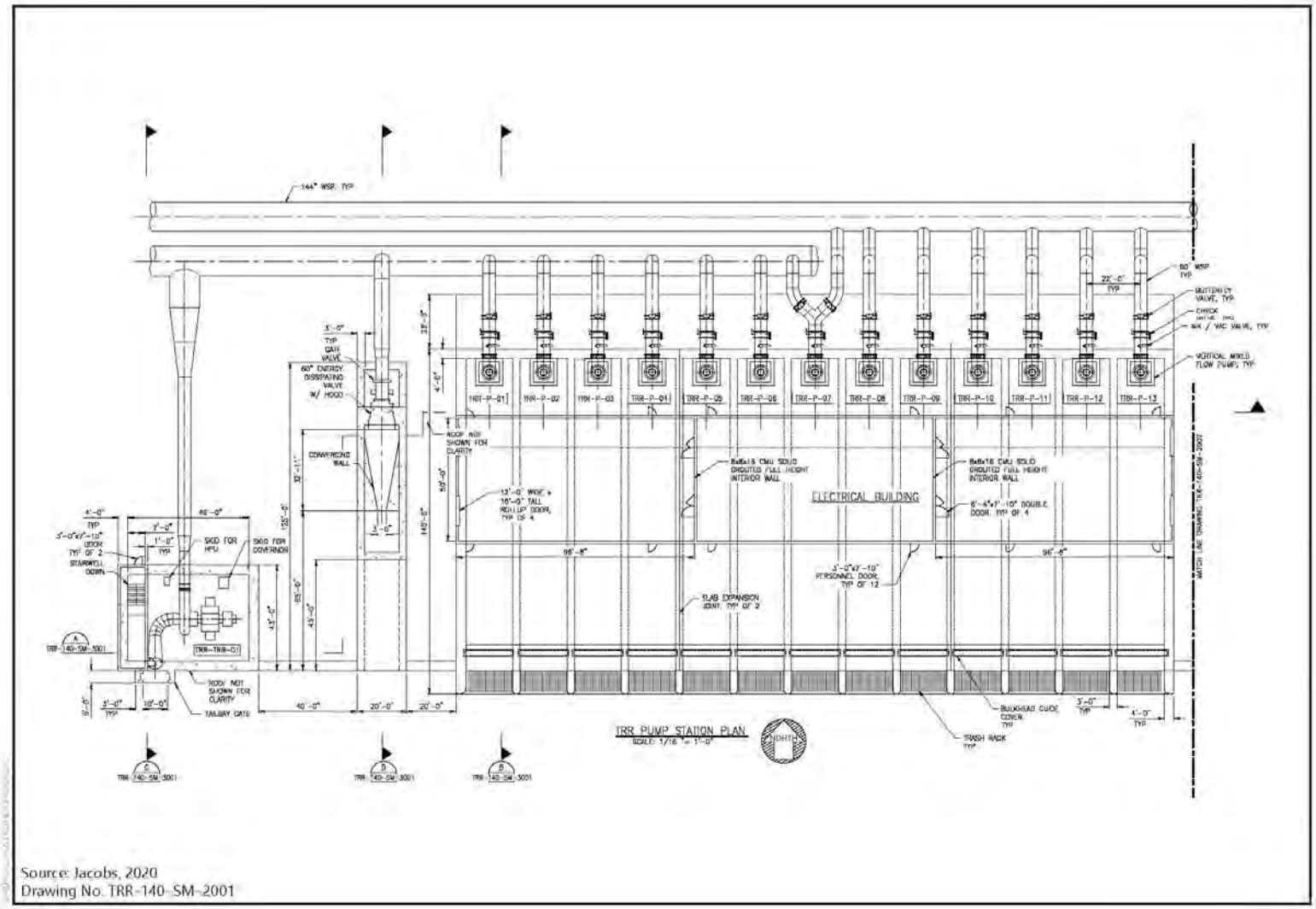


Source: Jacobs, 2020
Drawing No. TRR-140-SM-2001

Figure 2-11. TRR Pump Generating Plant Facilities

The pump station would support the pumps at the edge of the TRR and be designed to minimize pump vibration. A trashrack would be installed at the front of the wet well to exclude debris. Bulkhead slots would be provided at each wet well to allow bulkheads to be installed and isolate pump bays for maintenance. The pump station would contain 13 pumps in a single row. Six pumps each would feed into two 12-foot-diameter pipes connecting to the turbines (discussed below), and there would be a single standby pump that could feed into either pipe. It is anticipated that all pumps would have a variable frequency drive to adjust to the variable pumping heads while staying within the pump operating range and efficiency.

The two turbine generator buildings would house the turbines, generator, draft tube, associated piping appurtenances, and other electrical equipment. There would be two 13-kilowatt turbines (one for each 12-foot-diameter pipe) that would have a horizontal laying flow pattern. The turbines would discharge water into a draft tube prior to exiting into the TRR. Because the discharge would need to be submerged, the turbines would be in an underground structure with a roof. The aboveground portion of the turbine generator buildings would consist of concrete masonry unit walls.

The two energy dissipation valve structures would allow releases back to the TRR as back-up to the hydroelectric turbine facilities. These structures would each contain a stilling basin and fixed cone valve to dissipate energy before water enters the TRR. There would be a 60-inch fixed cone valve on each of the two 12-foot-diameter pipes for a total of two 60-inch fixed cone valves and a total flow of 1,000 cfs.

TRR Electrical Substation

The TRR PGP would require a substation to provide electricity to the associated facilities described above. The electrical substation would connect to existing Pacific Gas and Electric Company (PG&E) or Western Area Power Administration (WAPA) lines. The facility would be constructed on approximately 1.5 acres within the TRR PGP footprint to the north of the TRR. The dimensions of the electrical substation would depend on whether it is connected with PG&E or WAPA lines. The substation would be approximately 460 feet long by 300 feet wide if connected to PG&E lines and be 300 feet long by 240 feet wide if connected to WAPA lines. Figure 2-12, TRR Electrical Substation, provides a plan view of the facility.

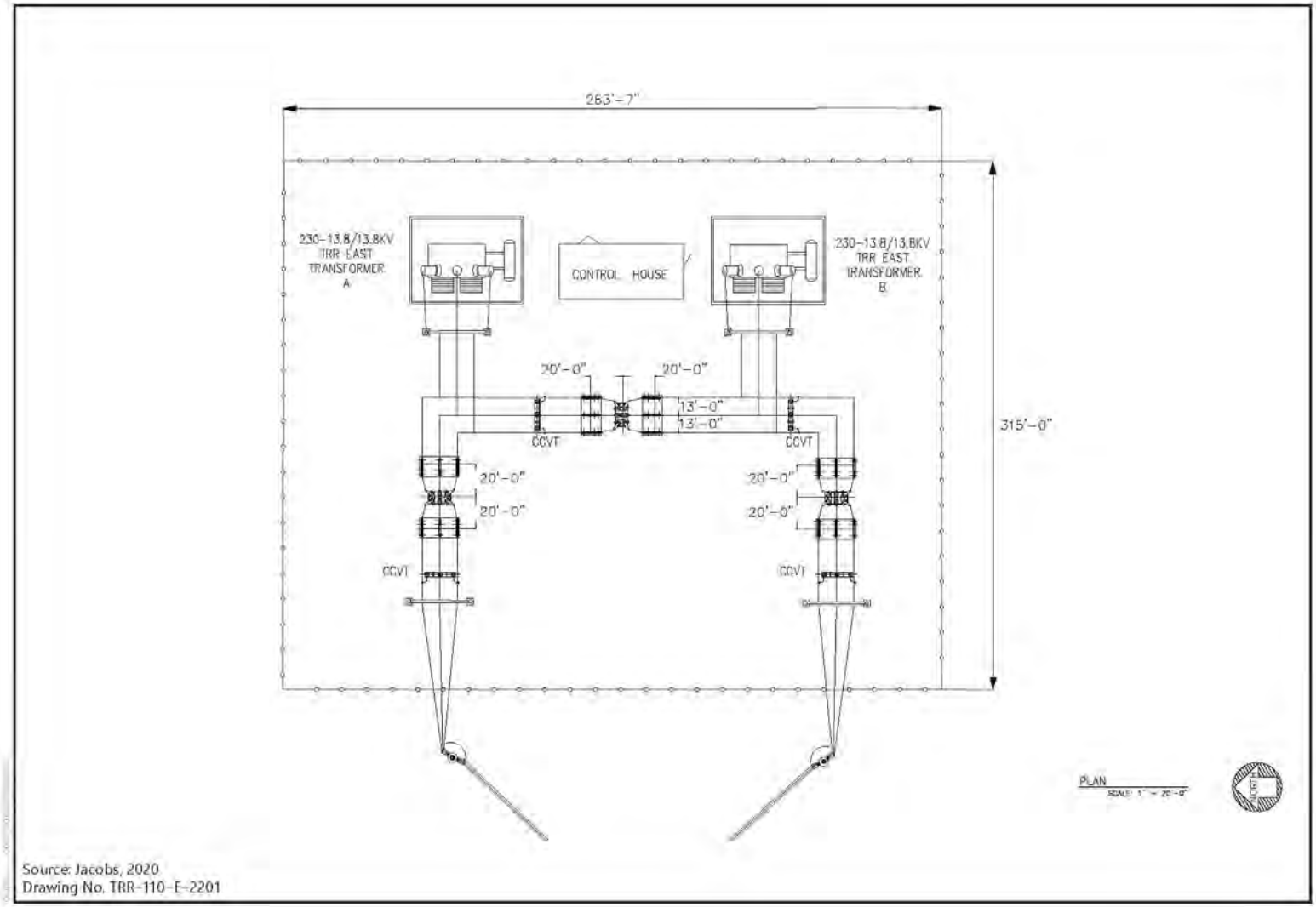


Figure 2-12. TRR Electrical Substation

The electrical substation would use electrical equipment that meets the standards of the National Electrical Manufacturers Association, American National Standards Institute, and Institution of Electrical and Electronics Engineers. Additionally, equipment that is listed or labeled as meeting the safety standards or ratings identified by Underwriter Laboratories or a nationally recognized testing laboratory would also be used. The substation design would include primary safety equipment (e.g., circuit breakers, utility-grade relays) and meet the total pumping power requirements or total generation requirements. For more information regarding the pumping power requirements or total generation requirements, please see Section 2.5.2.2, *Energy Generation and Energy Use*. The substation would have sufficient redundancy such that the failure of any one component would permit the substation to be safely and reliably isolated from the transmission system under fault conditions.

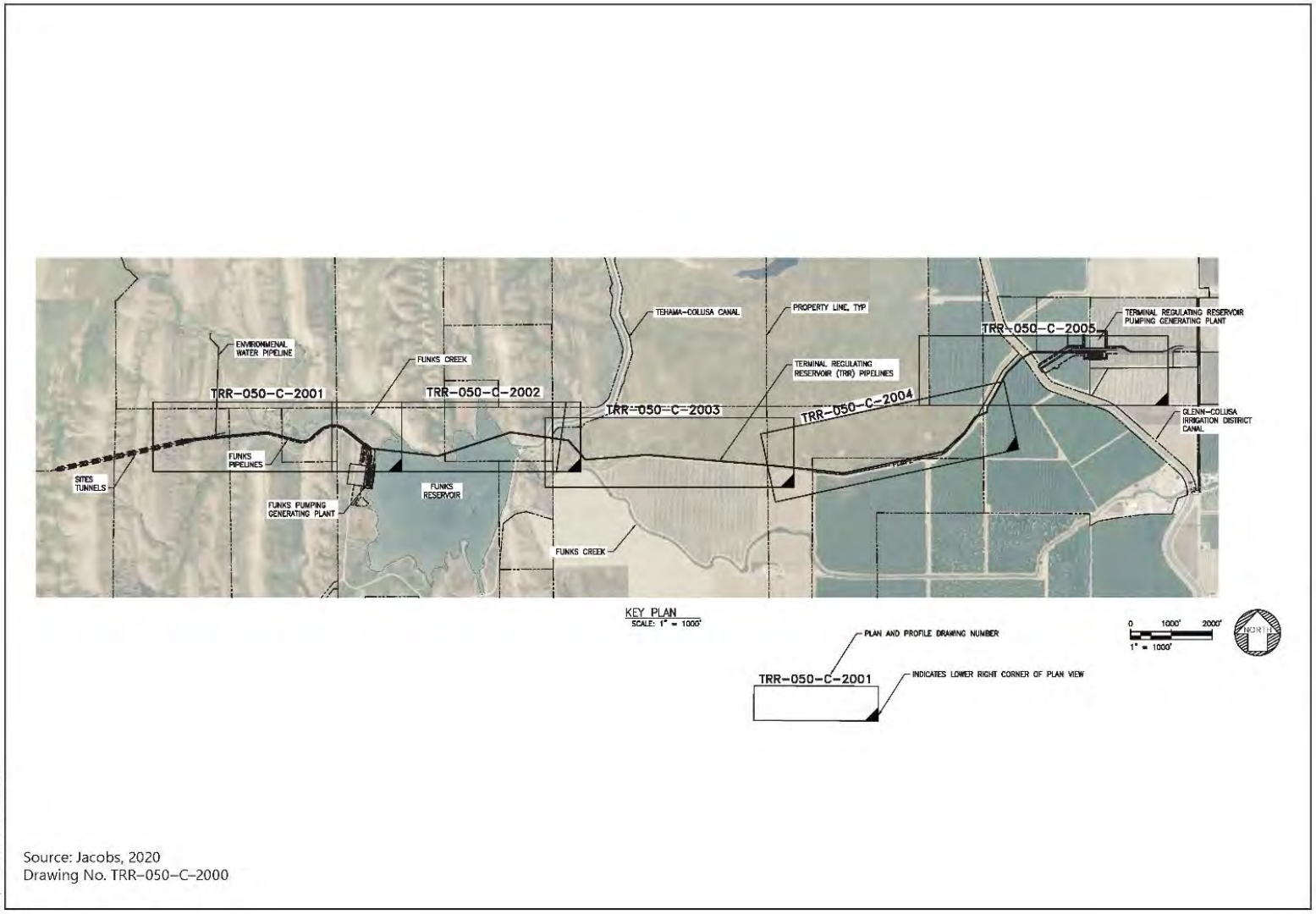
TRR Pipelines

Two underground TRR pipelines would convey water approximately 4.5 miles between the TRR PGP and Sites Reservoir. See Figure 2-13, TRR Pipelines, for the location and alignment route of the pipelines. The 12-foot-diameter pipes would extend from the TRR PGP, under Funks Reservoir, and terminate at the transition manifold south of Funks Creek near the Golden Gate Dam. Both TRR pipelines would connect to one of the two side-by-side, 23-foot-inside diameter I/O tunnels at the transition manifold.

The pipelines would parallel the Funks pipelines and Funks Creek and would generally be from 6 feet to 30 feet below ground surface after installation (does not include depth below ground surface where tunneling occurs, which could be up to 100 feet). Trenching for pipelines would include the use of excavators and would be excavated to meet all applicable requirements. Between the TRR and Funks Reservoir, the pipelines would cross the TC Canal using a trenchless method or open cut, depending on construction schedule. East of the TC Canal, the TRR pipelines would run parallel to a drainage canal until they reached the GCID Main Canal where they would cross using a trenchless method or open cut, depending on construction schedule.

Funks Reservoir

The existing Funks Reservoir would be used to store and pump water from the TC Canal to and from Sites Reservoir. Excavation of existing accumulated sediment from Funks Reservoir would be required, as would the construction of three facilities: Funks PGP, an electrical substation, and Funks pipelines. These facilities would be constructed in Colusa County, west of the TC Canal, on approximately 7 acres. The overall site would be enclosed by a security fence with access gates on the south and northwest sides. See Figure 2-14, Funks Reservoir Facilities Site Plan, for the location of the facilities.



Source: Jacobs, 2020
Drawing No. TRR-050-C-2000

Figure 2-13. TRR Pipelines

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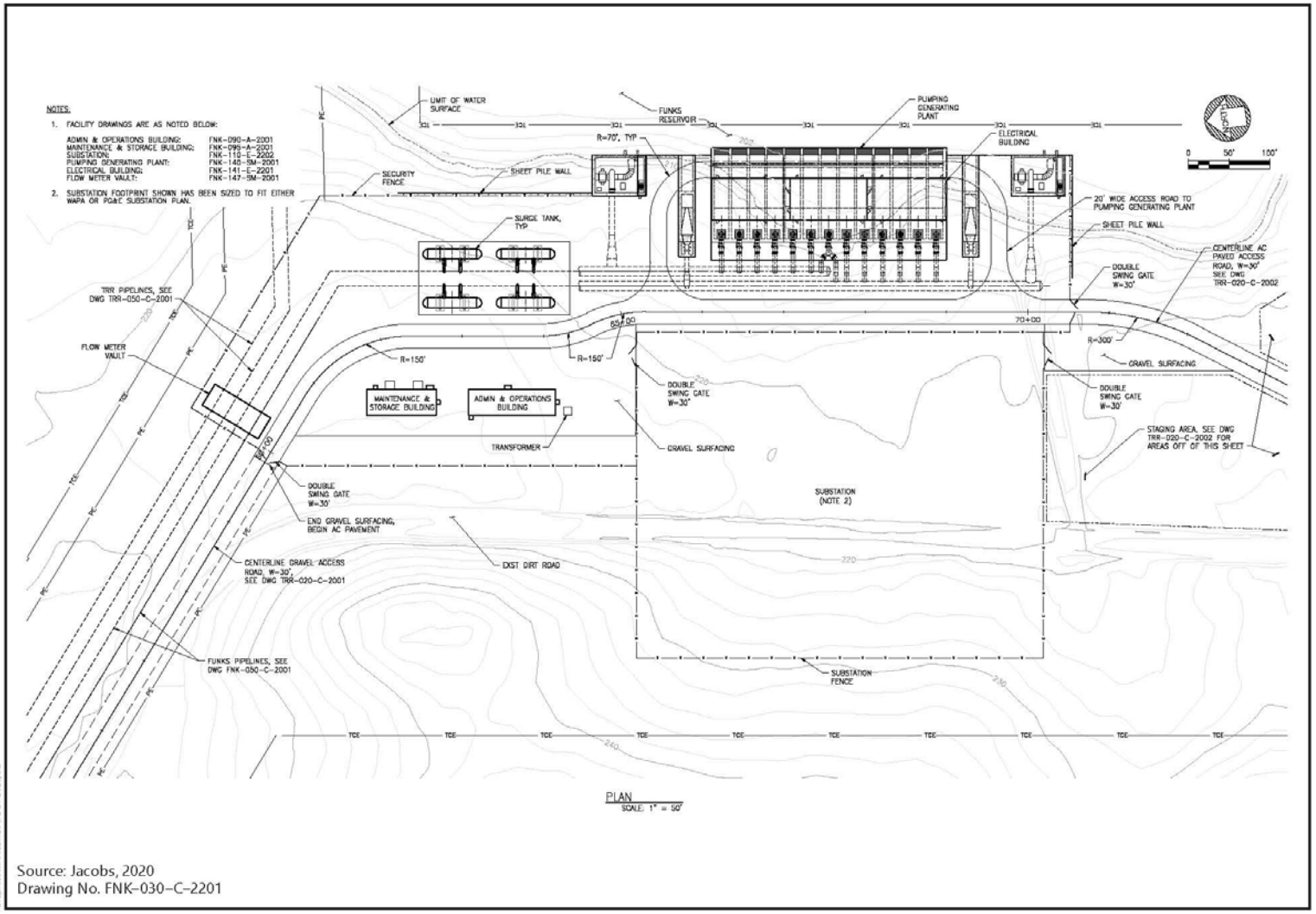

Source: Jacobs, 2020
Drawing No. FNK-030-C-2201

Figure 2-14. Funks Reservoir Facilities Site Plan

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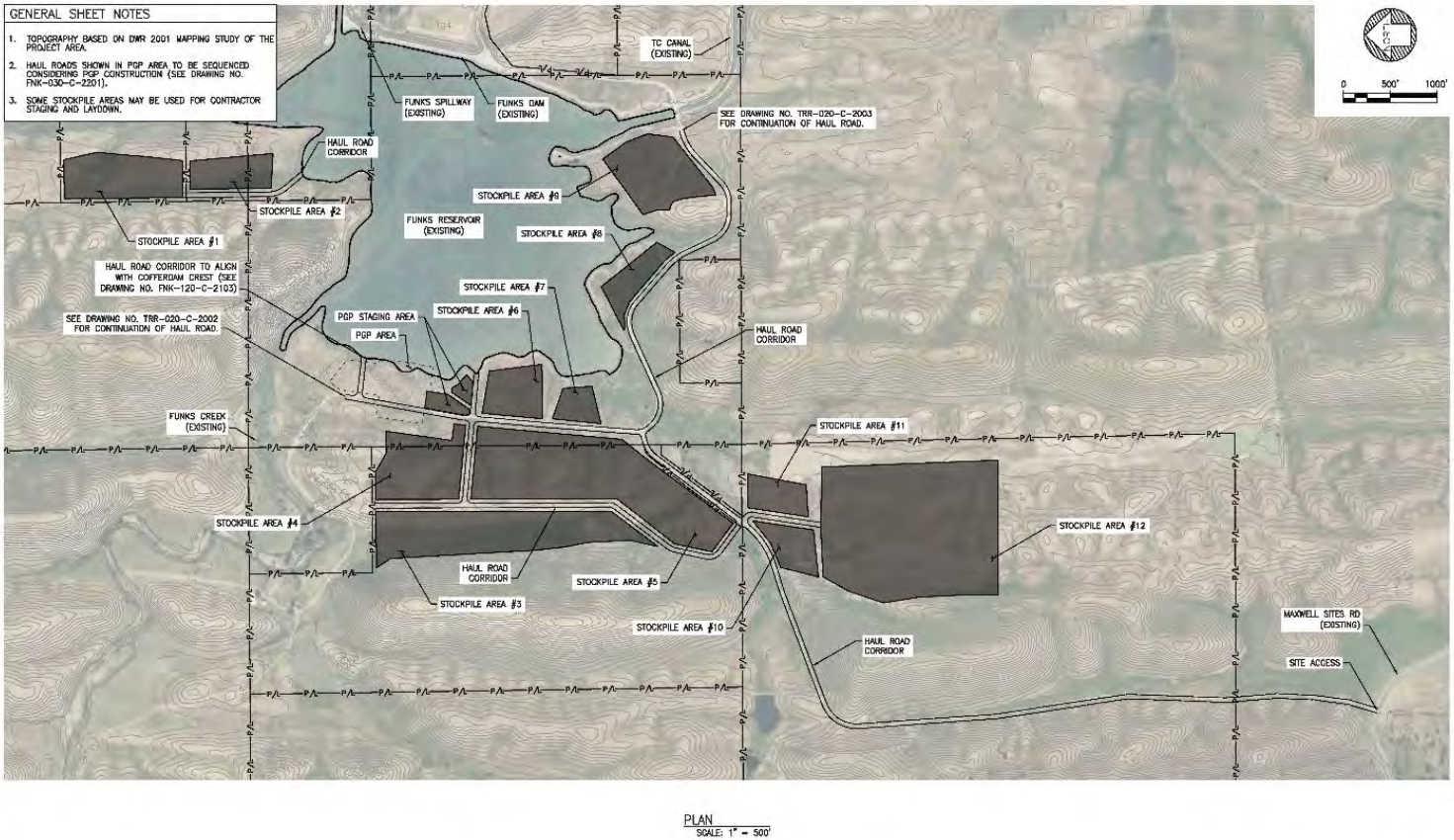
Access to the Funks Reservoir-related facilities would be provided at the north and south ends of the site. A gravel parking area would be provided near the PGP. Asphalt concrete paved, onsite vehicular access would be provided between the Funks PGP and electrical substation, with facility spacing to accommodate an operational crane. The facilities site would be accessed by an asphalt concrete paved road from Maxwell Sites Road to the south. Existing gravel roads would be improved to be 30 feet wide, with asphalt concrete surfacing for the southern access route, and would be relocated through the site. A gravel bypass road may be provided to the west of the site. On the north side of the facilities site, the existing dirt road would be improved to be a gravel road that would follow the existing road alignment until it reaches the TRR pipeline. At that location, a new access road would be built along the Funks and TRR pipelines to the connection with the I/O tunnels.

The proposed location of the Funks Reservoir-related facilities is in a FEMA Area of Minimal Flood Hazard, Zone X. Onsite drainage would be conveyed offsite directly into Funks Reservoir through shallow swales or overland flow. Offsite stormwater runoff would be collected on the west side of the site in a ditch, conveyed around the site, and deposited into Funks Reservoir.

The existing Funks Reservoir would be used as a source of water to pump to Sites Reservoir and would receive water discharged from the reservoir. The Funks Reservoir operational WSE can only vary slightly from the TC Canal and the reservoir WSE typically ranges from 200 to 205 feet, although the preferred operational WSE range is 202 to 204 feet.

All Action Alternatives would not alter the footprint of Funks Reservoir; however, 740,000 cubic yards of sediment that has accumulated since originally constructed would be excavated from the reservoir. The excavation is anticipated to restore the original capacity of Funks Reservoir. Excavation would proceed to an elevation of approximately 197 feet in the reservoir and 185.5 feet near the Funks PGP on the western side. The bottom of Funks Reservoir would be reshaped to allow large, unimpeded flows to and from the Funks PGP. The excavated sediment would be deposited adjacent to Funks Reservoir as shown on Figure 2-15. For the purposes of this analysis, the sediment is assumed to remain near Funks Reservoir.



Source: Jacobs, 2020
Drawing No. FNK-120-C-2101

Figure 2-15. Funks Reservoir Stockpile and Haul Route Plan

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Funks Pumping Generating Plant

The Funks PGP would be used to pump water from Funks Reservoir to Sites Reservoir. The PGP would be constructed on the northwest side of Funks Reservoir. The PGP would include the following three facilities in five buildings: one pump station, two turbine generator buildings, and two energy dissipating structures. An electrical building would also be constructed behind the pumps as part of the pump station. See Figure 2-16, Funks Pump Generating Plant Facilities.

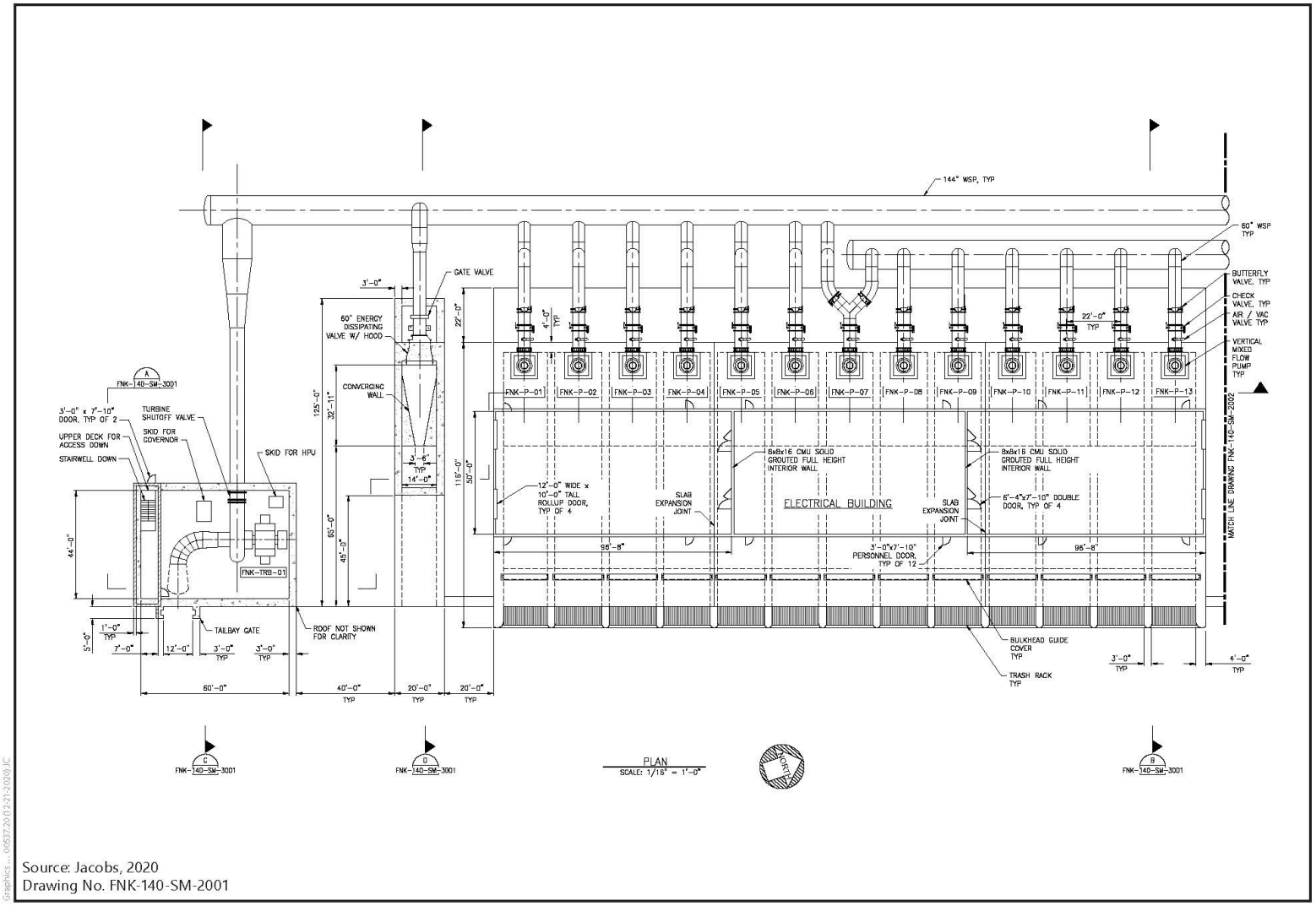
The Funks pump station would be similar to the TRR pump station, except that the orientation of 12-foot-diameter pipelines would be different. The pump station would have a flow rate of 2,100 cfs. The turbine generator buildings would be the same as described for the TRR PGP, and each generator would have a design criterion of 1,000 cfs for redundancy. There would be two turbines, 20-megwatt and 14.5megawatt. Each of the two energy dissipation structures would consist of a single 60-inch fixed cone valve with a design criterion of 1,000 cfs. There would be a 60-inch fixed cone valve on each of the two 12-foot-diameter pipes for a total of two fixed cone valves and a total flow of 2,000 cfs (1,000 cfs each).

Funks Electrical Substation

As with the TRR PGP, the Funks PGP would require a substation to provide electricity to the Funks PGP facilities. This substation would connect to either existing WAPA or PG&E lines. The substation would be located west of Funks Reservoir in the footprint of the Funks PGP and would encompass approximately 3 acres. The Funks electrical substation would be similar to the TRR electrical substation; it would be approximately 460 feet long by 300 feet wide if connected to PG&E lines and would be 300 feet long by 240 feet wide if connected to WAPA lines. There is no difference between the Funks substation and the TRR substation. The substation would be designed to accommodate the total pumping power requirements (import) or total generation requirements (export).

Funks Pipelines

Two underground Funks pipelines would convey water approximately 1 mile between the Funks PGP and Sites Reservoir. See Figure 2-17, Conveyance Complex Pipelines, for the location and alignment route of the pipelines. The 12-foot-diameter pipes would extend from the Funks Reservoir and Funks PGP and terminate at the transition manifold south of Funks Creek near the Golden Gate Dam. The Funks pipelines generally run parallel to the TRR pipelines. After curving around Funks Creek and hilly areas, the Funks pipelines run south, deviating from the TRR pipeline alignment, to the Funks PGP. Both TRR pipelines would connect to one of the two side-by-side, 23-foot-diameter I/O tunnels at the transition manifold. After installation, the pipelines would generally be from 6 feet to 25 feet below ground surface.



Source: Jacobs, 2020
Drawing No. FNK-140-SM-2001

Figure 2-16. Funks Pump Generating Plant Facilities

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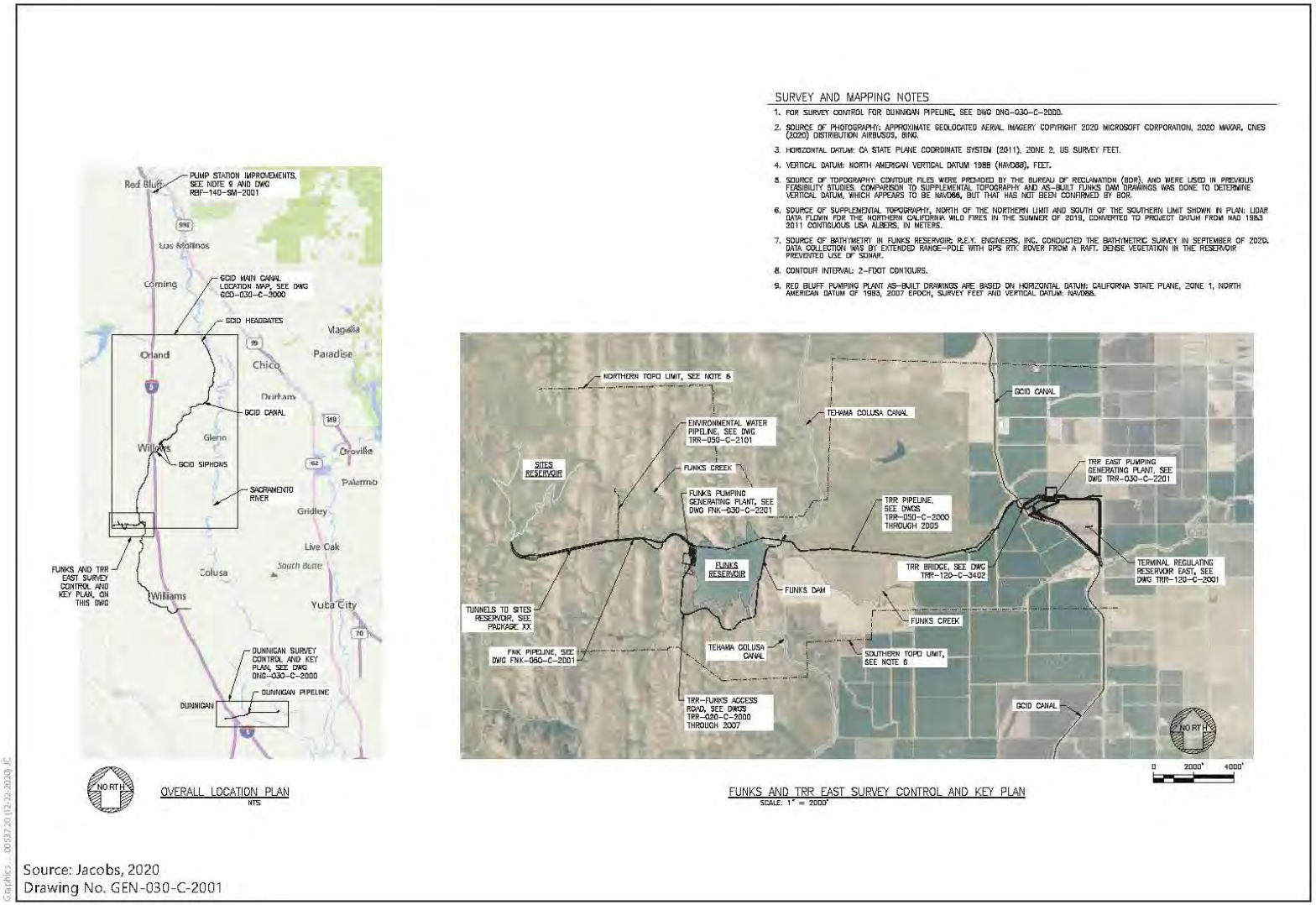

Figure 2-17. Conveyance Complex Pipelines

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Transition Manifold

The transition manifold would be constructed at the base of Golden Gate Dam to connect Sites Reservoir to Funks Reservoir and the TRR. The transition manifold would be installed approximately 6 feet below ground and would be approximately 114 feet long by 92 feet wide. The structure would connect the four 12-foot-diameter conveyance pipelines from Funks Reservoir and TRR to two 23-foot-diameter tunnels extending from the Sites Reservoir Inlet/Outlet Works (I/O Works), which are discussed in Section 2.5.1.4, *Sites Reservoir and Related Facilities*. The transition manifold would have isolation valves to close off the pipelines and allow for maintenance.

In addition to the transition manifold structure, a 12-inch-diameter underground pipeline would extend 2,800 feet north from the manifold to Funks Creek, where it would discharge via an energy-dissipation structure/outlet into the creek. The pressure-reducing valve to dissipate energy before the water is discharged into Funks Creek is necessary because the water pressure would be equal to the Sites Reservoir elevation. The pipeline would be sized to accommodate a range of discharges (zero to 100 cfs) to provide water for the approximately 1.8-mile stretch of Funks Creek below Golden Gate Dam to Funks Reservoir.

Construction of the Transition Manifold would happen after the I/O Tunnels are constructed. Construction means and methods would be similar to that of the TRR Pipelines and Funks Pipelines.

Electrical Transmission Connections

New high-voltage transmission lines would be required to provide power to the Funks and TRR PGPs. Transmission lines connecting Funks and TRR substations would also be required. Interconnecting to the existing transmission system would be necessary to provide the electricity needed to operate the large pumps at the TRR and Funks Reservoir. This interconnection would also enable the energy produced at the Funks and TRR PGPs to enter the transmission system during periods of operation that use their respective turbines/generators.

The general laydown areas and construction means and methods of the three substations and high voltage transmission lines that connect either PG&E or WAPA facilities to Sites facilities are provided in Appendix 2C.

North-South Transmission Connections

A new north-south transmission line originating between Funks Reservoir and TRR would connect to WAPA or PG&E existing facilities. Two 230-kilovolt (kV) lines owned and operated by WAPA are located north of Funks Reservoir, and four 230-kV lines owned and operated by PG&E are located west and north of the TRR. WAPA and PG&E are defined as the Transmission Owner and the Transmission Operator of their respective high-voltage transmission lines. Each of these lines is a potential point of interconnection (POI) location; a POI to a high-voltage electric transmission line would be required to provide power. See Figure 2-18, WAPA Schematic Sketch, and Figure 2-19, PG&E Schematic Sketch, for a schematic sketch showing the WAPA and PG&E alternative POI arrangements and the required transmission line lengths to the Funks and TRR electrical substations. The POI would require a

third substation, which is expected to be located adjacent to either the WAPA lines or the PG&E 230-kV lines.

The POI between the electrical substations and existing transmission lines would require that an application for interconnection request be submitted and processed under the California Independent System Operator (CalISO) interconnection process. The location of the POI to the WAPA or PG&E 230-kV transmission lines would depend on the results of a system impact study completed by WAPA or PG&E in conjunction with CalISO.

East-West Transmission Lines

There would also be an interconnection between the Funks and TRR PGPs, and it is anticipated that the transmission lines would parallel the pipelines within the same easement. Up to four 230-kV transmission lines would be required: two for the source supply to either of the PGPs and two between the Funks and TRR electrical substations. The two looped source circuits would be installed on a set of common double-circuit steel monopole structures and would require separate easements because they would not parallel any of the proposed pipelines (Figure 2-20, Double-Circuit Source Transmission Poles). The two transmission lines between the Funks and TRR electrical substations would be installed on their own common set of double circuit steel monopole structures within the pipeline easement (Figure 2-21, Funks to TRR Electrical Interconnection).

2.5.1.3 Administration, Operations and Maintenance, and Storage Buildings

All Action Alternatives would involve the construction of an administration and operations building and a maintenance and storage building. These buildings would be located along the existing gravel access road to the Funks PGP on approximately 0.15 acre. The administration and operations building would be a one-story building encompassing approximately 3,400 square feet. The maintenance building would be a one-story building encompassing roughly 2,700 square feet that would include space for equipment storage and maintenance rooms to support the Project facilities.

The utilities that would be required for these buildings would be a septic system at least 100 feet away from Funks Reservoir and Funks Creek (per county code), potable water provided via groundwater wells, and electricity obtained from the Funks Reservoir switchyard. The building designs would be in accordance with the California Building Code and would provide asphalt concrete paved onsite parking and vehicular access. See Figure 2-22, Administration and Operations Building, and Figure 2-23, Maintenance and Storage Building, for the plan view and elevation view of these two buildings.

Construction of the proposed buildings would include the following: clearing and grading; transporting materials and placing them at staging areas; constructing ancillary facilities (e.g., potable water source, septic system, lighting, concrete pad for refueling island, aboveground fuel tanks, perimeter fencing); and performing site restoration after construction is complete.

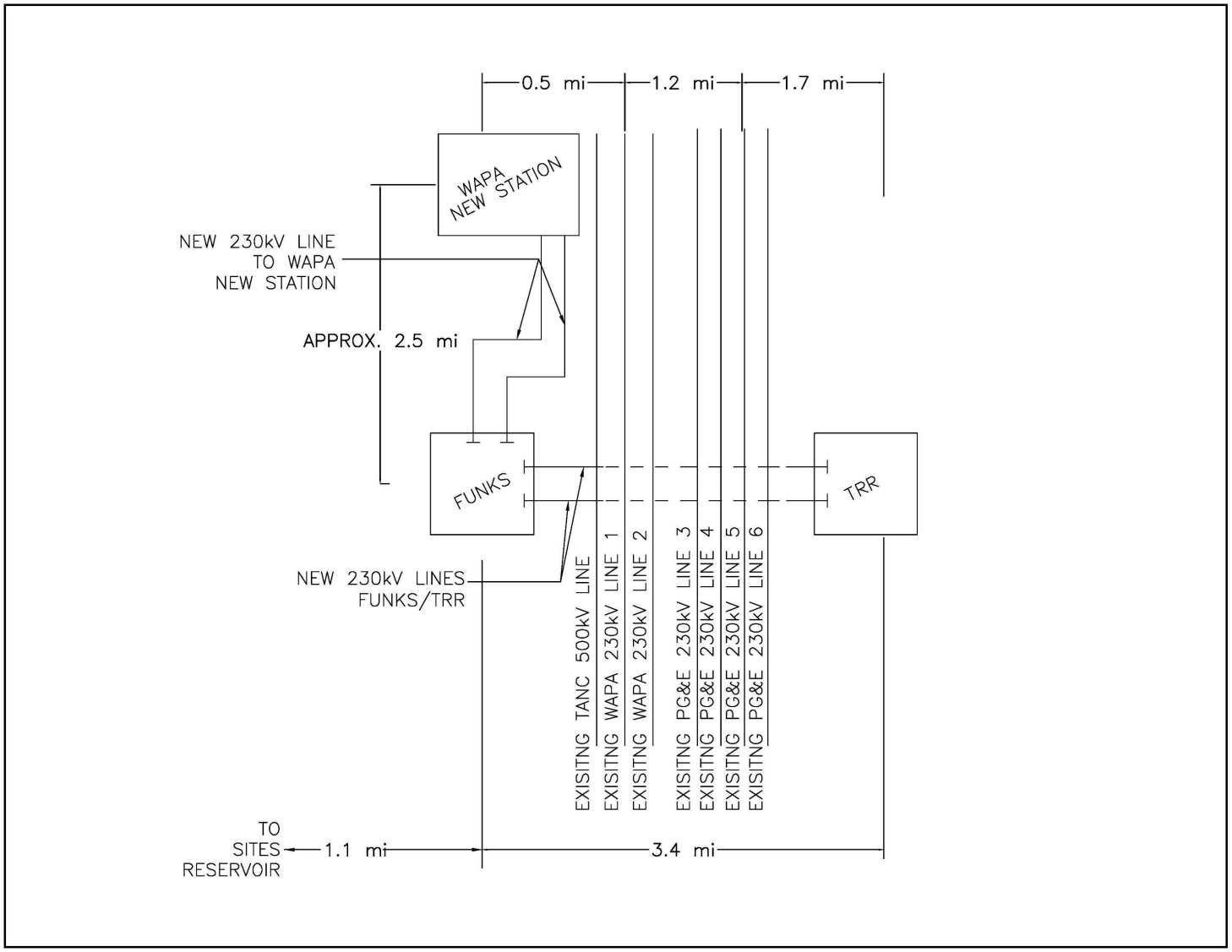


Figure 2-18. WAPA Schematic Sketch

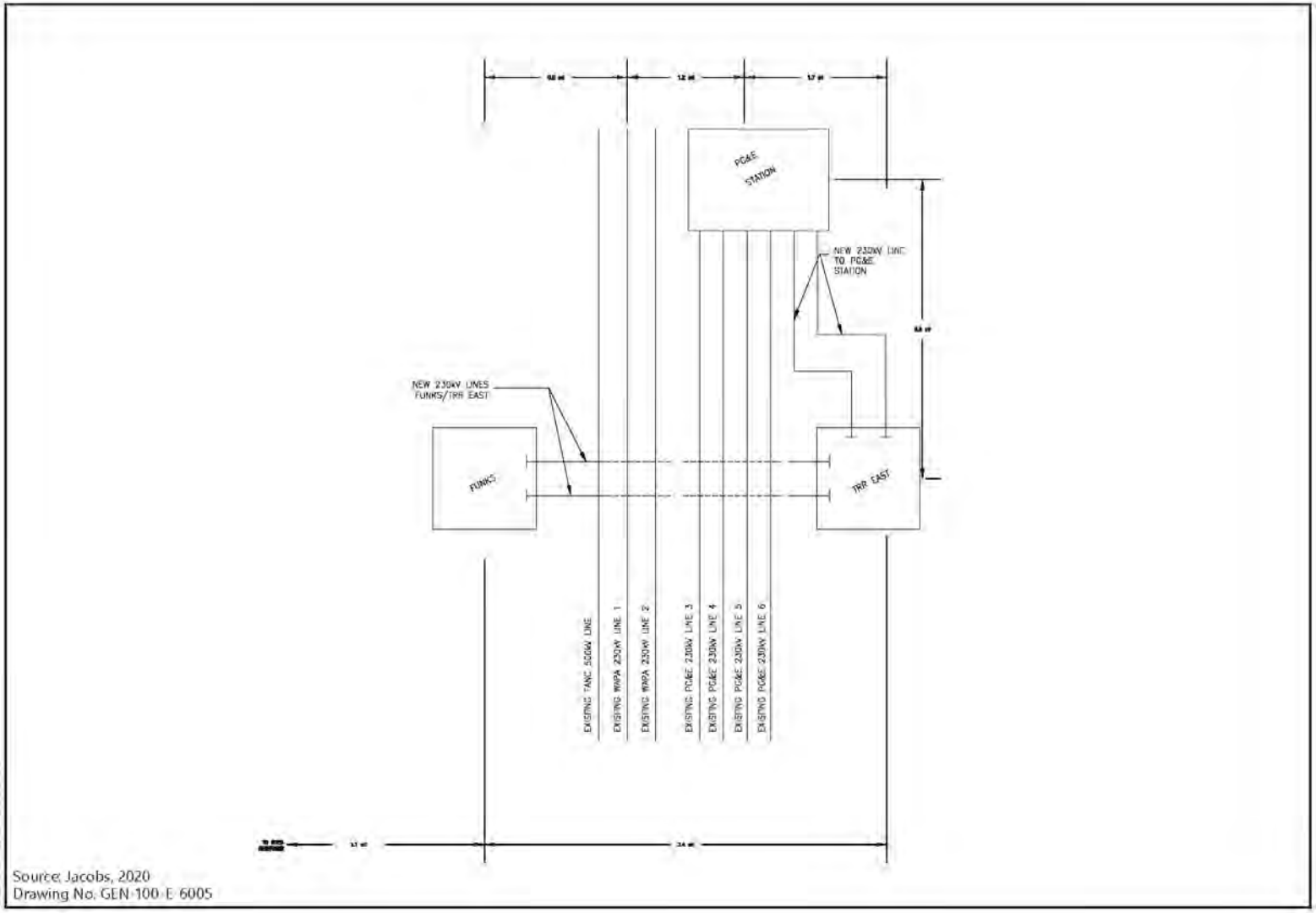
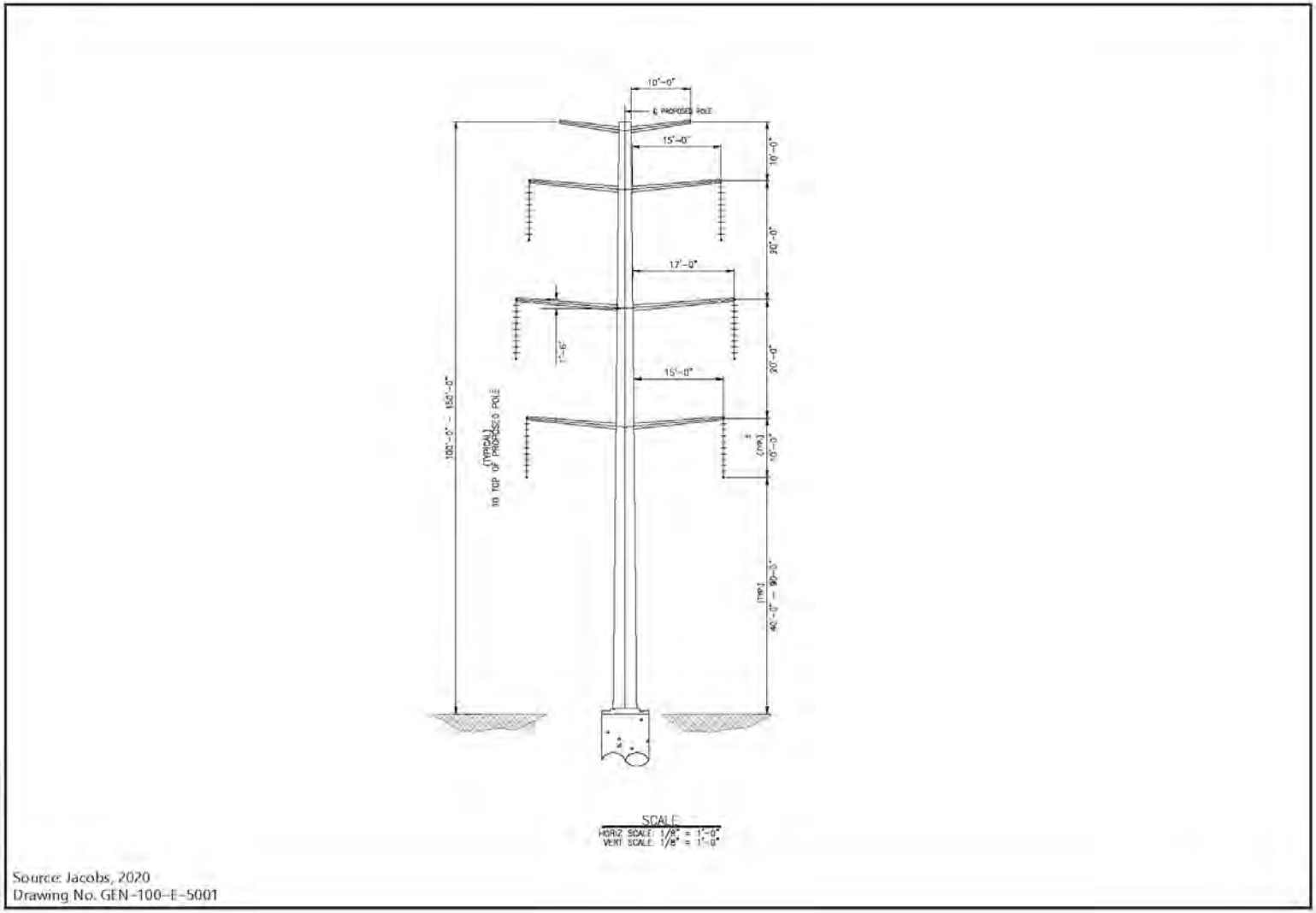


Figure 2-19. PG&E Schematic Sketch



Source: Jacobs, 2020
Drawing No. GEN-100-E-5001

Figure 2-20. Double-Circuit Source Transmission Poles

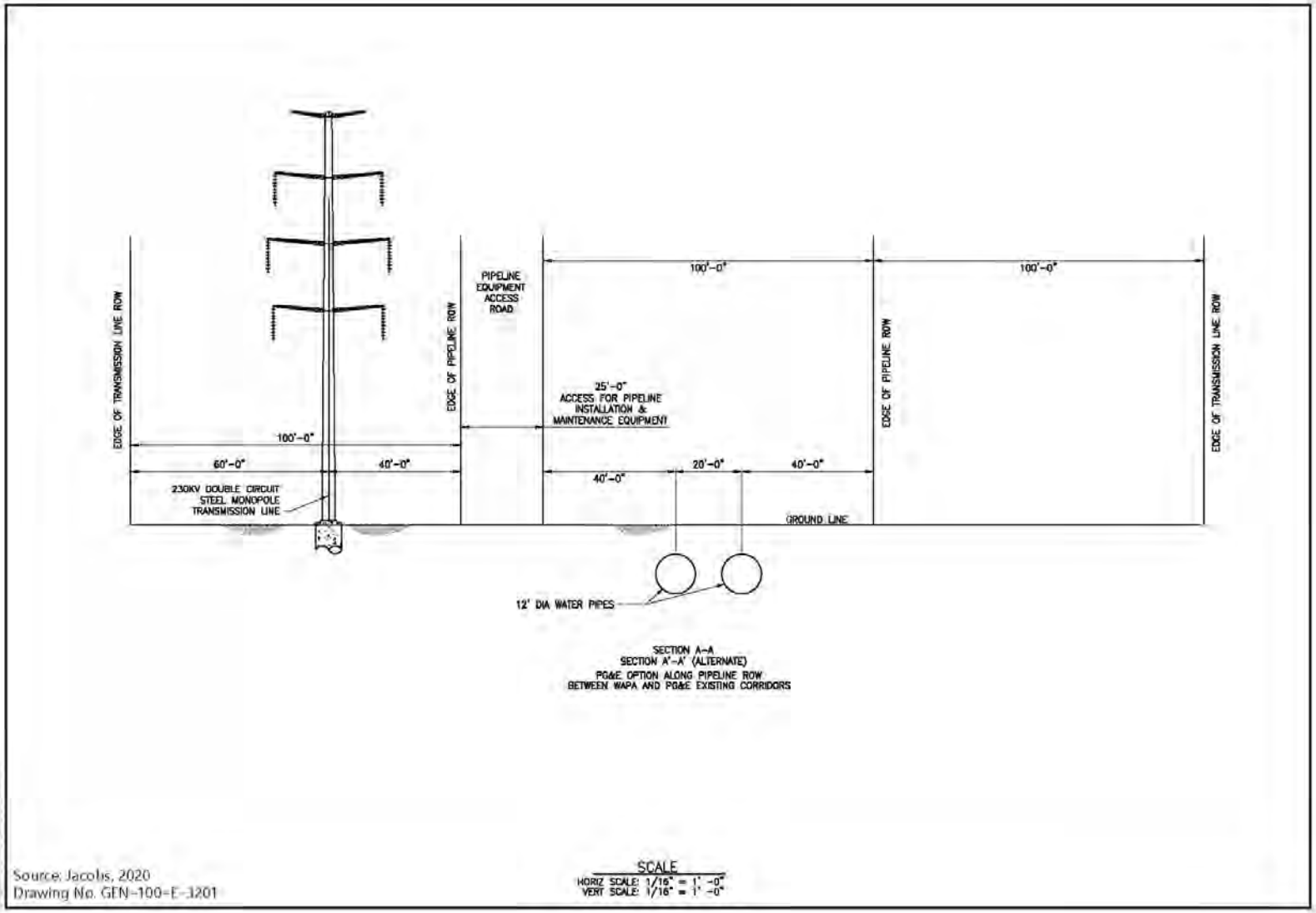


Figure 2-21. Funks to TRR Electrical Interconnection

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2.5.1.4 Sites Reservoir and Related Facilities

Under all Action Alternatives, water would be impounded by the Golden Gate Dam on Funks Creek and the Sites Dam on Stone Corral Creek; a series of saddle dams along the eastern and northern rims of reservoir would close off topographic saddles in the surrounding ridges to form Sites Reservoir. See Figure 2-1 and Figure 2-3 for the location of the Sites Reservoir, Golden Gate Dam, saddle dams, and I/O Works.

Inlet/Outlet Works

The I/O Works for the reservoir are generally located to the south of Golden Gate Dam in Sites Reservoir. See Figure 2-24 (plan) and Figure 2-25 (profile), Inlet/Outlet Works Site, for a plan and profile view of the I/O Works. The I/O Works consists of a low-level intake, multi-level I/O tower, and two I/O tunnels. These structures are described in the subsections below, and Appendix 2C provides the engineering schematics for each structure.

The I/O Works would be designed to meet maximum water supply commitments, as well as safely pass emergency releases per DSOD requirements. The I/O Works would allow a maximum release of 16,000 cfs; the parallel I/O tunnels are designed to each convey half of the emergency drawdown flows (anticipated to be approximately 8,000 cfs each). The I/O Works would meet summer irrigation demands downstream with an estimated maximum release flow of 3,100 cfs. The I/O Works would also allow inflows pumped into the reservoir from the canals; the maximum inflows are anticipated to be 3,900 cfs.

Construction of the I/O Works would disturb approximately 30 acres in the reservoir inundation area and a similarly sized area at the downstream tunnel portal. The construction disturbance would consist of the footprint of the two intakes; tunnel portals; materials, spoils, and equipment staging areas; and access roads. A portion of the footprint outside the reservoir inundation area would overlap with the disturbance area for the conveyance system. Major construction activities associated with the I/O Works would consist of dewatering the construction site with an onsite treatment facility, excavating the hillside for the downstream and upstream tunnel portals, tunneling and hauling tunnel muck to a disposal area, using spoils from the tunnels for Golden Gate Dam or disposing of them in the reservoir inundation area, excavating for the multi-level tower shaft, building the multi-level tower, constructing the access bridge to the multi-level tower, building the low-level intake, and completing finished grading and site clean-up.

The construction of the tunnels that connect the Sites Reservoir to the Funks and TRR pipelines would require excavating the tunnel, installing the tunnel support systems, and controlling groundwater. The I/O tunnels would be constructed using a combination of drill and blast and road header excavation, depending on the strength of the rock, and pre-excavation measures would be used to stabilize the ground and reduce groundwater inflow. As construction proceeded, support systems would be installed and then the reinforced cast-in-place concrete tunnels and steel carrier pipe would be installed.

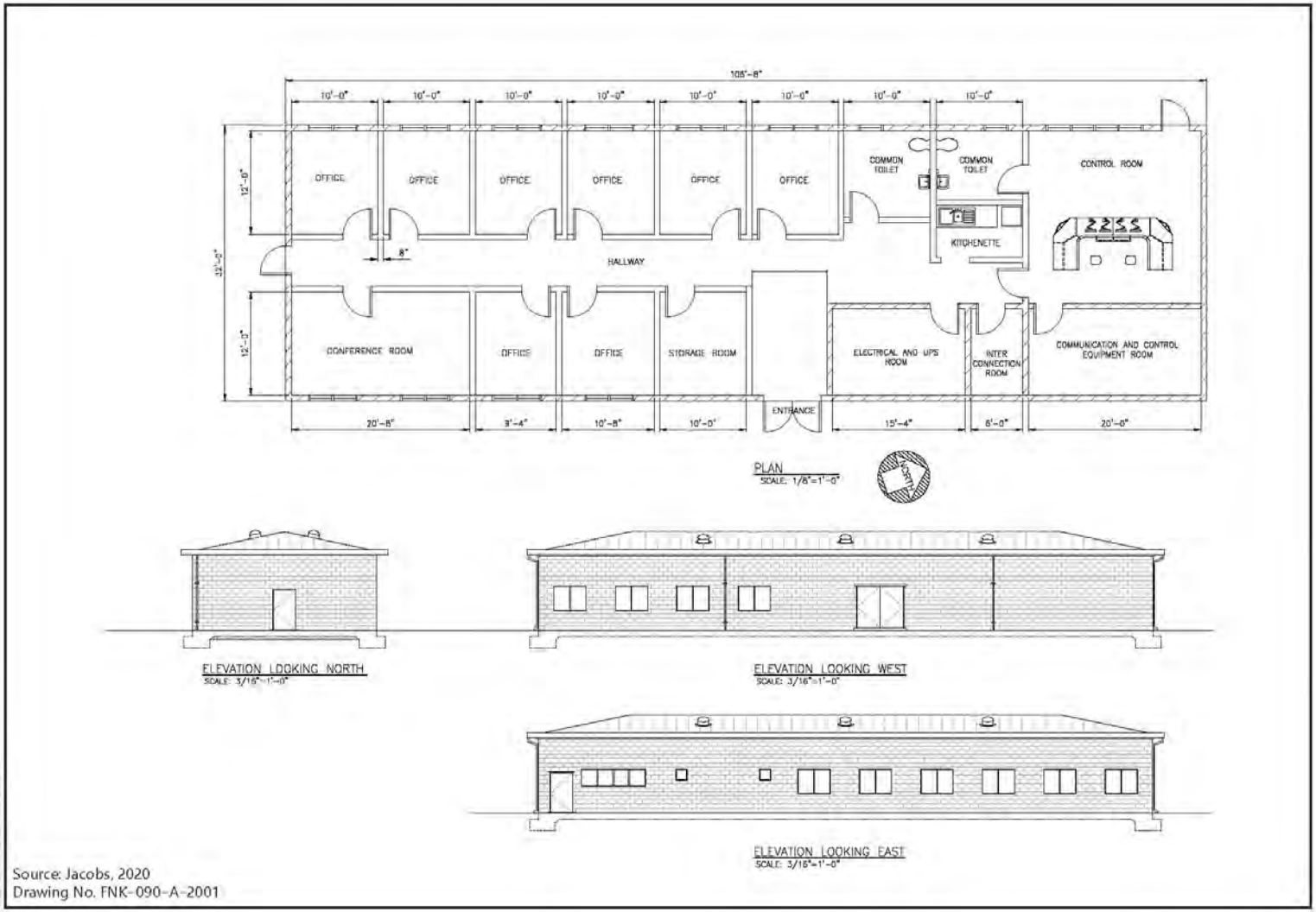
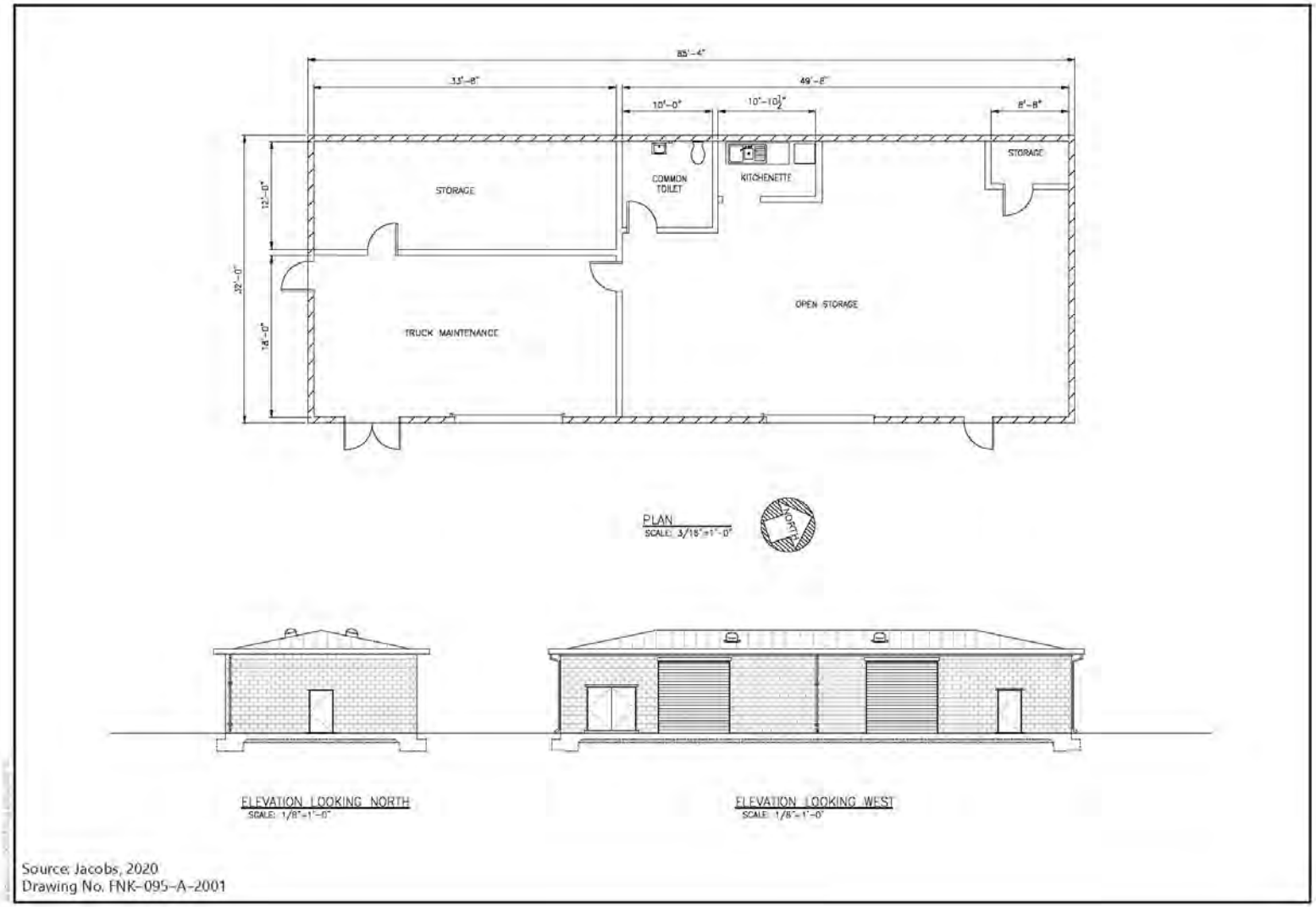


Figure 2-22. Administration and Operations Building



Source: Jacobs, 2020
Drawing No. FNK-095-A-2001

Figure 2-23. Maintenance and Storage Building

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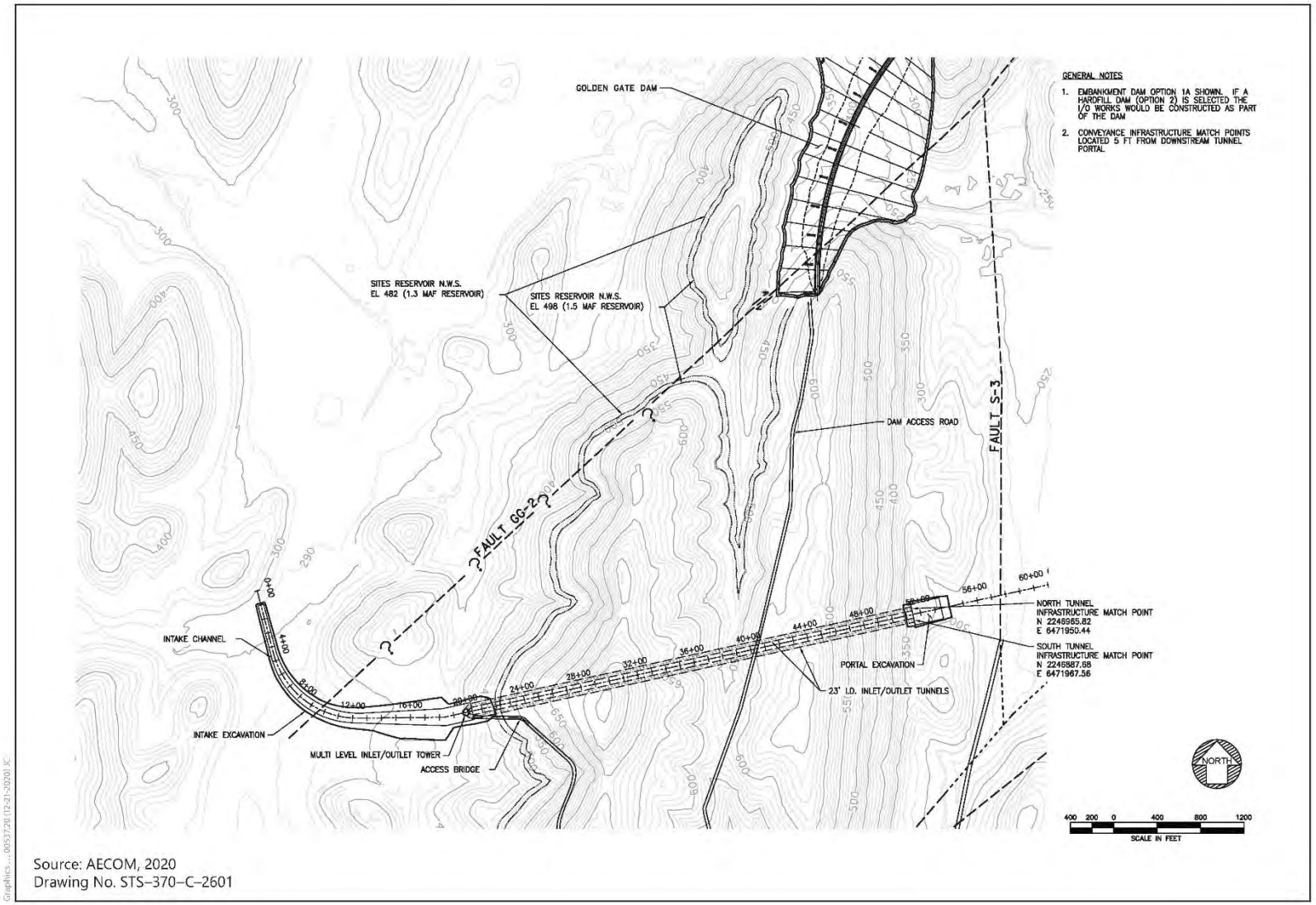

Source: AECOM, 2020
Drawing No. STS–370–C–2601

Figure 2-24. Plan of Inlet/Outlet Works Site

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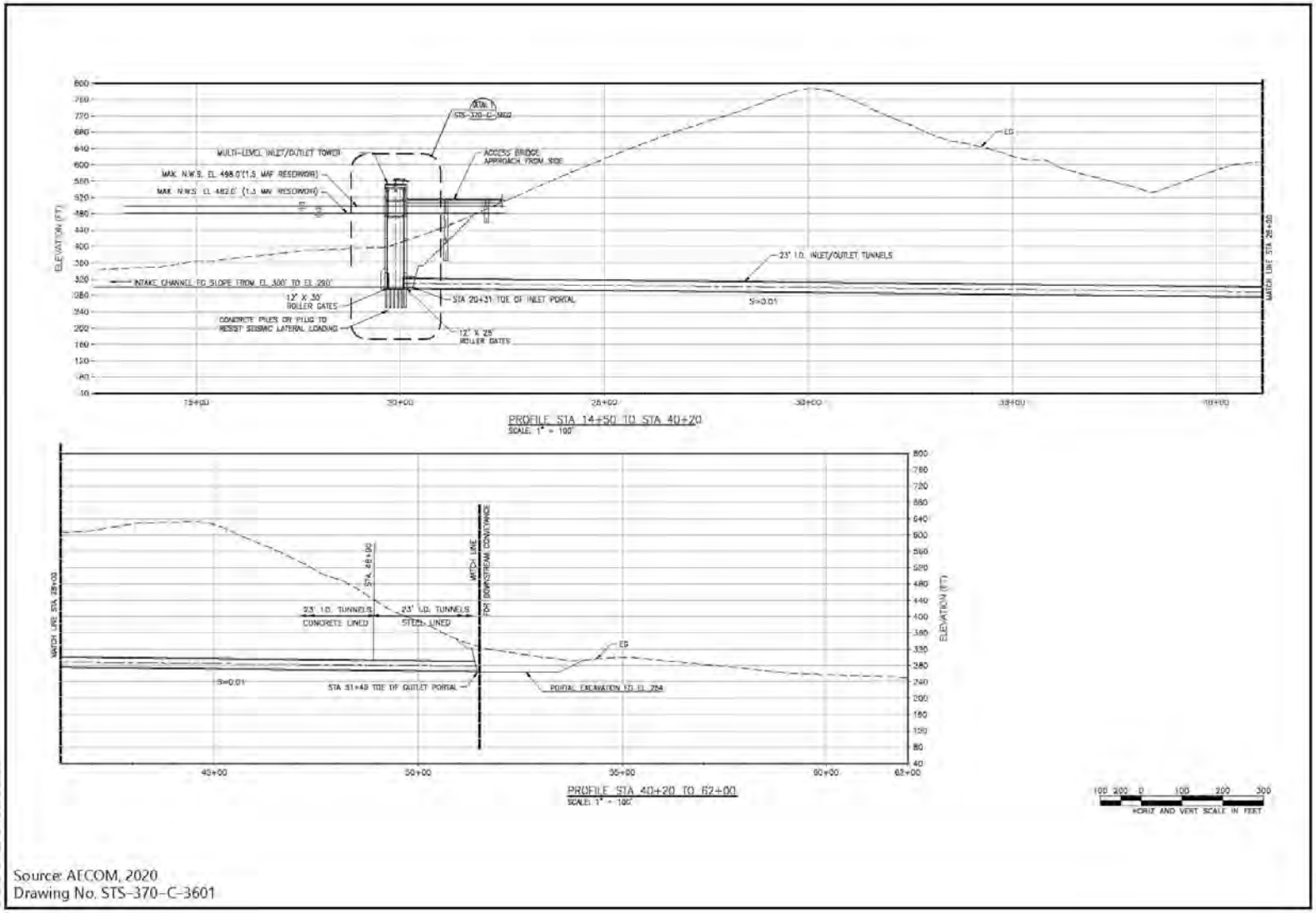

Source: AECOM, 2020
Drawing No. STS-370-C-3601

Figure 2-25. Profile of Inlet/Outlet Works Site

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Low-Level Intake

The low-level intake would be used to meet DSOD-required emergency drawdown releases (refer to Section 2.5.2.1, *Water Operations - Emergency Release*, for more information about these requirements). This intake would also release stored water below the lowest ports in the I/O tower during drought conditions.

The low-level intake would be at an elevation of 300 feet to allow for sediment accumulation over a 100-year project life. Flows would not be pumped in directly from the Sacramento River, and the main source of sediment is expected to be from local runoff in the reservoir watershed. The intake channel would be excavated down to an elevation of approximately 290 feet. The installation of bar-type trashracks would protect the I/O tunnels from damage and keep debris from clogging the flow streams. The low-level intake would be designed to allow for inspection and maintenance.

I/O Tower

The 300-foot-tall, multi-level I/O tower would allow flows into and out of the reservoir through the use of ports around the tower's perimeter. These ports would be at multiple elevations and equipped with roller gates or valves, which would allow for operational flexibility, including managing the temperature/quality of water released from the reservoir. The tower would also have moveable fish screens. The movable fish screens would be sized as design progresses and criteria are established by the Authority in consultation with the applicable regulatory agencies. Head gates at the bottom (below ground surface) of the I/O tower would allow access to the I/O tunnels. The lower portion of the I/O tower would be anchored in bedrock, and the connections at the tower and abutments would accommodate differential movement that may occur during the design seismic event. Table 2-2 summarizes key design characteristics for the I/O tower.

Table 2-2. Summary of I/O Tower Design Characteristics for All Alternatives

Key Characteristic	Alternative 1 and 3	Alternative 2
Maximum Normal Water Surface Elevation*	498 feet above mean sea level	482 feet above mean sea level
Top of Tower Elevation	558 feet above mean sea level	542 feet above mean sea level
Top Tier Port Centerline Elevation	470 feet above mean sea level	450 feet above mean sea level
Maximum Number of Ports	21 (3 each at 7 tiers)	18 (3 each at 6 tiers)
Minimum Port Size	5.5-foot-wide by 7-foot-high rectangular ports have been assumed; Ports would be sized such that the maximum operational drawdown (3,900 cfs) can be achieved with ports at two levels (6 ports total)	

*This would also be the maximum normal operating water elevation

Seven operating levels (or tiers) are anticipated based on the current design. The upper tiers would be spaced 20 feet on center, with centerlines at elevations ranging from 350 to 450 feet (Alternative 2) or 470 feet (Alternative 1 and 3). The lowest tier would be located 10 feet on center below the next lowest tier at 340 feet elevation (all Action Alternatives). At each tier there would be three ports on alternating faces of the hexagonally shaped tower. The ports would be

constructed at different elevations to allow flexibility to withdraw water based on its quality (e.g., temperature, turbidity) needs. These ports would be controlled by roller gates or valves.

The head gates would be located in the I/O tower base (below ground surface) to allow the isolation of its tunnels for maintenance, inspection, and operational needs. The head gates would be designed to prevent outflow from the I/O tower at the full range of reservoir levels. The gates would be able to open (i.e., raised) and close under all normal reservoir operations and if emergency releases were required. Gates for either I/O tunnel would be closed to prevent outflow for operational purposes (downstream release or equipment preference, maintenance, or dewatering for inspection or equipment change out). Emergency raising and lowering of the gates by emergency power upon loss of electricity would be required.

A bridge would provide access to the I/O tower from the nearby access road. The bridge would be designed to accommodate equipment and materials required for maintenance of the tower. The bridge's length would depend on the access road design but is expected to be approximately 300 feet.

Two 23-foot-diameter I/O tunnels would extend from the I/O tower through the ridge on the right abutment of Golden Gate Dam. They would daylight on the other side of the ridge and connect to the transition manifold. The tunnels would each be about 3,110 feet long, connect to the multi-level tower at approximately 300 feet elevation, and have a downstream slope of 1%.

Dams and Dikes

All Action Alternatives would include Sites Dam and Golden Gate Dam along with a number of saddle dams and saddle dikes. The height of these facilities and the number of saddle dams and dikes varies between the Action Alternatives as summarized in Table 2-3. Sites Dam, Golden Gate Dam and the saddle dams and saddle dikes are discussed in more detail below.

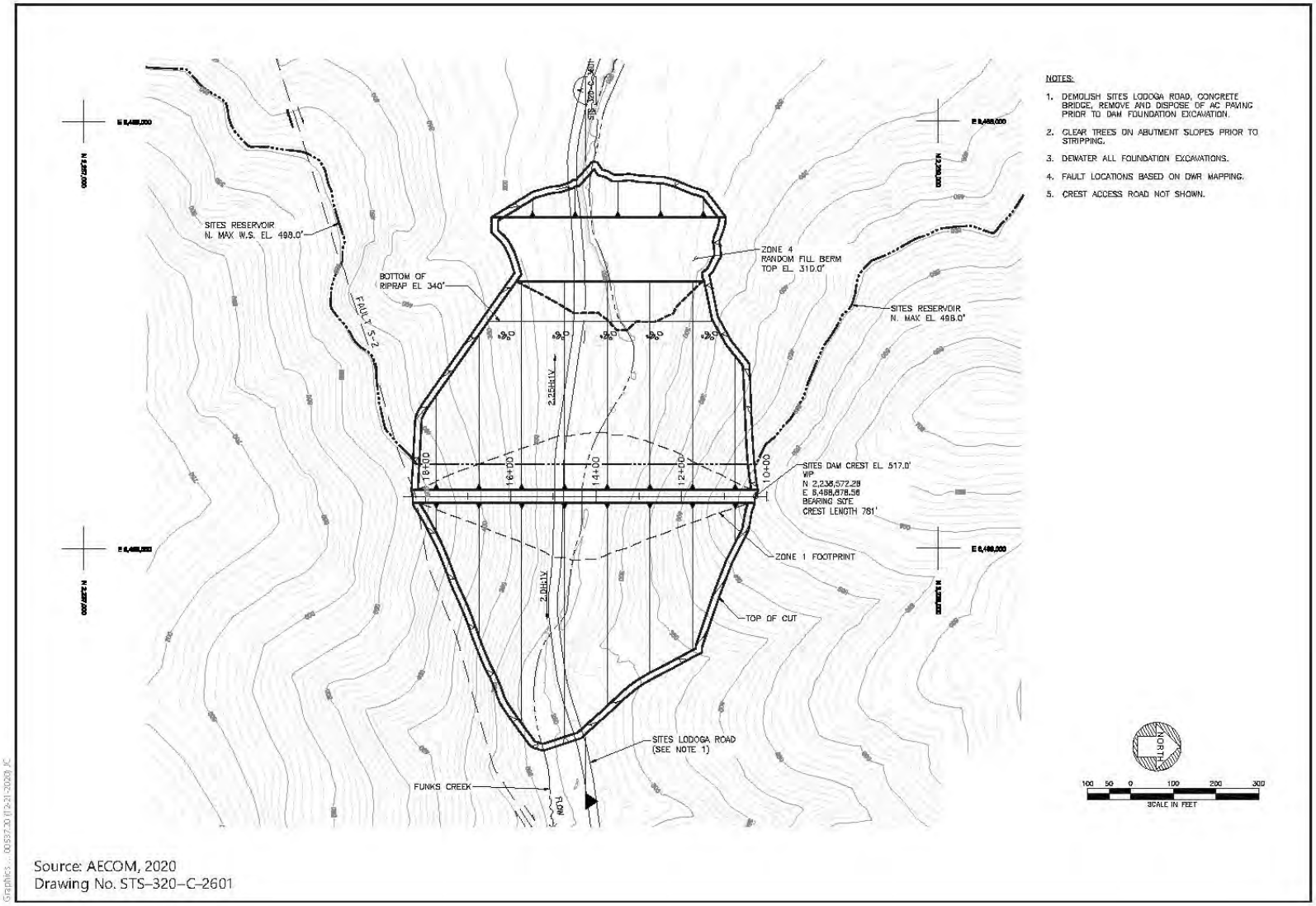
Table 2-3. Main Dam, Saddle Dam and Saddle Dike Summary for All Alternatives

Dam/Dike	Alternative 1 and 3		Alternative 2	
	Maximum Height Above Streambed (feet)	Length (feet)	Maximum Height Above Streambed (feet)	Length (feet)
Sites Dam	267	781	250	729
Golden Gate Dam	287	2,221	270	2,063
Saddle Dam 1	27	318	--	--
Saddle Dam 2	57	250	--	--
Saddle Dam 3	107	3,422	90	2,677
Saddle Dam 5	77	1,894	60	1,747
Saddle Dam 6	47	362	--	--
Saddle Dam 8A	82	1,300	62	1,140
Saddle Dam 8B	37	475	20	277
Saddle Dike 1	12	122	10	148
Saddle Dike 2	12	198	20	79
Saddle Dike 3	--	--	30	247

Sites Dam and Diversion Tunnel

Sites Dam would be on Stone Corral Creek approximately 0.25 mile east of the community of Sites and 8 miles west of the community of Maxwell. The dam would be designed to safely accommodate potential fault displacement by providing widened filter, drainage, and transition zones. Sites Dam would be an embankment dam consisting of a combination of earth and rockfill embankment zones with a central impervious core, exterior upstream rockfill shell, and downstream earthen shell. The upstream and downstream slopes of the dam embankment would be 2.25:1 (horizontal: vertical; H:V) and 2H:1V, respectively. The upstream and downstream slopes of the dam's central core would be 0.5H:1V. Figure 2-26 provides a plan view of Sites Dam and Figure 2-27 provides a section view of Sites Dam.

Sites Dam would have a permanent diversion pipeline and tunnel that would be constructed in the left abutment of the dam. The approximately 1,600-foot-long tunnel would contain a 1,900-foot-long pipe with an internal diameter of 12 feet. The pipe would be fitted with one or more valves sized to release flow up to 100 cfs into Stone Corral Creek. The Sites Dam piping system is expected to include a bar trashrack, a slide gate, a separate fish screen and inlet valve to support Stone Corral Creek release flows, a stoplog bulkhead, and a permanent air vent assembly. The fish screen would be designed and sized to meet the requirements for aquatic life protection.



Source: AECOM, 2020
Drawing No. STS–320–C–2601

Figure 2-26. Sites Dam Plan

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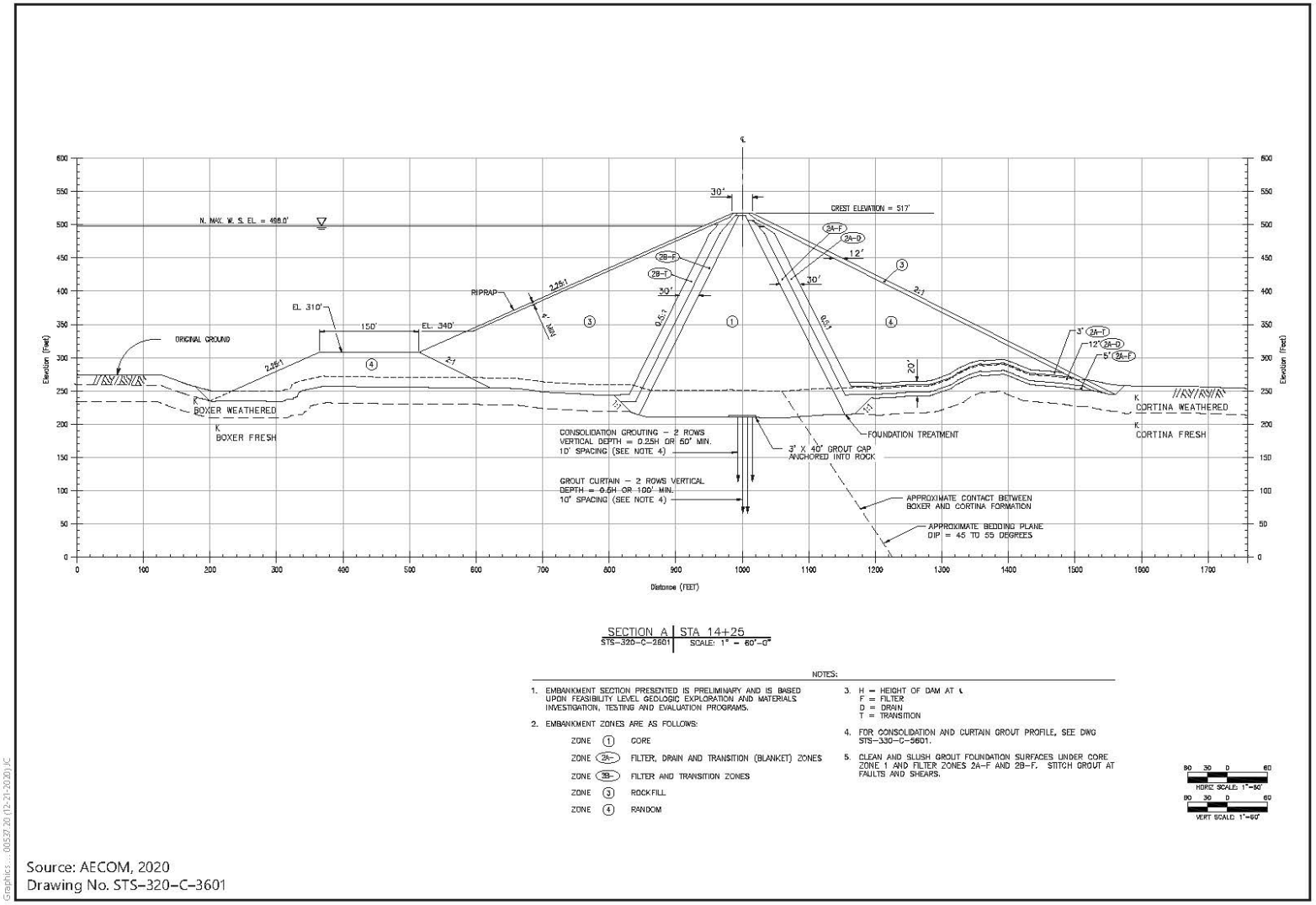

Source: AECOM, 2020
Drawing No. STS–320–C–3601

Figure 2-27. Sites Dam Section

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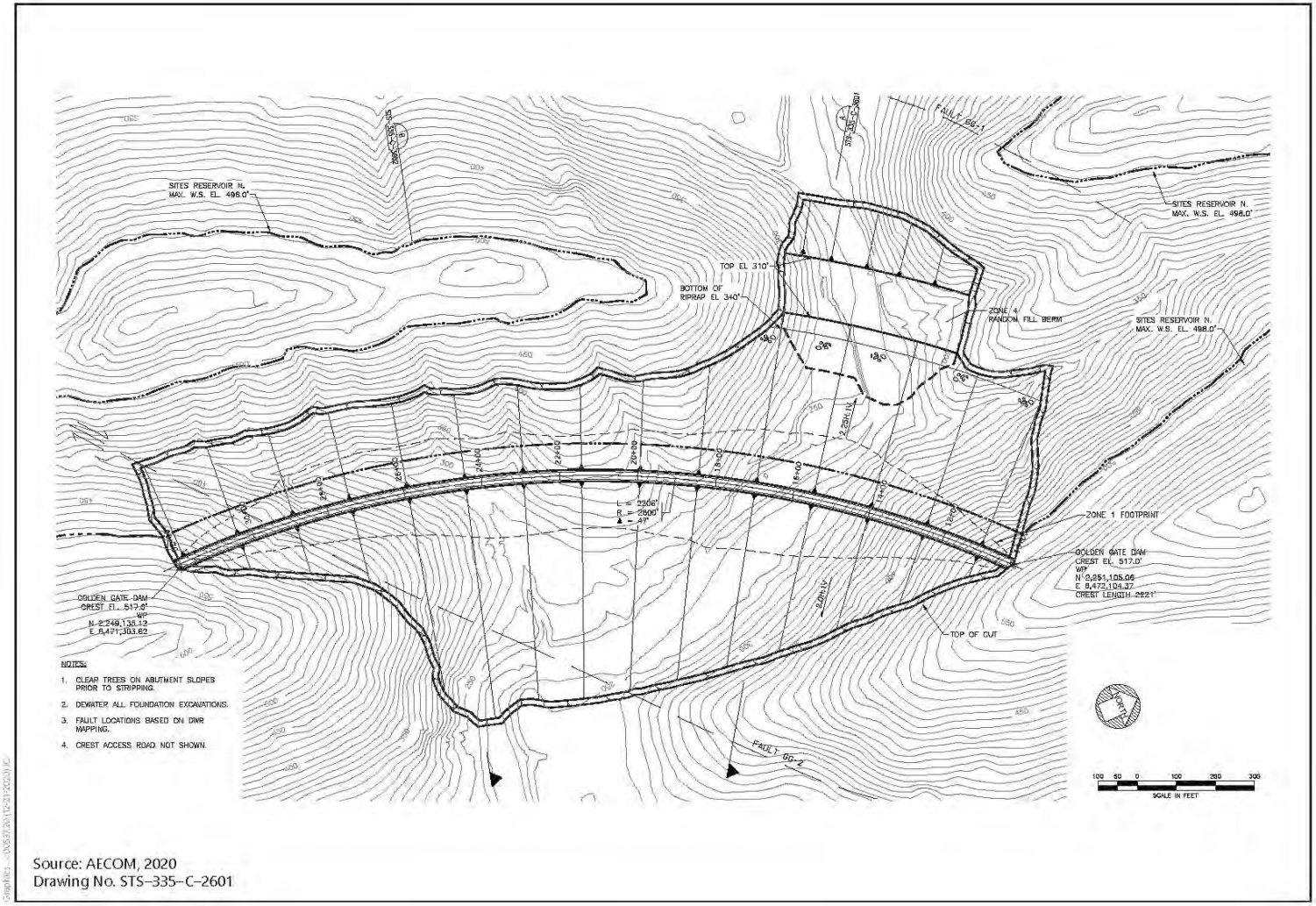
Stone Corral Creek would be diverted for construction of Sites Dam. A coffer dam would be installed to enable construction of the dam embankments in dry conditions. During construction storm flows would be conveyed in the 12-foot-diameter diversion tunnel through the ridge at Sites Dam. This tunnel would prevent a potential seepage path from forming through the embankment. Water in Stone Corral Creek would be diverted directly from the creek into the creek diversion pipeline through the Sites Dam abutment and into Stone Corral Creek on the east side of the Sites Dam work area. The outlet tunnel with two 84-inch-diameter fixed cone valves would accommodate these releases, and an energy dissipating chamber would reduce the velocity of the water released.

Golden Gate Dam

Golden Gate Dam would be on Funks Creek approximately 1.8 miles west of Funks Reservoir. The dam type and material, upstream slopes, and downstream slopes would be the same as described above for Sites Dam. Golden Gate Dam would not have a permanent diversion tunnel; all releases made would be through the I/O Works. Figure 2-28 provides a plan view of Golden Gate Dam and Figure 2-29 provides a section view of Golden Gate Dam.

Funks Creek would be diverted for construction of Golden Gate Dam. A coffer dam would be installed to enable construction of the dam embankments in dry conditions. At Golden Gate Dam, a 48-inch-diameter diversion pipe would be placed in the foundation of the dam to divert Funks Creek but would be filled in and decommissioned after construction and prior to use of the dam. However, the coffer dam would be left in place and become part of the main dam.

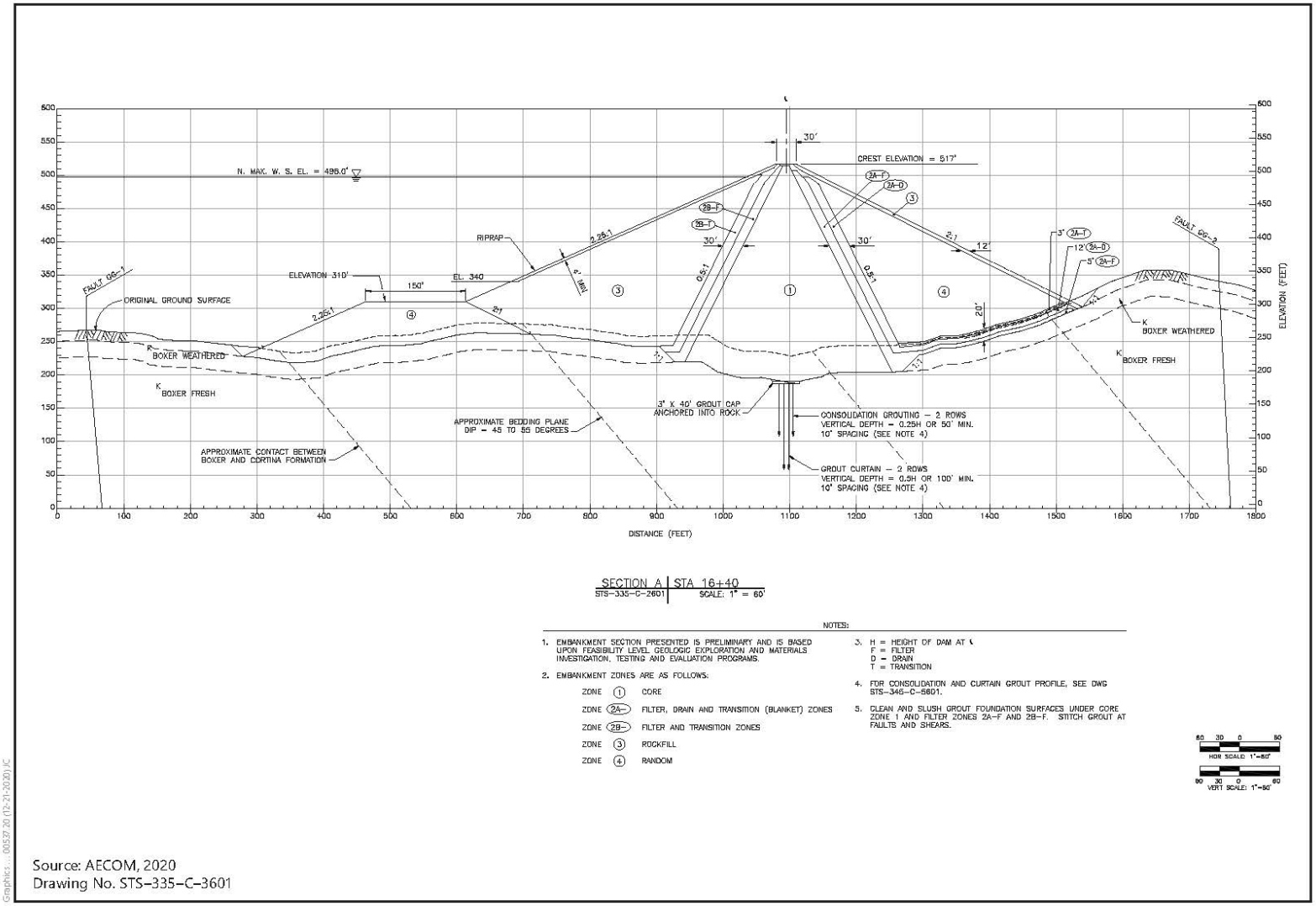
During construction, water would pond behind the coffer dam on Funks Creek, flow through the temporary pipe underneath the Golden Gate Dam construction site to the east side of the dam, and then re-enter the Funks Creek channel. The coffer dam should provide enough residence for settling to occur for typical flows in Funks Creek.



Source: AECOM, 2020
Drawing No. STS–335–C–2601

Figure 2-28. Golden Gate Dam Plan

Predecisional Working Document—For Discussion Purposes Only



Source: AECOM, 2020
Drawing No. STS-335-C-3601

Figure 2-29. Golden Gate Dam Section

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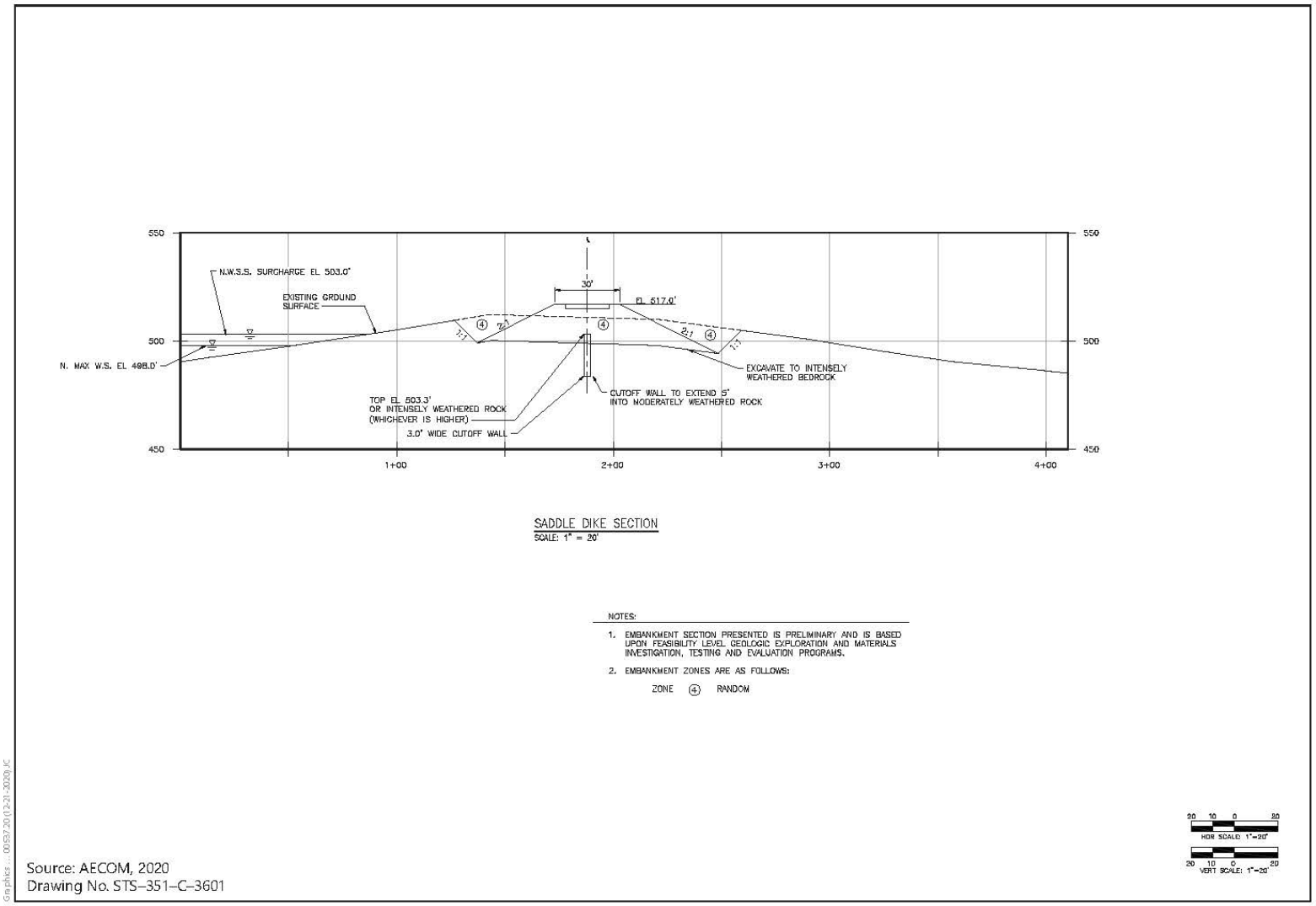
Saddle Dams and Saddle Dikes

The saddle dam and saddle dike material would be the same as described above for the Sites Dam. The number and locations of the saddle dams are based on the size of the reservoir because the saddle dams would be needed at topographic saddle low points along the eastern ridge of the reservoir. The upstream and downstream slopes of saddle dams are 3H:1V and 2.5H:1V, respectively. The upstream slope of the central core for the saddle dams would be 1H:1V with a vertical downstream face. See Figure 2-30 for saddle dam and dike locations. Saddle Dams 3, 5, and 8B would have slightly different design features that are discussed below.

Saddle dikes would be required at topographic saddle low points along the northern end of the reservoir. The saddle dikes would not retain water like the saddle dams but would raise two saddles that are below the minimum crest elevation to an elevation above the maximum reservoir elevation during the Probable Maximum Flood (PMF). The upstream and downstream slopes of saddle dikes would be 2H:1V. The saddle dikes would not have a central core. A typical saddle dike section is presented on Figure 2-30, Saddle Dike Section.

Saddle Dams 3 and 5 would be designed to release emergency flows. Therefore, these two saddle dams would have an intake in the reservoir, a tunnel under the ridge, and an outlet structure to provide energy dissipation and controlled emergency releases of water to the local receiving drainage, Hunters Creek. The intake would be a reinforced concrete structure of appropriate length (approximately 65 linear feet with trashracks). The tunnel would be reinforced concrete with a steel liner; its diameter is expected to range from 10 to 12 feet, and it would be approximately 830 linear feet. The energy dissipation structure would be a reinforced concrete structure containing one or multiple energy dissipation valves within steel-lined chambers to contain spray and provide controlled release of water to Hunters Creek. The size of the energy dissipation chambers would be determined based on manufacturer recommendations. A riprap-lined basin would extend for a minimum of 100 feet downstream of the energy dissipation structure to transition the discharge to the receiving channel.

Saddle Dam 8B would contain the reservoir spillway (see Figure 2-31). The crest width for the dam would be designed to accommodate a 16-foot-wide crest road with suitable concrete or metal guardrails on both sides. The length of the spillway crest section would be based on flood routing analyses, and the crest elevation would be based on the size of the reservoir and normal operating water surface elevation. This elevation would allow storage of the PMF without spilling and have sufficient capacity to pass the volume of over-pumping water in the unlikely event that over-pumping occurred for more than 10 days; it would also enable controlled emergency releases to the local receiving drainage, Hunters Creek. See Figure 2-31, Saddle Dam 8B Spillway, for a schematic of the spillway.



Source: AECOM, 2020
Drawing No. STS–351–C–3601

Figure 2-30. Saddle Dike Section

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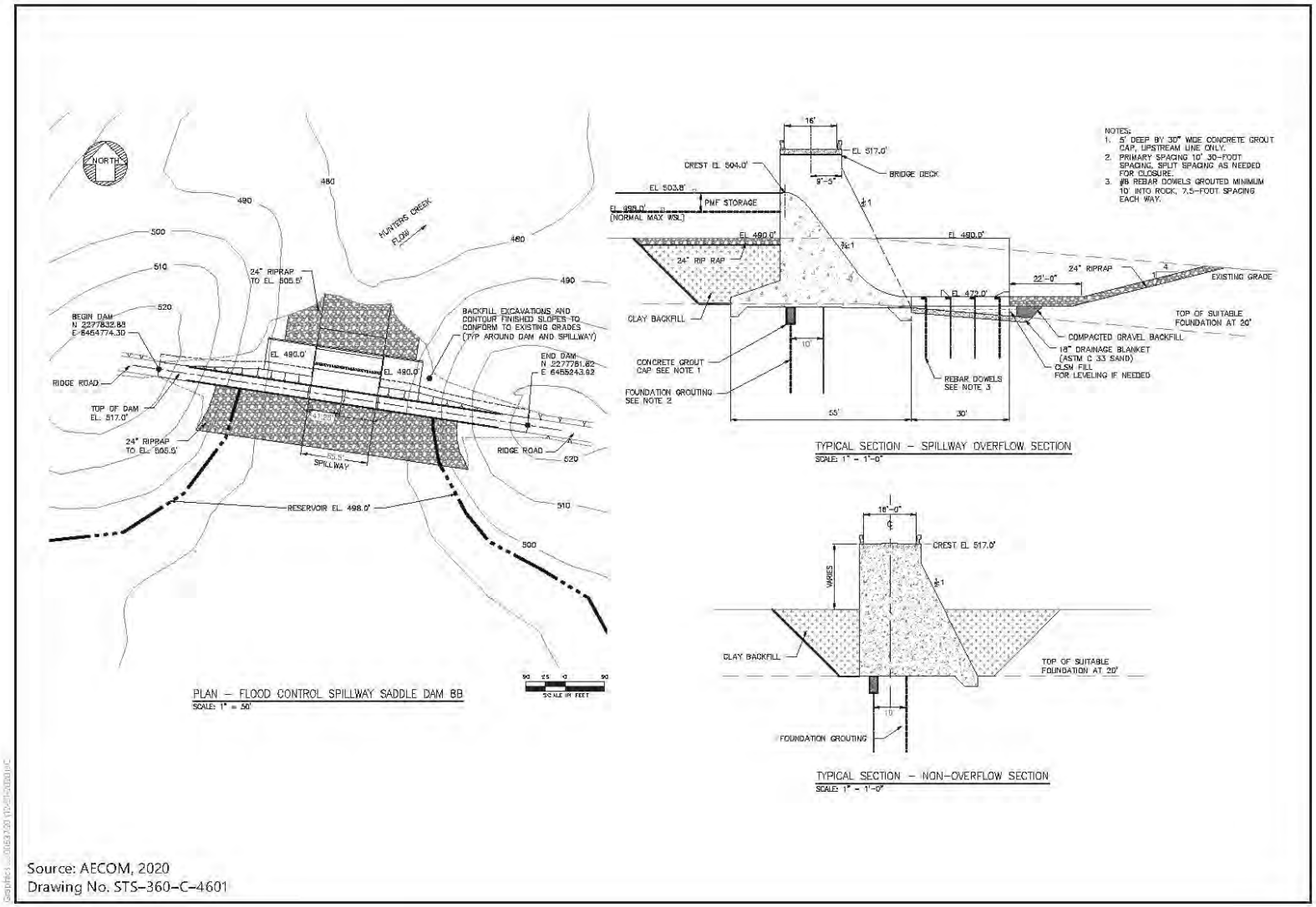

Source: AECOM, 2020
Drawing No. STS-360-C-4601

Figure 2-31. Saddle Dam 8B Spillway

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Dam Monitoring

Instrumentation would be installed in the dam abutments, dam embankments, and downstream of the dams. The objectives of instrumenting the dams include developing physical data for comparison to assumptions made for the design analyses, anticipated behavior based during the studies, and monitoring of dam performance during construction, first filling of the reservoir, and long-term operation of the Project.

The types and locations of instrumentation would be selected to measure specific engineering parameters, including deformation, seepage flows, piezometric levels, pore-water pressure, and seismic response. Types of instrumentation could include piezometers, inclinometers, extensometers, survey monuments, weirs, and strong motion accelerographs. A reservoir level indicator and meteorological station would also be included, and an automated data acquisition system would provide for remote data acquisition of the dams.

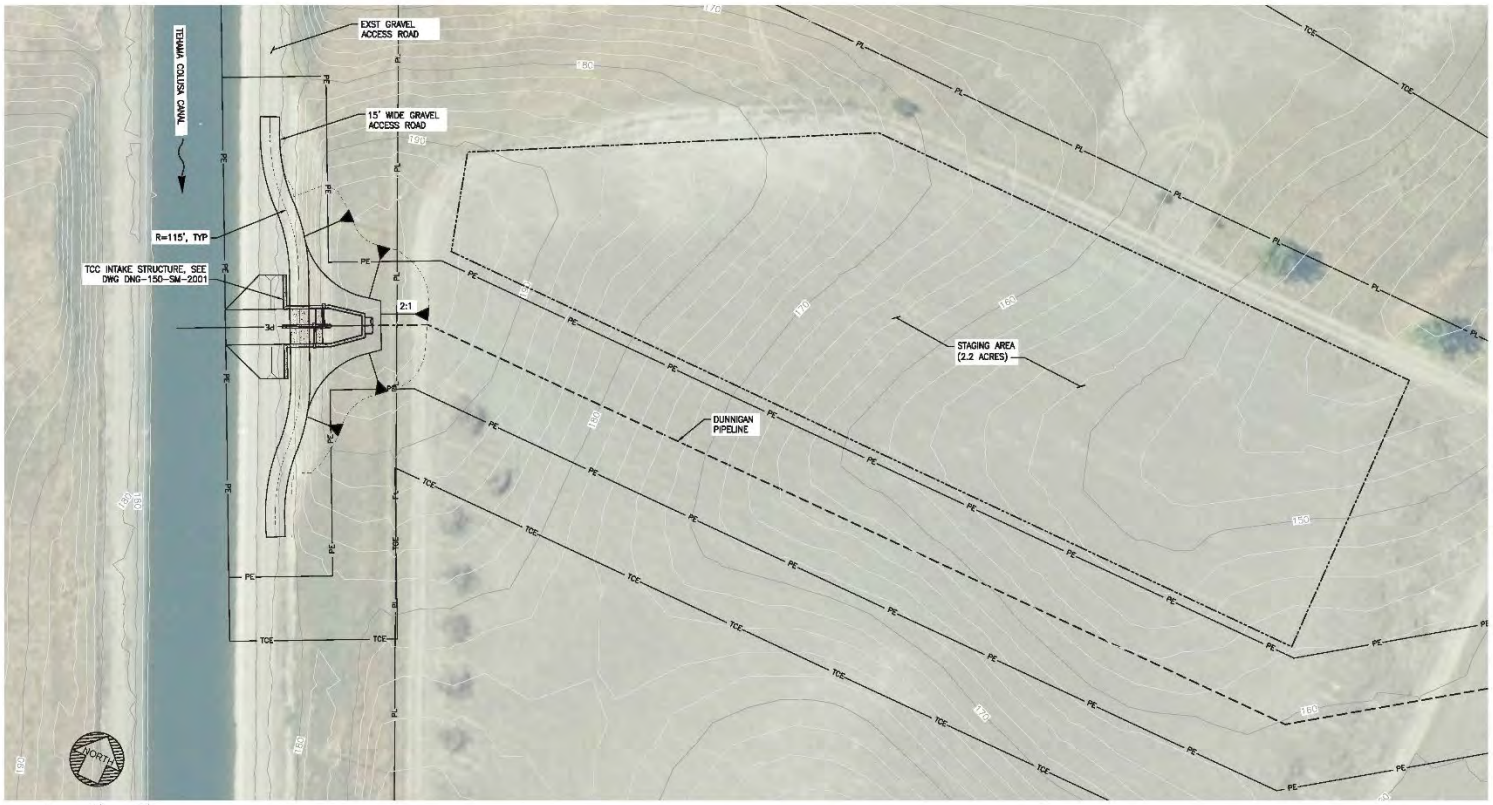
2.5.1.5 Conveyance to Sacramento River

Water released from Sites Reservoir would be conveyed south of the reservoir using the existing TC Canal and a new Dunnigan Pipeline. The water would flow south about 40 miles to near the end of the TC Canal, where it would be diverted into the Dunnigan Pipeline. The flows would subsequently be conveyed to the CBD and ultimately reach the Sacramento River. See Figure 2-2, Alternative 1 and 3 Conveyance to Sacramento River Components, for the location of the facilities associated with conveying water to the CBD and Sacramento River.

TC Canal Intake

A new intake would be required to move water from the TC Canal into the Dunnigan Pipeline. See Figure 2-32, TC Canal Intake Site Plan, for a site plan of the intake. The TC Canal intake site would encompass approximately 0.5 acre and be accessed from the existing TC Canal access road. The intake would be a concrete structure sized for a flow of 1,000 cfs that supports the control gates and associated gate operators. Power would be needed for SCADA control and gate operation to let water into the Dunnigan Pipeline; however, there would be a gravity outlet structure from the TC Canal into the Dunnigan Pipeline and no pumping would be required. A concrete bridge deck would provide vehicular access across the top of the intake. Stoplog slots at the inlet and outlet channels would enable isolation of the control gates for maintenance.

Temporary disturbance for construction of the TC Canal intake adjacent to the TC Canal would require 2 acres for temporary construction for about 1 year. The staging area would be located on the east side of the TC Canal and just north of the Dunnigan Pipeline. Access to this structure is anticipated to be from the existing TC Canal access road.



Source: Jacobs, 2020
Drawing No. DWG-030-C-2001

Figure 2-32. TC Canal Intake Site Plan

Dunnigan Pipeline

The Dunnigan Pipeline would convey water released from the TC Canal to the CBD. See Figure 2-33, Dunnigan CBD Discharge Site Plan, for the location of this facility. The Dunnigan pipeline would be about 4 miles long, have a minimum depth of 6 feet below ground surface, and have an inside diameter of approximately 9 feet (Alternative 1 and 3) to 10.5 feet (Alternative 2). The Dunnigan Pipeline would extend through existing agricultural lands, as well as crossing Interstate 5 (I-5), Road 99W, the railroad, and a commercial auction yard between I-5 and Road 99W. The tunneled crossings at I-5, Road 99W and the railroad would be 300 feet long and 250 feet long, respectively, and would require 12-5-foot-diameter casings.

A CBD outlet with an energy dissipation facility would be required at the downstream end of the pipeline prior to discharging the water into the CBD. Two 60-inch-diameter, fixed-cone valves would be placed at the discharge stilling basin to dissipate energy and adjust the flow. Hoods on the fixed-cones valves would control spray. The conveyance through the Dunnigan Pipeline to the CBD would use gravity (i.e., no pump station) and have a flow up to 1,000 cfs.

Construction of the Dunnigan Pipeline from the TC Canal to the CBD would require dewatering, trenching, and pile driving or a vibration hammer. Dewatering would be necessary for a segment of the pipeline to reduce groundwater levels to 20 or 30 feet below ground surface along its length. Trenching and pipeline installation would be completed after dewatering. Pile driving or a vibration hammer would be used to install piles for construction of the CBD outlet. Construction would include open cut of approximately 100 feet to cross Bird Creek in the dry season.

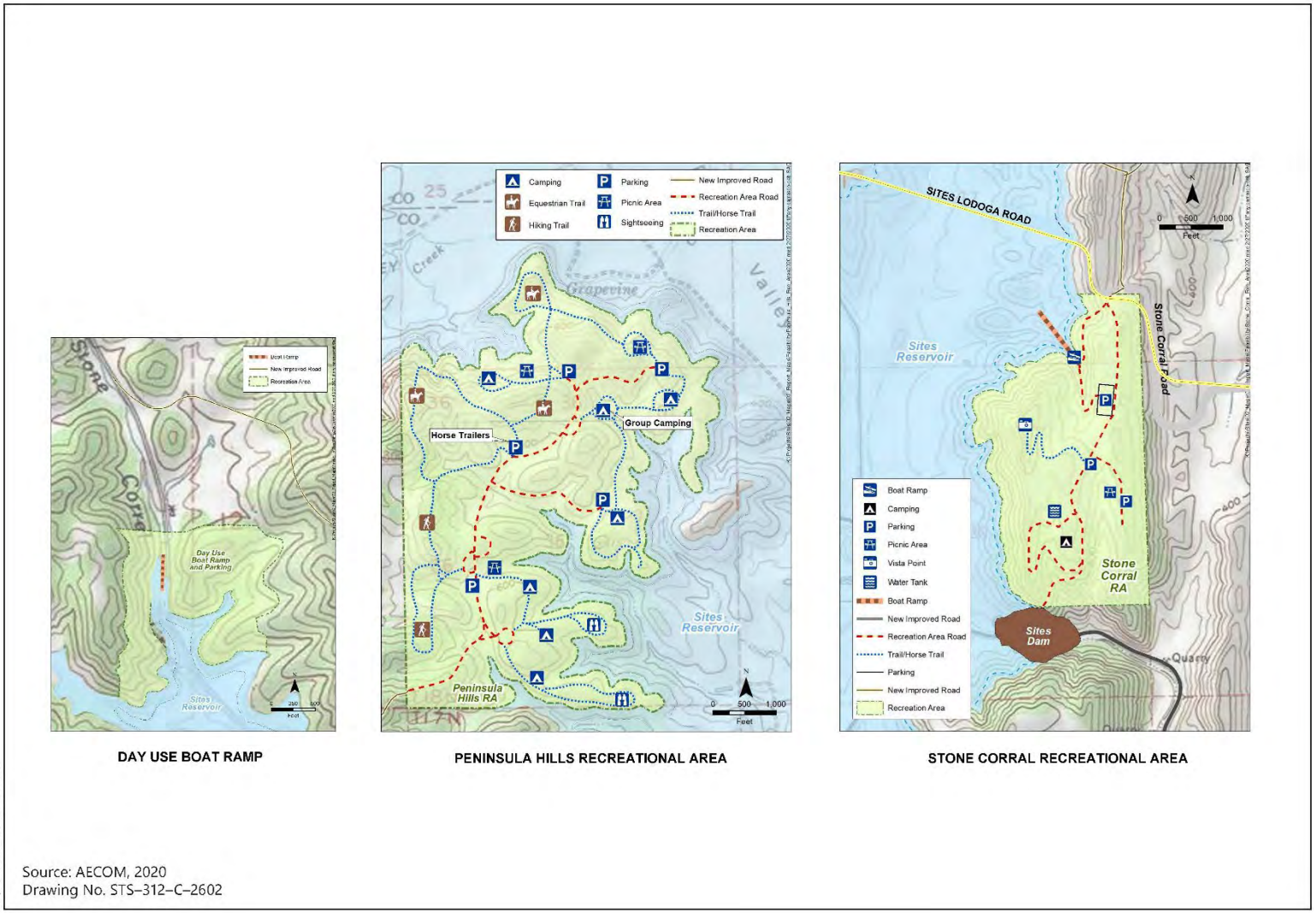
2.5.1.6 Recreation Areas

The Project proposes the development of two primary recreation areas and a day-use boat ramp. The recreation areas would also require a network of new roads and upgrades to existing roads for maintenance and local access (see Section 2.5.1.7, *New and Existing Roadways* a). Figure 2-34, Recreation Areas, shows a conceptual site map of each recreation area and the recreation areas are described below.

- **Peninsula Hills Recreation Area –** The Peninsula Hills Recreation Area would be located on the northwest shore of the Sites Reservoir, to the north of the existing Sites Lodoga Road and across the reservoir from the Stone Corral Creek Recreation Area. Access would be provided by the existing Sites Lodoga Road west of the reservoir. This recreation area would encompass up to 373 acres and would include a kiosk, access to electricity and potable water, 10 picnic sites (with parking at each site), and hiking trails. There would also be 19 vault toilets, 200 campsites (car and recreational vehicle), and one group camp area.

Source: Jacobs, 2020
Drawing No. DWG-030-C-2002

Figure 2-33. Dunnigan CBD Discharge Site Plan



Source: AECOM, 2020
Drawing No. STS–312–C–2602

Figure 2-34. Recreation Areas

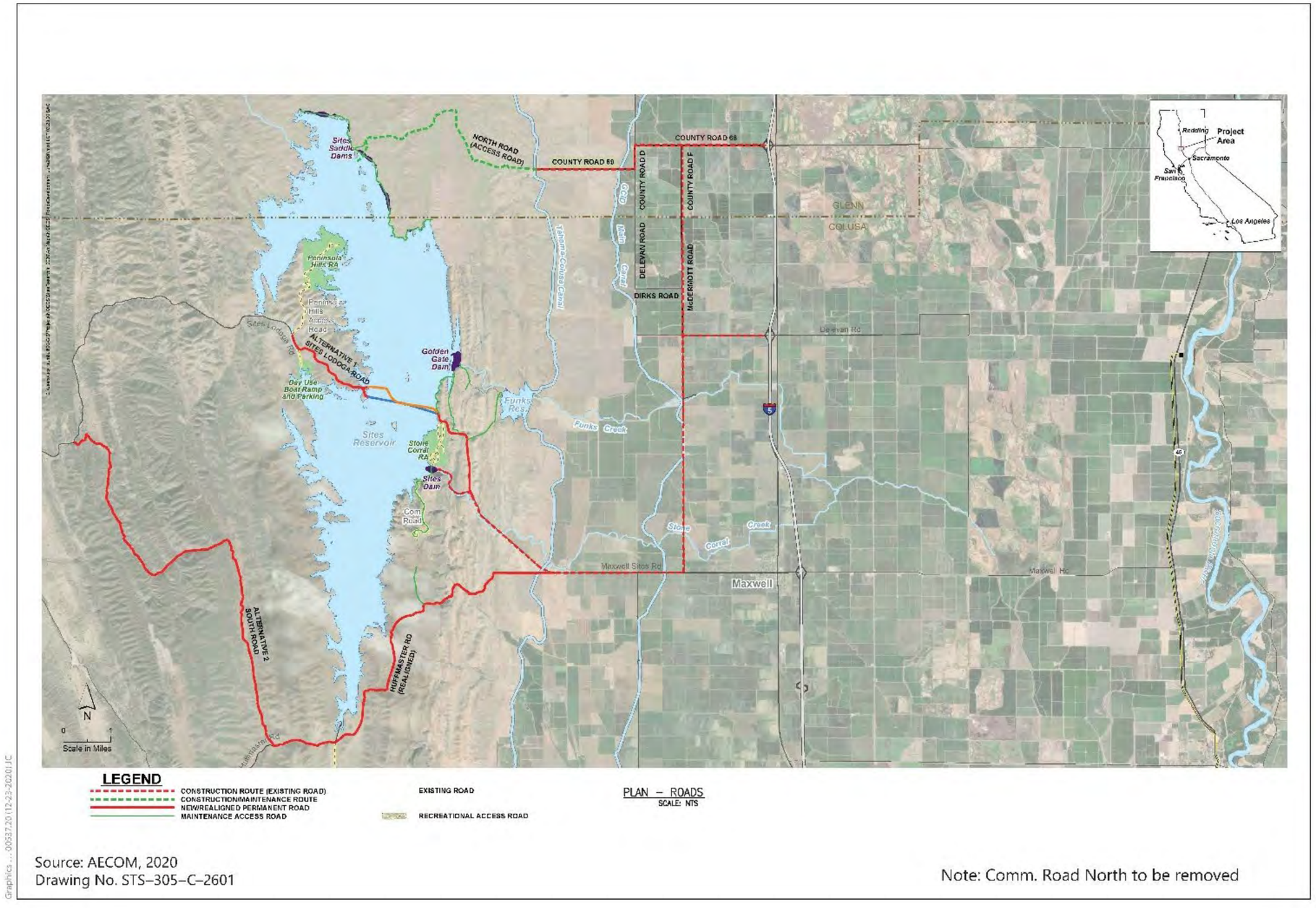
- **Stone Corral Creek Recreation Area –** The Stone Corral Creek Recreation Area would be located on the eastern shore of the Sites Reservoir, north of the existing Maxwell Sites Road and Sites Dam. Access would be provided from Sites Dam and Sites Lodoga Road near the eastern end of the bridge across the reservoir. This recreation area would encompass up to 235 acres and its facilities would include a kiosk, access to electricity and potable water, 10 picnic sites (with parking at each site), and hiking trails. There would also be 10 vault toilets and 50 campsites (car and recreational vehicle).
- **Day-Use Boat Ramp and Parking Areas –** The day-use boat ramp would be located on the western side of the reservoir where the existing Sites Lodoga Road intersects with the proposed inundation area for the reservoir. A parking area would be added to the existing Sites Lodoga Road where it exits the inundation area footprint of the reservoir. The boat ramp and parking area would encompass up to 10 acres and include a kiosk, access to potable water, and one vault toilet.

Construction of the recreation areas and facilities would consist of clearing and grubbing, excavating, backfilling, constructing roads and parking lots, installing utility connections, constructing amenities, constructing the boat ramps, and restoring temporarily disturbed areas. It is anticipated that all construction activities associated with the recreation areas would occur within the proposed footprints of the recreation areas and the temporary and permanent access road areas.

The Authority is also considering a recreation area on the north side of the reservoir within Glenn County. This area may consist of a day-use boat ramp, parking area, picnic facilities, kiosk, access to potable water, and one vault toilet encompassing up to 10 acres. As this facility is conceptual in nature, it is not analyzed in this RDEIR/SDEIS and would require additional CEQA and NEPA analysis if developed and as appropriate.

2.5.1.7 New and Existing Roadways

Approximately 46 miles of new paved and unpaved roads would provide construction and maintenance access to the proposed facilities, as well as public access to the proposed recreation areas. Table 2-4 identifies these roads and their purposes (i.e., construction access, local access, and maintenance access). Figure 2-35, Alternatives 1, 2, and 3 Road Site Map, shows the locations of all local access, construction access, and maintenance access roads that would be needed. The general objectives and maintenance responsibilities for these road types are discussed below, and more detailed information for construction access, local access, and maintenance access roads is subsequently presented in the corresponding subsections. The proposed road improvements and roadway designs are being coordinated with Colusa and Glenn Counties.



Source: AECOM, 2020
Drawing No. STS–305–C–2601

Note: Comm. Road North to be removed

Figure 2-35. Alternatives 1, 2, and 3 Road Site Map

Construction access roads would be designed to provide the necessary roadway improvements specific to the movement of construction equipment and transport of materials. Roadways that would be used for construction access and local access would be designed to achieve the objectives for both uses and prioritize needs for local traffic use and safety. Roads used solely for construction access would be designed with two 12-foot-wide gravel lanes and up to 2-foot-wide shoulders. These roads would be used for maintenance access after completion of construction. Permanent facility access roads constructed from gravel and asphalt would facilitate operation and maintenance. These access roads would require new construction or the relocation of existing public county roads. Temporary gravel roads would also be built during construction. The maintenance of roads used for both construction and local access would be the construction contractor's responsibility during construction and the responsibility of the Colusa or Glenn County department having jurisdiction over them after construction.

Local access roads that would be improved or relocated for construction purposes would provide reliable infrastructure for the traveling public, accommodate transportation needs, and be consistent with state and local design standards. Local access roads would generally have two 12-foot-wide lanes with paved shoulders, and their postconstruction maintenance would be the responsibility of the Glenn or Colusa County department with jurisdiction over them.

Maintenance access roads would be constructed or improved in accordance with the equipment and personnel required for operations and maintenance of specific facilities. As discussed above, roads installed for construction access would be repurposed for maintenance following construction. Repurposed maintenance roads would have one 15-foot-wide minimum gravel lane with no shoulders.

Table 2-4. Sites Project Roads & Purposes Common to all Alternatives

Roads	Road Purpose		Approx. Current Length (miles)	Approx. Proposed Improved Length (miles)	Improvement Types
	Colusa County[2]	Glenn County[2]			
Road 68	--	Local, Construction	3	3	Shoulder improvements/ intersection widening, two structure improvements
Road D	--	Local, Construction	0.5	0.5	Shoulder improvements/ intersection widening, two structure improvements
Road 69	--	Local, Construction	2	2	Shoulder improvements/ intersection widening, three structure improvements
North Road	--	Construction, Maintenance	0	5	New gravel road

Roads	Road Purpose		Approx. Current Length (miles)	Approx. Proposed Improved Length (miles)	Improvement Types
	Colusa County[2]	Glenn County[2]			
Delevan Road	Local, Construction		2	2	Shoulder improvements/ widening
McDermott Road	Local, Construction	Local, Construction	8	4	Shoulder improvements/ widening/paving, five structure improvements
Saddle Dam Road – North (5–9) (provide access to northern portions of Sites Reservoir and the saddle dams)	--	Construction, Maintenance	1	2	New gravel road
Saddle Dam Road – South (1–5)	Maintenance	Maintenance	0	3	New road
Huffmaster Road realigned	Local	--	12	7	Gravel road for residents
Sites Lodoga Temporary Detour Road (Shoo-Fly)	Local, Construction	--	1	1	New, temporary gravel road
Day-Use Boat Ramp (westside)	Local	--	0	0.3	New paved road
Peninsula Hills Recreation Area (provide access from Sites Lodoga Road to the proposed Peninsula Hills Recreation Area)	Local	--	0	4	New gravel road
Potential Access Road A (O&M/PGP/GG Dam)	Maintenance	--	0	1	New road
Potential Access Road B (O&M/PGP/GG Dam)	Maintenance	--	0	0.4	New road

Roads	Road Purpose		Approx. Current Length (miles)	Approx. Proposed Improved Length (miles)	Improvement Types
	Colusa County[2]	Glenn County[2]			
Potential Access Road C1 (O&M/PGP)	Maintenance	--	0.4	0.4	Existing road
Potential Access Road C2 (O&M/PGP/GG Dam)	Maintenance	--	0.6	0.6	Existing jeep road
Stone Corral Creek Recreation Area/Sites Dam	Local	--	0	2.5	New road
Comm Road South	Local	--	0	1	New road

Table Notes:
Local access includes local road for public use and recreational access.
Any improvement type identified as a new road has an approximate current length of 0.

The roadway alignments discussed below are based on service needs and existing planning-level-based mapping to establish a corridor width along roadways. Corridor widths would vary depending on the level of topographical relief—greater relief requires greater flexibility throughout the design process to allow the engineers to move the road within the corridor.

Several existing roads would be improved to support the construction of Sites Reservoir facilities (e.g., main dams and saddle dams) and enable construction vehicles to safely pass one another if needed. After construction of the reservoir was completed, these roads would be maintained to support the operation of the Sites Reservoir. Some of these roads would also be available for public use. This subsection describes the expected routes for construction access and the roadway improvements that would be needed to accommodate construction and maintenance access.

The disturbance area for roads would include the footprints of the proposed roads and stream crossings, the staging areas for materials and equipment, and the area needed to construct the facilities and access roads. Traffic that was not construction related would be diverted around construction disturbance areas in accordance with a traffic management plan.

Initial construction activities would involve establishing staging areas, surveying and marking roadways, clearing, and grading. Road construction would entail making road cuts and fills; hauling away excess cut materials; constructing culverts; laying aggregate road base and asphalt; erecting fences, guardrails, and signs; installing roadway striping and reflectors; restoring temporary disturbance areas; and cleaning up the work sites.

Construction Access

Construction access for the reservoir and supporting facilities would occur on public roads from I-5 to the reservoir site on the north and at Sites Lodoga Road on the east. These roads currently cross small creeks and irrigation canals, and the crossings are generally reinforced through concrete box culverts. There are three primary construction access routes for consideration that would most likely be defined for use by the construction contractor.

The first construction access route would be on 5.5 miles of existing approximately 24 feet wide paved road from I-5 west along Road 68, south on Road D, and west on Road 69 to just west of the TC Canal. From here the road reverts to a single lane (± 12 feet wide) gravel road (North Road), which would be temporary and continue for approximately 5 miles along existing ranch roads and trails to the north end of the reservoir at the saddle dams. From this location, the contractor would establish their own onsite access roads within the limits of the reservoir.

The second construction access route would be on 7.2 miles of existing paved road from I-5 west along Delevan Road, north along McDermott Road, and west on Road 69 to just west of the TC Canal as noted above. Approximately 1.5 miles of McDermott Road between Dirks Road and West Glenn Road consist of gravel; therefore, it is assumed paving would be needed to accommodate the volume of heavy construction traffic.

The third construction access route would be on 12 miles of existing paved road from I-5 along Delevan Road, south along McDermott Road to Maxwell Sites Road, and then west to the existing gravel access road to Funks Reservoir. The first mile of this gravel road would be the initial segment of the Sites Lodoga Road realignment. This gravel road would also provide access to the Funks PGP and Golden Gate Dam. Maxwell Sites Road would provide access to Sites Dam. Construction equipment/materials would not be permitted to pass through the community of Maxwell on the Maxwell Sites Road, thus the construction access roads would circumvent Maxwell.

The existing roads are nonstandard in geometry and have inadequate roadbed structural section to accommodate the large, heavy vehicles that would be used to transport construction equipment and materials. These roads consist of Road 68, Road D, Road 69, Delevan Road, and McDermott Road. They are narrow and typically include two paved 11-foot- or 12-foot-wide lanes and 1- to 3-foot-wide earthen shoulders. The pavement conditions of Road 68, Road D, and Road 69 pavement conditions are “at risk”, “poor”, and “very poor”, respectively, upon visual inspection by project engineers. A segment of McDermott Road in Colusa County is gravel. Road 69 transitions to a single-lane, gravel road west of the TC Canal. The following improvements would need to be implemented on these roadways:

- Roadbed and intersection widening to allow for safe mobility of construction traffic that would be comingled with local vehicular and agricultural equipment traffic.
- Roadbed reconstruction to enable use by large, heavy vehicles transporting construction equipment and materials
- Horizonal and vertical curve corrections
- Drainage feature improvements to allow for proper drainage

Reconstruction of the roads above would include the addition of new 2-foot-wide paved shoulders to each lane, as well as potential modifications to existing creek and irrigation canal crossings (as described below). The new shoulders would be within the public right-of-way, as would any temporary work areas needed to reconstruct the roads. All existing roadway improvements would be designed to avoid or minimize impacts on existing utility infrastructure and public right-of-way. Once the roads are constructed, all county roads would be maintained by Glenn or Colusa County, while specific access and maintenance roads (e.g., North Road, South Comm Road) would be maintained by the Authority.

The following roads involve the noted number of structures that would need to be crossed. It is assumed that these structures would need to be widened, strengthened, or replaced, depending on their structural condition and load rating capacity.

- Road 68 – two structures
- Road D – two structures
- Road 69 – three structures (two on paved roads crossing the TC Canal and GCID Main Canal, and one on a gravel road)
- McDermott Road – five structures

Local Access

In addition to the local roads described above that would be improved for construction purposes and then remain local access roads, a number of other public local roads would be relocated or developed to accommodate reservoir facilities. These roads include Sites Lodoga Road, Huffmaster Road, Comm Road South, and recreation area roads. There would also be one temporary detour during construction, the Sites Lodoga Temporary Detour Road. Permanent changes to Sites Lodoga Road and Huffmaster Road are discussed in Section 2.6, Alternative 1 Specific Elements and Section 2.7, Alternative 2 Specific Elements below.

- **Comm Road South** – Access to existing communication facilities would consist of a gravel road that would start near the northern end of Huffmaster Road and proceed north to the communications tower.

- **Recreation Area Roads** – New recreation area roads would provide access from Sites Lodoga Road to the Peninsula Hills Recreation Area, day-use boat ramp, and Stone Corral Creek Recreation Area. The access road to Peninsula Hills Recreation Area on the west side of Sites Reservoir would be paved. The access road to the day-use boat ramp, which would also be on the west side of the reservoir, would be paved. The access road to the Stone Corral Creek Recreation Area on the east side of the reservoir would be paved and gravel.

- **Sites Lodoga Temporary Detour Road** – A temporary detour road would be constructed to expedite construction and maintain traffic movement through the reservoir site during the construction of Sites Dam and the bridge across the reservoir (including fill prisms). This road would convey local traffic for a period of approximately 1 year and would be aligned around the Sites Dam site partially on the Sites Lodoga realignment

from Maxwell Sites Road to near the easterly bridge at the top of the ridge. The temporary detour road would then split off to the south and traverse hilly terrain before Comm Road South rejoining Sites Lodoga Road near its intersection with Peterson Road.

Maintenance Access

New and existing maintenance access roads would provide access to the main dams, saddle dams and dikes, I/O Works, and Funks PGP. Except for the existing road to Funks Reservoir, the maintenance access roads would be single-lane, 15-foot-wide gravel roads with no shoulder. Comm Road South would be a local access and maintenance access road.

North Road would begin at the end of the unpaved Road 69, continue 5 miles to the reservoir's edge, and connect with several new maintenance access roads that would provide access to the saddle dams and dikes. Access Road A1 would be a new gravel road along the crest of the Golden Gate Dam with minor cuts/fills. Access Roads B1 and B2 would be new gravel roads connecting to the I/O Works and Golden Gate Dam with minor cuts/fills. Access Road C1 is expected to be a two-lane, 30-foot-wide, paved road to access Funks Reservoir and the existing road to the reservoir would be maintained. Access Road C2 would be improved from an existing jeep trail at the east base of the Golden Gate Dam to a gravel road that would extend off Access Road C1.

2.5.1.8 Project Buffer

The Authority would acquire and maintain a project buffer encompassing the lands beyond the facility footprints. The buffer width would be 100 feet around the Sites Reservoir and related facilities, all buildings, most aboveground components, and recreation areas. The buffer may be less than 100 feet wide if a facility is near a property boundary and the proposed uses do not conflict with the adjacent land uses. Buffers are not anticipated for underground or buried facilities (i.e., Dunnigan Pipeline), transmission lines, or roads (both public and Project maintenance access roads).

Although buffer areas would generally remain undeveloped, the Authority would install limited features and perform periodic maintenance primarily related to reducing fire hazards. These actions would include erecting and maintaining fencing, grading fire breaks/trails, maintaining vegetation (e.g., grazing, tilling, or disking), and performing limited prescribed/controlled burns. The Authority may manage buffer areas as wildlife habitat where appropriate.

2.5.2 Operations and Maintenance Common to All Action Alternatives

This section describes the operations and maintenance activities common to all of the Action Alternatives.

2.5.2.1 Water Operations

The Project would provide water supply and water supply related environmental benefits to the Sites Storage Partners. Water would be diverted into Sites Reservoir from the Sacramento River at the existing RBPP into the TC Canal and at the existing GCID Hamilton City Pump Station into the GCID Main Canal. Both of these facilities have existing fish screens. Once in the TC Canal, water would be conveyed to the existing Funks Reservoir and pumped into the new Sites Reservoir via the Funks PGP and associated facilities. Once in the GCID Main Canal, water

would be conveyed to the new TRR and pumped into the new Sites Reservoir via the TRR PGP and associated facilities. Water could be diverted to storage in Sites Reservoir when the diversion criteria are met and when the Delta is in excess conditions. Diversions to storage could occur anytime between September 1 to June 15, the timeframe that the Sacramento River is not fully appropriated. Water would be held in storage in Sites Reservoir until requested for release by a Sites Storage Partner. Water releases would generally be made from May to November, but could occur at any time of the year depending on the Storage Partner's need and conveyance capacity to convey water to its intended point of delivery. Water would be released from Sites Reservoir via the I/O Works back through the TRR PGP and into the TRR or back through Funks PGP back into Funks Reservoir. Water released could be used along the GCID Main Canal, along the TC Canal, or conveyed to the new Dunnigan Pipeline and discharged to the Colusa Basin Drain and conveyed via the Sacramento River or the Yolo Bypass to a variety of locations in Delta and south-of-Delta[2]. Exchanges of water may also occur with the CVP and SWP. Water would also be diverted and impounded from Funks and Stone Corral Creeks and releases from Golden Gate Dam and Sites Dam, respectively, would occur into Funks and Stone Corral Creeks. Water operations are described in more detail below.

The Authority intends to apply for and obtain a water right permit from the State Water Resources Control Board (SWRCB) for the operations of Sites Reservoir. Actual operations would be subject to the terms and conditions of this water right along with all applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time. Operations under all Action Alternatives would also require coordination with Reclamation and DWR as described below. The Authority is working with Reclamation and DWR to develop mutually agreeable operating agreements that would describe the approach for coordinating operations with Sites and the CVP and SWP operations, respectively.

Diversion to Sites Reservoir

Sites Reservoir would be filled through the diversion of Sacramento River water that generally originates from unregulated tributaries to the Sacramento River downstream from Keswick Dam. Only a small amount of the diversions to Sites Reservoir would come from flood releases from Shasta Lake. Diversions to Sites Reservoir would be made from the Sacramento River at the existing RBPP (River Mile 243) near Red Bluff into the TC Canal and at the existing GCID Hamilton City Pump Station (River Mile 205) near Hamilton City into the GCID Main Canal. Water could be diverted to storage in Sites Reservoir from September 1 to June 15. Diversions would only occur when all of the following conditions are met:

- Flows in the Sacramento River exceed the minimum diversion criteria (described below);
- The Delta is in "excess" conditions as determined by Reclamation and DWR;

[2] The term south-of-Delta or phrase south of the Delta is used to refer to areas that can receive water from the south Delta pumping facilities, including the SWP Banks Pumping Plant, Reclamation's Jones and Rock Slough pumping plants, and Contra Costa Water District's pumping plants. This includes areas south and west of the Delta, such as Contra Costa, Alameda, and Santa Clara counties.

- Senior downstream water rights, existing CVP and SWP and other water rights diversions including CVP 215 water and Article 3F water and SWP Article 21 (interruptible supply), and other more senior flow priorities (such as diversions associated with Freeport Regional Water Project and existing Los Vaqueros Reservoir) have been satisfied;
- Flows are available for diversion above flows needed to meet all applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time that diversion occurs. This would include, but is not limited to any flow requirements in Water Right Decision 1641 (SWRCB, 2000), the 2019 ROC on LTO Biological Opinions (USFWS 2019 and NMFS 2019) and the SWP ITP (CDFW 2020); and
- There is available capacity at the RBPP and in the TC Canal and GCID facilities to divert and convey water to Sites Reservoir, above the capacity needed for deliveries to existing TC Canal users and within the GCID service area.

The RBPP would serve as the primary diversion location and would divert water from the Sacramento River to Funks Reservoir through the TC Canal and into the Sites Reservoir through the Funks PGP and the I/O Works. Up to 2,100 cfs, plus losses, would be diverted at the RBPP for the Project. The RBPP has an existing fish screen that meets NMFS and CDFW fish screen criteria through which all flows diverted for the Project would be screened. The Hamilton City Pump Station would serve as the secondary diversion location and would divert water from the Sacramento River to the new TRR through the GCID Main Canal and into the Sites Reservoir through the TRR PGP and the I/O Works. Up to 1,800 cfs, plus losses, would be diverted at the Hamilton City Pump Station for the Project. The Hamilton City Pump Station has an existing fish screen that meets NMFS and CDFW fish screen criteria through which all flows diverted for the Project would be screened. Although the RBPP will be the primary diversion point, both facilities would be operated simultaneously when river conditions, facilities, and capacity are available for a maximum combined diversion rate of 3,900 cfs, plus losses.

Estimated total annual diversion of Sacramento River water from both diversion facilities to Sites Reservoir could be up to the full reservoir amount. Based on model simulations, the estimated annual diversions would usually range from 60 thousand acre-feet (TAF) per year to 390 TAF per year, depending on hydrologic conditions, availability of Sacramento River water, and diversion and conveyance facility capacities.

Diversion Criteria

The Project would be operated to meet the diversion criteria summarized in Table 2-5 and described in more detail below. All diversion criteria must be met for the Project to divert.

Table 2-5. Summary of Project Diversion Criteria

Location (Listed from North to South)	Criteria
Bend Bridge Pulse Protection	Protection of all qualified precipitation-generated pulse events (i.e., peaks in river flow rather than scheduled operational events) from October to May based on the detection of fish presence and migration during the beginning of the flow event. For each event where fish presence and migration is detected, diversions from the Sacramento Riverwould cease for 7 days.
Minimum Bypass Flows in the Sacramento River at the RBPP	3,250 cfs minimum bypass flow at all times; rate of diversion controlled by fish screen design
Minimum Bypass Flows in the Sacramento River at the Hamilton City Pump Station	4,000 cfs minimum bypass flow at all times; rate of diversion controlled by fish screen design
Minimum Bypass Flows in the Sacramento River at Wilkins Slough	8,000 cfs in April and May; 5,000 cfs all other times
Fremont Weir Notch Protections	No more than 1% reduction in flow over weir when spill over the weir are less than 600 cfs. No more than a 10% reduction when flow over weir when spills over the weir are between 600 cfs and 6,000 cfs. No restriction when flows over the weir are greater than 6,000 cfs
Freeport, Net Delta Outflow Index, X2, and Delta Water Quality	Operations consistent with all applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time that diversion occurs

Bend Bridge Pulse Protection

All Action Alternatives would implement a pulse flow protection measure to be applied to all qualified precipitation generated peaks in the hydrograph that originate primarily from tributaries to the Sacramento River that flow into the mainstem Sacramento River downstream of Keswick Dam from October through May. The pulse flow protection measure addresses the survival of migrating juvenile winter-, spring-, fall-, and late fall-run Chinook salmon (*Oncorhynchus tshawytscha*), and steelhead (*Oncorhynchus mykiss*) through the middle reaches of the Sacramento River. Pulse flows during this period would provide flow continuity between the upper and lower Sacramento River (i.e., below Wilkins Slough) and are expected to enhance survival of these migratory fish (Michel et al. 2015, In Press ; Notch 2017) as fish movement is thought to occur in response to increased flow, water-year type and turbidity associated with the beginning of a precipitation-generated high-flow event (Poytress et al. 2014, Cavallo et al. 2015).

Pulse protection would occur from October through May to address outmigration of juvenile winter-, spring-, fall- and late fall-run Chinook salmon, as well as a portion of the steelhead juvenile outmigration period. The Project's Adaptive Management Plan would include a fish monitoring program capable of detecting a migratory fish response during the beginning of a

precipitation-generated high flow event and continuing research would be utilized to operate to, and further refine the pulse flow protection strategy.

The Adaptive Management Plan and fish monitoring program would be developed in cooperation with Reclamation and the fishery resource agencies, including CDFW, NMFS, and USFWS and would be integrated with existing fish monitoring programs to the extent possible. For example, the USFWS monitoring program at RBDD, conducted for purposes of estimating fish production indices in the spawning reach above RBDD, is particularly relevant. This program could be supplemented with additional monitoring sites downstream, as necessary. The Authority would coordinate with the fishery resource agencies to define an appropriate capture rate or other metric to define the onset of a fish pulse stimulated by increasing flows and turbidity from storm events. The following criteria define a qualified pulse event:

- Outmigration of anadromous fish is detected based on the Adaptive Management Plan and fish monitoring program.
- If the 3-day trailing average of Sacramento River flow at Bend Bridge exceeds 8,000 cfs and 3-day trailing average tributary flow upstream of Bend Bridge (Cow Creek, Cottonwood Creek and Battle Creek) exceeds 2,500 cfs, a pulse event is initiated if the previous day was not already in a pulse event. This flow level is consistent with Sacramento River flow of 10,700 cfs at Wilkins Slough (considering increases from tributary inflows).
- A pulse event terminates seven days after initiation.
- After completion of a pulse event, the following conditions must occur before another pulse event is triggered: (1) 3-day trailing average of Sacramento River flow at Bend Bridge was less than 7,500 cfs for seven consecutive days; and (2) 3-day trailing average of tributary flow upstream of Bend Bridge (Cow Creek, Cottonwood Creek and Battle Creek) was less than 2,500 cfs for seven consecutive days.

Project diversions from the Sacramento River would not occur during a qualified pulse event. Diversions are otherwise unrestricted by the Bend Bridge Pulse Flow protection criteria.

Minimum Bypass Flows in the Sacramento River at the RBPP

A minimum bypass flow in the Sacramento River at the RBPP of 3,250 cfs would be in place at all times to stabilize flows in the Sacramento River and protect salmon redds. When flow in the Sacramento River is less than 3,250 cfs at the RBPP, the Project would not divert. When flows in the Sacramento River exceed 3,250 cfs at the RBPP, diversions at the RBPP may occur and the rate of diversion at the RBPP would be controlled by and scaled to the fish screen design as shown in Figure 2-36, until the full 2,100 cfs diversion could be achieved at flows of approximately 7,860 cfs in the Sacramento River.

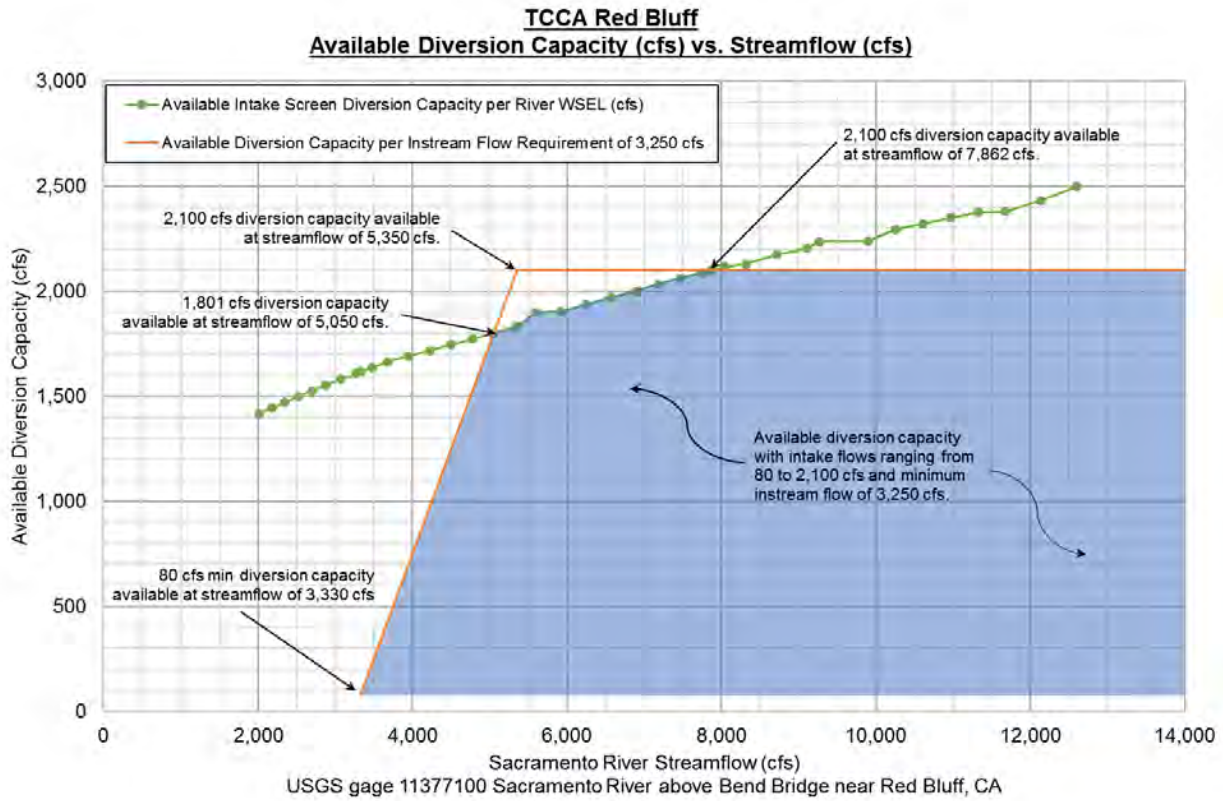


Figure 2-36. Available Diversion Capacity versus Streamflow at RBPP

Minimum Bypass Flows in the Sacramento River at the Hamilton City Pump Station

A minimum bypass flow in the Sacramento River at the Hamilton City Pump Station of 4,000 cfs would be in place at all times to stabilize flows in the Sacramento River and ensure proper function of the fish screen. When flow in the Sacramento River is less than 4,000 cfs at the Hamilton City Pump Station, the Project would not divert. When flows in the Sacramento River exceed 4,000 cfs at the Hamilton City Pump Station, diversion at the Hamilton City Pump Station may occur and the rate of diversion at the Hamilton City Pump Station would be controlled by and scaled to the fish screen design as shown in Figure 2-37, until the full 1,800 cfs diversion could be achieved at flows of about 5,800 cfs in the Sacramento River.

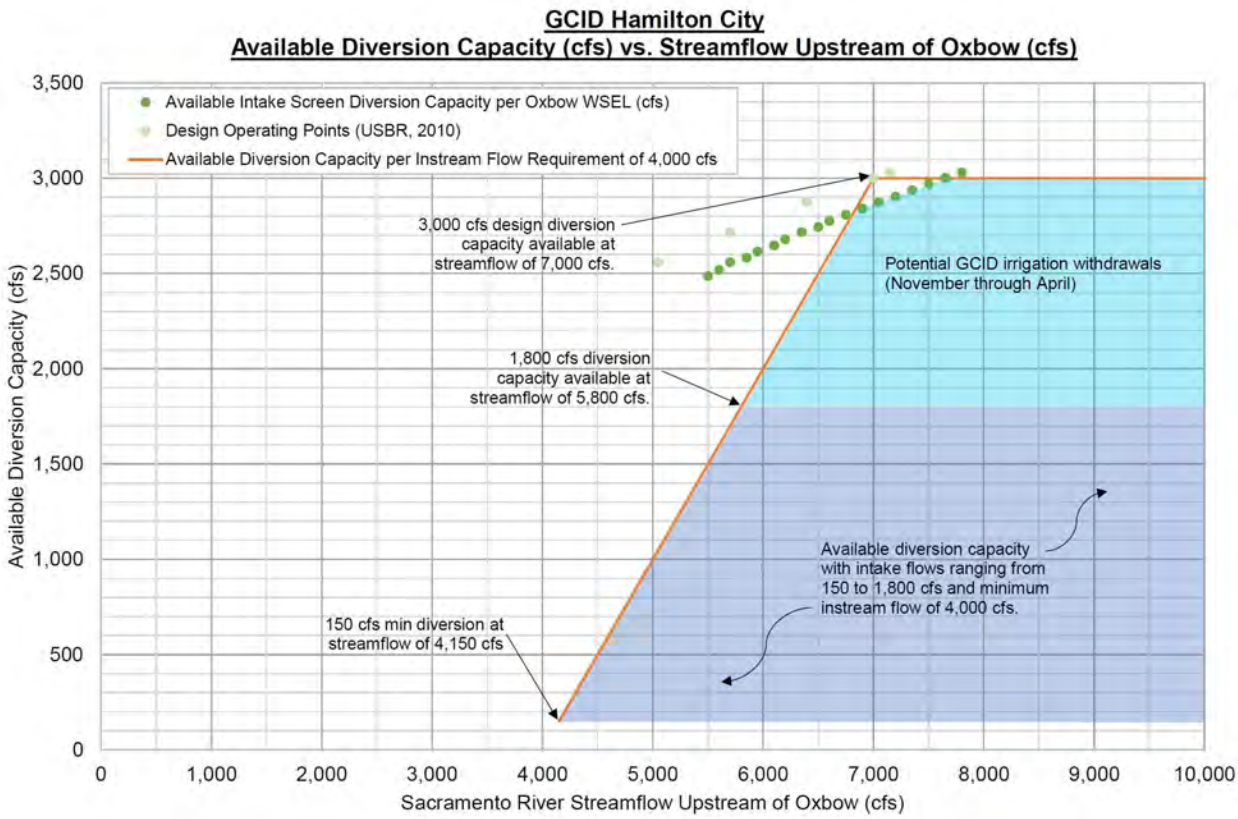


Figure 2-37. Available Diversion Capacity versus Streamflow at the Hamilton City Pump Station

Minimum Bypass Flows in the Sacramento River at Wilkins Slough

In addition to the minimum bypass flows in the Sacramento River at RBPP and the Hamilton City Pump Station, a minimum bypass flow of 8,000 cfs in the Sacramento River at Wilkins Slough would be in place in April and May and 5,000 cfs at all other times. This bypass flow regime is consistent with recommendations of 10,700 cfs at Wilkins Slough (considering increases from tributary inflows) and based on research performed over the last 30 years; focusing on recent studies that relate survival of outmigrating juvenile Chinook salmon to flows in the Sacramento River (Michel 2010, del Rosario et al. 2013, Poytress et al. 2014, Michel et al. 2015, Iglesias et al. 2017, Notch 2017. Henderson et al. 2018, Hassrick et al. In Prep, and Michel et al. In Press).

Fremont Weir Notch Protections

The Project's diversion criteria have been formulated to avoid impacts on Reclamation's ability to implement its obligations in the 2019 NMFS ROC on LTO Biological Opinion to implement the Yolo Bypass Restoration Salmonid Habitat Restoration and Fish Passage Implementation Plan and provide 17,000+ acres of inundation in the Yolo Bypass from December to April (NMFS 2019). For the purposes of modeling the effects of the Project, Project diversions may occur if no more than a 1% reduction in flow over the weir would occur when spills over the weir are less than 600 cfs. Project diversions may occur if no more than a 10% reduction in flow

over the weir would occur when spills over the weir are between 600 cfs and 6,000 cfs. When flows over the Fremont Weir are greater than 6,000 cfs there would be no restriction on Project diversions. These limitations are intended to reduce changes to spill frequency and duration.

Freeport, Net Delta Outflow Index, X2, and Delta Water Quality

For lower Sacramento River and Delta locations, the Project would operate in a manner that would not adversely affect the ability of others to meet all applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time that diversion occurs.

Storage in Sites Reservoir

Water would be stored in Sites Reservoir until requested for release by a Sites Storage Partner. The Authority would prepare a Reservoir Management Plan that would describe the management of water resources in Sites Reservoir which would include a plan for monitoring water quality (see Section 2.5.2.4 for more information on the Reservoir Management Plan).

Releases from Sites Reservoir

Releases from Sites Reservoir would be made in any water year type to meet the needs of the Sites Storage Partners, including the water supply related environmental benefits under WSIP. The releases would be made from the I/O Works in Sites Reservoir and conveyed via pipeline to either Funks Reservoir or the TRR. Under normal operating conditions, 2,000 cfs would be released from the I/O Works to Funks Reservoir and 1,000 cfs would be released from the I/O Works to the TRR. The I/O Works would allow withdrawal of water from Sites Reservoir over a range of depths to manage release water temperatures.

From Funks Reservoir or the TRR, releases would be conveyed as follows:

- **Release for Sites Storage Partners Along the TC Canal and the GCID Main Canal –** Releases would be made to Funks Reservoir or the TRR and conveyed to the respective Sites Storage Partner via the existing TC Canal and GCID facilities.
- **Releases for Sites Storage Partners Along the Sacramento River –** Releases for Sites Storage Partners along the Sacramento River would generally be made via exchange as water from Sites Reservoir cannot be physically conveyed to any Sites Storage Partner on the Sacramento River between the GCID Hamilton City Pump Station and Knights Landing. Real-time exchanges, primarily with GCID, but also with Reclamation would be used for these Sites Storage Partners.
- **Releases for Sites Storage Partners Along the CBD, Yolo Bypass, and North Bay Aqueduct –** Releases for Sites Storage Partners, including some of the Proposition 1 water, would be made to Funks Reservoir. This water would then be conveyed down the TC Canal to the new Dunnigan Pipeline and released into the CBD. The water would then be conveyed down the CBD, through the Knights Landing Ridgecut, to the Yolo Bypass/Cache Sough Complex for Proposition 1 benefits or for diversion into the North Bay Aqueduct.

- **Releases for Sites Storage Partners South-of-Delta –** Releases for Sites Storage Partners who are located south of the Delta, including water for Incremental Level 4 Refuge water supply benefits under WSIP, can take a combination of different paths under all Action Alternatives. Releases could be made to Funks Reservoir, conveyed down the TC Canal to the new Dunnigan Pipeline and released into the CBD. This water would then be conveyed down the CBD, through the Knights Landing Ridgecut, to the Yolo Bypass/Cache Sough Complex and into the North Delta. Once in the Delta, this water could be diverted at any of the South Delta pumping facilities (SWP's Banks Pumping Plant, Reclamation's Jones Pumping Plant or Rock Slough Pumping Plant, or Contra Costa Water District's pumping plants) and conveyed to the respective Sites Storage Partner using existing conveyance facilities and mechanisms. Alternatively, once releases are in the CBD, they could be conveyed to the Sacramento River via the Knights Landing Outfall Gates. Once in the Sacramento River, these releases would enter the Delta and could be diverted at any of the South Delta pumping facilities. Releases for Sites Storage Partners who are located south of the Delta, including water for Incremental Level 4 Refuge water benefits under WSIP, may also be made by exchanges with Reclamation and DWR. Releases for Sites Storage Partners south-of-Delta would generally be made during July to November to coincide with available pumping capacity at the South Delta pumping facilities and would be subject to applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time.

Releases would be coordinated with Reclamation and DWR to ensure there are no conflicts with CVP and SWP operations and no adverse effects to the CVP and SWP. In addition, releases would be coordinated with Reclamation and DWR to ensure that there is available capacity to redivert releases at the South Delta pumping facilities for any releases that would be pumped at these locations. The majority of releases to the Sacramento River would occur when the CVP and SWP are in balanced conditions, that is releases from upstream reservoirs and unregulated flow approximately equal water supply needed to meet Sacramento Valley in-basin uses and CVP and SWP exports.

Sites Reservoir is currently estimated to have a dead pool of approximately 17,700 AF, below which water cannot physically be removed from the reservoir using the I/O Works. However, the Authority is currently planning to operate to a dead pool of 120,000 AF under normal conditions. The operational dead pool amount may be revised and reduced in final design. Sites Reservoir may also be drawn down below the operational dead pool in drought situations.

Coordination with CVP and SWP

Operations of all Action Alternatives would be coordinated with Reclamation and DWR to prevent conflicts with the CVP and SWP operations or add additional obligations on the CVP or SWP to meet applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time. The Authority is currently working with Reclamation and DWR to establish operating agreements with both agencies that would describe the details of the coordination and collaboration that would take place in the operations of the Project.

It is expected that the Project would also be incorporated into existing and future technical and advisory teams in which Reclamation and DWR participate in to coordinate the CVP and SWP operations with the regulatory agencies. This could include, but would not be limited to, the Sacramento River Temperature Task Group and Delta Operations for Salmon and Sturgeon Group. This would allow for better and more efficient coordination of the Project's operations, in concert with the CVP and SWP operations, with the regulatory agencies along with providing opportunities to work collaboratively to achieve species benefits in the Sacramento Valley and the Delta.

All of the Action Alternatives also include the possibility of exchanges of water with the CVP and SWP. Exchanges have the potential to assist the CVP and SWP in meeting their regulatory obligations. Exchanges are expected to primarily occur with Shasta Lake and Lake Oroville, but could also occur with Folsom Lake and real-time with local participants. Exchanges would only be conducted when they would be neutral or beneficial to CVP and SWP operations and not impact the ability of the CVP or SWP to meet applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time. Exchanges are described in more detail below.

- **Shasta Lake Exchanges –** Exchanges under the Project with Shasta Lake would be formulated to target cold-water pool preservation and anadromous fish benefits. Shasta Lake exchanges would occur in years when forecasted temperature-based mortality of early life stage winter-run Chinook salmon would be reduced if the exchange is in place. Under a Shasta Lake exchange, water would be released from Sites Reservoir in the spring to meet CVP purposes, including CVP water service and/or repayment contractors in the Sacramento Valley that could physically receive water from Sites Reservoir. By reducing releases from Shasta Lake in the spring, storage and the cold-water pool in Shasta Lake would be preserved for use later in the year, typically during critical months of the cold-water pool management season (August and September). In late-summer and fall (i.e., August through November), Reclamation would release an equivalent amount of water from Shasta Lake for Sites Storage Partners. All exchange water would be released from Shasta Lake in late summer and fall and no exchanged water would be carried over from year to year.
- **Lake Oroville Exchanges** – Exchanges under the Project with Lake Oroville would be formulated to facilitate Sites Project deliveries to Sites Storage Partners and refuges south of the Delta and may also improve cold-water pool conditions at Lake Oroville. Exchanges with Lake Oroville are expected to happen more frequently and would be driven by a variety of factors. Under a Lake Oroville exchange, water would be released from Sites Reservoir primarily in June and July to meet SWP purposes. By reducing releases from Lake Oroville in these months, storage and the cold-water pool in Lake Oroville would be preserved for use later in the year, typically during critical months of the cold-water pool management season (August and September). In late-summer and fall (i.e., August through November), DWR would release an equivalent amount of water from Lake Oroville for Sites Storage Partners. All exchange water would be released from Lake Oroville in late summer and fall and no exchanged water would be carried over from year to year.

- **Folsom Lake Exchanges** – Exchanges with Folsom Lake would be operated similarly to exchanges with Shasta Lake. Sites Reservoir would release water in the spring and early summer to meet CVP purposes in lieu of Reclamation releases at Folsom Lake. An equivalent amount of water would then be released from Folsom Lake in the late summer and fall for Sites Storage Partners. All exchange water would be released from Folsom Lake in late summer and fall and no exchanged water would be carried over from year to year.
- **Real-Time Exchanges with Local Participants** – To support timing of releases and deliveries to Sites Storage Partners north and south of the Delta, in-lieu exchanges with local participants may occur. This type of exchange is most likely to occur with GCID, but could also occur with Sacramento River Settlement Contractors and Reclamation. Instead of diverting all of its CVP supply from the Sacramento River, the contractor would receive a portion of its CVP supply from Sites Reservoir. A portion of the water released from Shasta Lake to meet the contractor's CVP supply would be left in the Sacramento River (not diverted by the contractor) and used for other Sites Storage Partners.

Funks Creek and Stone Corral Creek Releases

The Project includes releases from Sites Reservoir into both Funks and Stone Corral Creeks. These releases would be made to comply with California Fish and Game Code Section 5937 and ensure no harm to downstream water right holders on these creeks. At this time, access to the creeks is restricted and there is not sufficient existing information on these two creeks, including current fish assemblage, channel capacity, and existing habitat, to determine a specific release pattern or approach to releases into these two creeks. Field studies would be conducted once access is obtained and before final design for Sites and Golden Gate Dam is completed to determine the following:

- Existing fish assemblage in these creeks, including fish species presence and habitat use;
- Characterization of habitats available (e.g., spawning, rearing, foraging, and sheltering habitats) at varying flow levels;
- Characterization of flows, including assessing the base flow during the summer months;
- Conducting a fluvial geomorphologic study to characterize bed load and flow levels necessary for mobilization; and
- Hydrological studies to define flow temperature relationships.

Using information from these field studies, along with currently available information, the Authority would prepare a Funks and Stone Corral Creeks Operations Plan that would identify the approach for releases, including release schedule and volumes, a monitoring plan, and an adaptive management plan to maintain fish in good condition consistent with California Fish and Game Code Section 5937. Releases into these creeks need to be made in consideration of the flood control benefits of the Project and in such a way as to not overtop the stream banks and flood downstream areas.

Water released into Funks Creek would be made through the transition manifold at the base of Golden Gate Dam and a new pipeline that terminates at Funks Creek below Golden Gate Dam. These facilities are currently being designed to carry up to 100 cfs with a release range of 0 to 100 cfs into Funks Creek. Water released into Stone Corral Creek would be made through the permanent outlet at Sites Dam. This outlet is currently being designed with a release range of 0 to 100 cfs, with an emergency release capacity of up to 2,500 cfs.

Flood Control

All Action Alternatives would provide flood damage reduction benefits to the communities of Maxwell and Colusa, local agricultural lands and rural homes and I-5 by impounding Funks Creek and Stone Corral Creeks. These flood control benefits are inherent in the design of the Project and no specific operational criteria are necessary to achieve these benefits.

Emergency Release

All Action Alternatives include the design and operation of facilities to meet DSOD criteria and requirements for emergency reservoir drawdown. During an emergency release event, Saddle Dams 3 and 5 (Alternative 1 and 3) and Saddle Dam 8B (all Action Alternatives), the I/O Works, and Sites Dam would operate simultaneously to release water. Once the water level fell below the levels of the saddle dam intakes, the I/O Works and Sites Dam would operate solely to release the remaining water. The emergency releases would be in accordance with DSOD requirements and would occur as follows:

- Under Alternative 1 and 3 only, the emergency release structures at Saddle Dams 3 and 5, located at the north end of the reservoir, would release water into the Hunters Creek watershed. These two structures could only be used during the emergency drawdown in the first 7 days, at a rate of 1,000 and 1,200 cfs, until the water level fell below their outlet.
- Under All Action Alternatives, the spillway on Saddle Dam 8B would also release to Hunters Creek. The size of the spillway would accommodate the peak outflow of a PMF event or the steady-state flow if an over-pumping event occurred. The design and size of the spillway assumed that a PMF overflow event and an over-pumping event have a very low probability of simultaneous occurrence.
- The permanent outlet on Sites Dam would release to Stone Corral Creek at a maximum rate of approximately 2,500 cfs.
- The I/O tunnels would release to Funks Reservoir and TRR at a rate of 16,000 cfs, with 9,000 cfs being discharged to Funks Reservoir and 7,000 cfs to the TRR with a maximum velocity of 40 feet per second in the pipelines. To achieve the flows needed for the emergency releases, the velocities in the pipes would exceed the 20 cfs criteria normally used by Reclamation. Discharges to the Funks Reservoir would be accommodated because its spillway is designed for 22,000 cfs which is greater than the 16,000 cfs emergency drawdown flow. The TRR would need to be designed with a spillway into Funks Creek of roughly 7,000 cfs to allow for this. Additional energy dissipation structures at Funks Reservoir and the TRR would be required for the emergency flows.

2.5.2.2 Energy Generation and Energy Use

All Action Alternatives would require power to run facilities and pump water and would also generate incidental power. The pumping energy requirements and power generation are summarized in Table 2-6 and Table 2-7 for all Action Alternatives.

Table 2-6. Pumping Summary for All Action Alternatives

Site	Net Pumping Power (MW)	Other Auxiliary Loads (MW)	Transformer and T Line Losses (MW)	Total Pumping Power (MW)	Total Pumping Power @ 0.85 PF (MVA)
Funks	67.1	1	0.1	68.2	80.2
TRR	75.4	1	0.1	76.5	90.0
Total	142.5	2	0.2	144.7	170.2

Notes:

MW = megawatts; PF = power factor; MVA = megavolt amperes

Table 2-7. Generating Summary for All Action Alternatives

Site	Net Generating Power (MW)	Other Auxiliary Loads (MW)	Transformer and T Line Losses (MW)	Total Power Generation (MW)	Total Power Generation @ 0.85 PF (MVA)
Funks	48.1	1	0.1	47.0	55.3
TRR	27.4	1	0.1	26.3	31.0
Total	75.5	2	0.2	73.3	86.2

Notes:

MW = megawatts; PF = power factor; MVA = megavolt amperes

All Action Alternatives would generate incidental power only when water is released from Sites Reservoir at the Funks and TRR PGPs. Power generation would be limited to 40 megawatts per facility and as such, would not require a Federal Energy Regulatory Commission license per the "Qualifying Conduit Hydropower Facility" under the Hydropower Regulatory Efficiency Act of 2013, as amended by America's Water Infrastructure Act of 2018. All Action Alternatives would include electrical substations at Funks Reservoir and the TRR. These substations would service a net pumping energy demand estimated at 80 megavolt amperes (MVA) at Funks Reservoir and 90 MVA at the TRR (i.e., 170 MVA of demand load total). Because of the size of the pumping units, no backup generation is planned for pumping facilities.

While hydropower generation would be an incidental benefit of conveying water through specific Project facilities and would be influenced by the timing of releases and movement of water and seasonal operational decisions, the Authority would work to schedule releases and outages such that it sought to maximize power generation to offset the Project's power needs. Additional operations power needs beyond those generated by the Project would be purchased from market sources, with a target of purchasing at least 60% of the Project's operations power needs from renewable, carbon-free sources from the start of operations to 2045. Starting in

2045, the Authority would target purchasing 100% of the Project's operations power needs from renewable, carbon-free sources. This target does not include any operational power needs attributable to Reclamation's participation, including the conveyance and pumping of Incremental Level 4 Refuge water supply.

2.5.2.3 Facility Operations and Maintenance

Operations and maintenance activities for all facilities, including recreational areas, would include debris removal, vegetation control, rodent control, erosion control and protection, routine inspections (dams, tunnels, pipelines, PGPs, I/O Works, fencing, signs, and gates), painting, cleaning, repairs, and other routine tasks to maintain the facilities in accordance with design standards after construction and commissioning. Routine visual inspection of the facilities would be conducted to monitor performance and prevent mechanical and structural failures. The Authority would implement operations and maintenance BMPs that are described in Section 2.5.4, *Project Commitments and Best Management Practices Common to All Alternatives*.

The RBPP has an established operations and maintenance plan. The two new pumps at the facility would be incorporated into the existing plan and operated and maintained as part of the overall activities at the facility. Improvements to the GCID facilities would likewise be incorporated into GCID's regular operations and maintenance activities.

Operations and maintenance activities unique to the TRR include daily visual inspections, setting and checking water control structures, annual and five-year dam safety inspections, quarterly vegetation and weed abatement and rodent control, annual preventative leak location surveys and evaluations of the reservoir liner, instrumentation monitoring and maintenance, and annual debris removal at the spillway outfall to Funks creek. Replacement of the TRR liner may be needed on an infrequent basis. Operations and maintenance activities unique to the TRR and Funks pumping plants and hydroelectric turbines would include greasing, painting, oiling, and generally keeping the pumps in good operating condition. Activities would also include annual inspections of pumps, interior coating condition inspection, pump leakage inspections, temperature and pressure checks, and clean exterior surfaces and check for leaks. Repair and replacement of pump components would be needed on a periodic basis. Monthly brake airline filter and lubricator inspection and maintenance would also be completed at the hydroelectric turbines. Energy dissipating units would be visually inspected and lubrication of bearings would be conducted on an as needed basis.

Operations and maintenance activities unique to the electrical switchgear include visual and mechanical inspections, moisture and corrosion inspections, general wiring checks, and insulator and barrier checks. A series of tests would be conduction on regular intervals, including but not limited to insulation electrical test, control wiring electrical tests, circuit breakers and switch tests, system function tests, and surge arrestor tests. Electrical switchgear would be maintained, repaired or replaced as needed to continue safe and efficient operations.

Pipelines and tunnels would be inspected at least every 5 years and remote operated vehicle (ROV) inspections would be acceptable. ROV inspections would not require dewatering the tunnels or pipelines. If physical inspections of tunnel interiors would be required, the tunnels would be completely shut down. Tunnel inspections may be completed during normally

scheduled shutdowns when water is not being conveyed in or out of the reservoir. The tunnel shutdown duration could run from a few days (inspection) to 2 weeks (if maintenance is required).

Different components of the I/O Works would need to be inspected and maintained at varying frequencies. Any port gate that was not operated in a given year based on reservoir level would be functionally tested at least once during that year. In general, pipeline appurtenances (e.g., air/vacuum valves, blowoffs) would be inspected and functionally tested where possible annually. Most of the mechanical components in the multi-level I/O tower could be functionally tested and/or maintained without requiring a shutdown (as there would be multiple tiers from which to draw water).

Maintenance of access roads includes replacing gravel or scraping and filling of ruts to keep the roads in good condition along with pavement replacement and repair for paved roads. Minor structures maintenance includes repair or replacement of gates, locks or fences, painting gates, replacing lost or damaged signage, and lubricating gates.

Maintenance of lands could include grading fire breaks/trails, maintaining vegetation (e.g., grazing, tilling, or disking), and performing limited prescribed/controlled burns.

In general, operations and maintenance activities could occur on a daily, annually, periodically (as needed), and long-term basis. It is estimated that 45 operations and maintenance workers would be needed to perform operations and maintenance activities (based on three shifts per day, 365 days a year).

2.5.2.4 *Operations and Management Plans*

The Authority would develop and implement a number of operations and management plans to govern the operations and maintenance activities of Project. These plans are described below.

Reservoir Operations Plan

The Reservoir Operations Plan would describe the management of water operations, including releases into Funks and Stone Corral Creeks. This plan would include but may not be limited to the following:

- **Diversions to Sites Reservoir** – Mechanics on how diversions are scheduled and managed, including diversion criteria and operating requirements for diversions.
- **Storage in Sites Reservoir** – How losses and evaporation are accounted for, how exchanges and transfers are managed (both between Sites Storage Partners and with non-Sites Storage Partners), and the process for leasing or sharing storage space.
- **Releases from Sites Reservoir** – When and how water can be released to each facility, how release orders are made and adjusted, and how releases are prioritized when necessary.
- **Flows in Funks and Stone Corral Creeks** – Release operations for releases into Funks and Stone Corral Creeks.

- **Flood Control and Health and Safety Considerations** – Descriptions of how emergencies should be handled and processes for notification in the event of emergencies. Emergency flow releases will be addressed in an Emergency Action Plan.

A draft of the Reservoir Operations Plan is expected to be completed in late 2021, with additional refinements and subsequent drafts as operational components are finalized (such as final permit conditions and agreements with Reclamation and DWR are completed). A complete Reservoir Operations Plan would be prepared at least one year prior to Project operations being initiated.

Reservoir Management Plan

The Reservoir Management Plan would describe the management of water resources within Sites Reservoir. This plan would include but may not be limited to the following:

- **Fisheries Management** – Target fisheries species composition and management activities for Sites Reservoir, including stocking strategies (if any), habitat enhancement measures, and monitoring efforts.
- **Reservoir Water Quality** – Baseline water quality metrics, standards, testing and monitoring protocols.
- **Vector Management** – Protocols and practices for communicating/coordinating with vector control authorities and determining how vector control would be managed at Sites Reservoir and the TRR.

The Reservoir Management Plan would be completed at least one year prior to Project operations being initiated.

Land Management Plan

The Land Management Plan would describe the management and maintenance activities on all non-recreation land resources held in fee or easement by the Authority. This plan would include management actions for buffer areas and the specific type and frequency of maintenance activities by location. Land management, maintenance, and monitoring actions for any mitigation areas owned by the Authority would also be described. The Land Management Plan would be completed within a year of the first fee title acquisition by the Authority and would be amended as needed as additional lands are acquired.

Recreation Management Plan

The Recreation Management Plan would describe the types, management, maintenance and monitoring activities on all Project recreation lands and areas. Development of the Recreation Management Plan would be coordinated with Colusa and Glenn counties and the local police, fire, and emergency response entities and organizations to ensure appropriate emergency response resources are available to respond to recreation emergencies. The Recreation Management Plan would be completed at least one year prior to the opening of Project recreational facilities.

Initial Reservoir Fill Plan

The Initial Reservoir Fill Plan would describe the monitoring program for Sites and Golden Gate Dams along with the saddle dams, saddle dikes, and areas around the reservoir that would be implemented during the initial filling of Sites Reservoir. The Initial Reservoir Fill Plan would be completed as part of the DSOD approval process and would be completed at least one year prior to beginning to fill Sites Reservoir.

Standard Operating Procedures

The Authority would prepare Standard Operating Procedures for all major Project facilities. These Standard Operating Procedures would include operational guidelines for facilities along with a schedule for inspection, monitoring and maintenance. The Standard Operating Procedures are expected to be completed as part of the DSOD approval process and would be completed prior to beginning operations of the specific Project facility.

Security Plan

The Authority would prepare a Security Plan for all major Project facilities. Preparation of the Security Plan would be coordinated with local, state, and federal law enforcement agencies to ensure a comprehensive security review and assessment along with appropriate security measures implemented for all major Project facilities. The Security Plan is expected to be completed as part of the DSOD approval process and would be completed during final design.

Emergency Action Plan

Consistent with California Water Code sections 6160, 6161, and 6002.5, an Emergency Action Plan would be prepared and submitted to the Governor's Office of Emergency Services (CalOES). The Emergency Action Plan would comply with SB 92 and CalOES's Emergency Action Plan requirements. The Emergency Action Plan would include, but may not be limited to the following: summary of responsibilities; notification procedures and flowchart; emergency response process; preparedness for different emergencies; and potential inundation mapping. The Emergency Action Plan would also identify the frequency for desktop and full exercises to prepare for emergencies.

2.5.3 Construction Considerations Common to All Action Alternatives

This section summarizes the activities associated with construction of the Project. Appendix 2C, Construction Means, Methods, and Assumptions, provides additional detail regarding the construction means and methods for various facilities that are ultimately incorporated into the impact analysis throughout Chapters 5 to 31 of this document.

2.5.3.1 Geotechnical Investigations

To support the engineering and final design of all facilities, the Authority would undertake preconstruction geologic, geotechnical, and geophysical investigations and testing. These geotechnical investigations and associated testing would also be required to support DSOD permitting processes. The investigations would be implemented in various locations in and around the footprints of the various facilities. Proposed investigations would be focused in areas where additional or updated data are needed for engineering cost refinement, for design, and to prepare permit applications. Depending on the time of year these activities would take place,

almost all of the geotechnical borings and geophysical work areas would require biological monitoring and/or some pre-activity clearance assessment and/or surveys due to their proximity to sensitive biological resources, particularly because the precise location of each individual investigation within its associated project feature has not been determined. The site-specific geotechnical investigations would include surface geologic mapping and surface and subsurface geophysical investigations as described below.

- Surface geologic mapping would generally involve noninvasive evaluation and documentation of geologic features and topography and would consist of soil mapping, walking surveys, and geophysical surveys.
- Surface geophysical investigations would generally involve non- or minimally invasive surface testing, such as seismic, gravitational, magnetic, electrical, and electromagnetic testing, and documentation of surface and subsurface site characteristics.
- Subsurface geotechnical investigations would involve surface and subsurface evaluation and documentation of site characteristics using test pits, borings and cone penetration test (CPT) probes, and fault trenching for different facilities.
    - All subsurface geotechnical investigation techniques would require some degree of ground disturbance, including spot leveling of areas directly below truck leveling jacks and holes measuring 2 to 10 inches in diameter through which augers and sampling equipment would be lowered to collect subsurface data and samples. Some drilling locations would require a bulldozer to create temporary roads for drill rig access. Test pits would be roughly 10 to 12 feet deep, and fault trenching would vary roughly 10 to 30 feet deep.
    - Borehole drilling would be performed using a drill rig that utilizes a combination of pilot bit, hollow stem flight augers, and rotary diamond core drilling. The hollow stem augers would likely have 8.5-inch outer diameter, and 4.25-inch inner diameter, with a 5-foot-long split tube inner barrel for dry core sample collection. Standard Penetration Test samplers may also be used at 5-foot intervals. All drill cuttings and any drilling fluids would be contained onsite in drums or bins and removed from the site to an existing permitted landfill or waste treatment facility. The temporary disturbance area would be approximately 20 by 50 feet (0.025 acre). Once each boring is complete, augers and testing equipment would be removed, the boring grouted and capped with soil, and the area cleared of work items (as required by permit requirements and at a minimum in accordance with California regulations and industry standards [Water Well Standards, DWR 74-81 and 74-90]). The permanent disturbance area would be approximately 1 square foot per borehole, except where a bulldozer created a larger area to access some locations.
    - CPTs are minimally invasive and consist of a specialized vehicle that inserts a 1.7-inch-diameter cone (probe) into the ground with a hydraulic direct push system. The temporary disturbance area would be approximately 20 by 50 feet (0.025 acre). Once each test is complete the rod would be retracted, the hole grouted and capped with soil, and the area cleared of work items (as required by permit requirements and at a minimum in accordance with California regulations and industry standards [Water

Well Standards, DWR 74-81 and 74-90]). The permanent disturbance area would be approximately 1 square foot per borehole.

Activities at most investigation areas would require approximately five personnel, including a driller/operator and one to two assistants, a utility locator, and a geologist/engineer to log the conditions encountered. Biological and cultural monitoring could also be required based on biological and cultural sensitivity and the type of activity being conducted. Each geotechnical investigation site would be active for a period ranging from 1 workday for CPT probes to 10 workdays for deep drill holes.

Additional details regarding geotechnical investigations for several of the key facilities are discussed below.

I/O Works

The investigation footprint for the I/O Works would encompass the area around each portal, at the I/O tower, and along each tunnel alignment. Geotechnical work would occur within the footprint of the construction area for these facilities. It is assumed that a boring would be required every 500 feet between the two I/O tunnel alignments and that each boring would extend two tunnel diameters below the tunnel invert, for a depth of approximately 70 feet.

A seismic fault study would map the faults adjacent to the I/O Works and ensure the location of the alignment would minimize fault crossings. The geotechnical investigation footprint for the seismic fault study would encompass the area between the mapped faults and I/O Works.

Current access to the site is limited given the existing topography and lack of access roads. It is assumed that track-mounted drill rigs would be used for the accessible locations and helicopters would be required to transport drill rigs to remote locations.

Dams and Reservoir

The dam foundations and reservoir rim would be the subject of specific geotechnical investigations. The investigations for the dams would involve geologic mapping, geophysics, borings, test pits, test excavations, and fault trenching. In-situ testing would include downhole geophysics (suspension and televiewer), packer testing, and dilatometer use. Piezometers would be installed at select locations to collect data on groundwater depth.

Objectives for the dam foundation and reservoir rim would differ. The objectives of the dam foundation exploration would be to evaluate excavation methods, excavated material use for dam construction, dewatering requirements for foundation excavation, foundation deformability, hydraulic conductivity and strength, foundation treatment, and foundation grouting/cutoff requirements. The dam foundation exploration objectives would also be to confirm fault locations and fault rupture potential. The objective of the exploration of the reservoir rim would be to evaluate seepage and stability. This investigation would use geologic mapping, geophysical investigations, and borings. In-situ testing would include downhole geophysics (televiewer) and packer testing.

Laboratory testing for the dam foundation and reservoir rim may include point load and unconfined compression on rock and index testing of soils. Laboratory testing for the rim of the reservoir may also include testing of remolded joint/shear material for strength evaluation.

Onsite Borrow Areas

The onsite borrow areas would have specific geotechnical investigations.

The objectives of the exploration for the borrow areas would be to confirm that the volume of materials available is at least 1.5 times the volume required and to evaluate excavation methods, excavation slopes at borrow locations, dewatering for borrow excavations, volume of materials generated from excavation, material types generated by excavation, requirements for processing of materials, properties of materials when placed and compacted in the dams, use of rock for riprap and aggregates, and types and volumes of materials generated from required excavations (i.e., at proposed locations of dams, structures, and tunnels).

The investigations for the borrow areas would involve geologic mapping, geophysics, borings, test pits, test excavations, test blasting and test fills. In-situ testing would include downhole geophysics (suspension and televiewer) and rippability studies. Laboratory testing would include point load and unconfined compression on rock and index testing of soils. Laboratory testing would also involve testing remolded samples for compaction, strength, permeability, compressibility, and erosion potential. Test fills would be performed on rockfill and random fill materials.

2.5.3.2 Land Acquisition and Resident Relocation Program

Prior to initiation of construction activities, land acquisition or establishment of temporary or permanent easements on private properties would be required. Overall, construction is expected to take approximately 6 years for reservoir facilities and 2 years for conveyance facilities. Construction of the reservoir facilities and the conveyance facilities would be conducted concurrently for a total construction duration of 6 years. Several factors could affect this anticipated schedule. Additional adjustments to the schedule would be addressed as required during Project development and implementation.

2.5.3.3 Additional Biological Surveys

After land acquisition and prior to construction actions, the Authority would complete additional biological surveys to confirm mapped habitat types and determine the presence/absence of biological resources including, but not limited to, special-status species, state and federal waters, sensitive plant communities and other applicable resources identified as sensitive by state, and/or federal agencies and discussed in Chapter 9, *Vegetation Resources*; Chapter 10, *Wildlife Resources*; and Chapter 11, *Aquatic Biological Resources* of this document. The Authority would use this information to assess the need for further technical studies (such as protocol surveys) and/or consultations with USFWS, CDFW, U. S. Army Corps of Engineers and/or State and Regional Water Quality Control Boards and identify resources that would be avoided during construction. In addition, the Authority would use this information to determine final mitigation types and acres for those areas that cannot be avoided.

2.5.3.4 Cultural Resources Management Plan

The Authority will develop and implement a Cultural Resources Management Plan prior to construction activities to guide the overall technical cultural resources efforts during construction activities. The Cultural Resources Management Plan will include, but not be limited to, a research design for the evaluation of known and predicted resources in the study area, methods used to assess the Project's effects to resources found prior to and during construction, procedures for the curation of recovered materials, procedures to be followed in the event of unanticipated discoveries, and procedures for the recovery and treatment of Native American and Non-Native American human remains. The Cultural Resources Management Plan is expected to be reviewed by the signatory parties to the Project's Programmatic Agreement under Section 106 of the National Historic Preservation Act.

2.5.3.5 Cemetery Relocation

Two private cemeteries in the inundation area would be relocated to a site approved for interment of human remains per requirements of the California Health and Safety Code (HSC § 7500-7527). The code requires a written order from the local health department or county superior court before human remains in a cemetery may be moved. The disinterment, transportation, and removal of human remains is subject to rules and regulations adopted by the board of health or health officer of the county.

2.5.3.6 Construction Disturbance Areas and Access

Construction activities would be confined to designated construction disturbance areas. These areas would also be used for construction vehicle and equipment parking and construction material storage. Special or sensitive sites near construction disturbance areas would be clearly marked (e.g., with temporary fencing, staking and flagging, pylons) prior to construction initiation. Construction personnel would be trained to recognize these markers and understand the equipment movement restrictions involved. Marking materials would be maintained until final cleanup and/or site restoration is completed, after which they would be removed. Potential staging areas would be located near each of the facilities. Construction-related traffic and local access routes are described in Section 2.5.1.7, New and Existing Roadways.

Demolition

Demolition would take place within the reservoir inundation area once lands are acquired. Demolition would include 20 houses, 25 barns, and 40 other structures (i.e., sheds, silos, and pump house); removal of existing septic tanks and other underground storage tanks; and removal of existing roads, fences, and other utilities. Demolition debris would be reused and recycled to the extent possible. Any materials not recyclable would be transported and disposed of at an approved landfill(s).

No demolition or relocation would be required for the TC Canal diversion, TRR-related facilities, Funks Reservoir-related facilities, or facilities associated with conveyance to the Sacramento River (i.e., TC Canal intake, Dunnigan Pipeline, or CBD outlet).

Clearing, Grubbing, and Topsoil Preservation

Clearing and grubbing would be required in the inundation area footprint and for most built facilities (i.e., dam facilities, I/O Works, Funks Reservoir facilities, TRR facilities, and Dunnigan Pipeline) and would entail removing and disposing of woody vegetation. This work is estimated to occur over 3 years. Materials cleared and grubbed would be composted, reused, placed in the reservoir inundation area to provide future fish habitat, or recycled to the extent possible.

Prior to construction, measures would be taken to preserve topsoil. In the inundation area where disturbance would occur, the topsoil material would be excavated, stockpiled separately, and used in one of several ways: for restoration of temporary work areas outside the inundation area, for support of native or naturalized plant species around a facility following construction, or for placement in agricultural areas. In the irrigated agricultural areas around the TRR and Dunnigan Pipeline, topsoil would be removed, stored, and replaced in areas of orchards, row crops, and rice fields. The topsoil would be restored so it has the same composition except where it is located on permanent maintenance roads. In the rangeland areas between the TRR and Funks Reservoir along the TRR pipeline route, the topsoil would be removed, stored, and replaced. This soil would be used to restore the rangeland to its same composition, except where it is located on permanent maintenance roads. The commercial area between I-5 and SR 99 would be restored to the pre-construction condition (i.e., unpaved large lot).

2.5.3.7 Construction Duration, Timing, and Sequence

Construction may start as early as spring 2024, depending on the timing of funding, design, and permitting. Initial activities would include developing the Sites Reservoir inundation area, constructing the access roads, and realigning/constructing the Sites Lodoga Road or South Road. Durations of construction were based on production rates associated with the anticipated equipment types needed for construction.

Construction of the Project components would generally be expected to occur in the sequence shown in Table 2-8 and detailed in Appendix 2C, Construction Means, Methods, and Assumptions. Some construction activities would be concurrent with the road relocations, but the existing Sites Lodoga Road and Huffmaster Road would not be closed until the road realignments were completed.

Table 2-8. General Construction Timing and Sequencing

Task Name	Duration	Start	Finish
Reservoir Site Development			
Reservoir Footprint Mitigation Actions	500 days	Q3 2025	Q2 2027
Site Access & Staging Development	100 days	Q3 2025	Q1 2026
Demolition & Clearing	100 days	Q3 2025	Q1 2026
Roads and Bridge			
Northern Construction Access Roads	284 days	Q3 2024	Q3 2025
Southern Construction Access Roads	274 days	Q3 2024	Q3 2025
Sites Lodoga Road Realignment and Bridge	680 days	Q3 2024	Q2 2027

Task Name	Duration	Start	Finish
Huffmaster Road Realignment	801 days	Q3 2024	Q3 2027
Process & Haul Filter Materials to Project	1180 days	Q1 2025	Q3 2029
Dams and Dikes			
Golden Gate Dam	1195 days	Q3 2024	Q2 2029
Sites Dam	956 days	Q3 2025	Q1 2029
Saddle Dam 3	771 days	Q3 2025	Q3 2028
Saddle Dam 5	821 days	Q3 2025	Q4 2028
Minor Saddle Dams (1, 2, 6, 8A)	711 days	Q4 2025	Q3 2028
Saddle Dam 8B - Spillway	257 days	Q4 2025	Q4 2026
Emergency Release Structure No. 1	285 days	Q4 2025	Q1 2027
Emergency Release Structure No. 2	410 days	Q1 2026	Q4 2027
Inlet Outlet Facilities	1015 days	Q4 2025	Q3 2029
Conveyance to Sacramento River			
Dunnigan Pipeline - Alt 1	355 days	Q3 2024	Q1 2026
Dunnigan Pipeline - Alt 2	505 days	Q2 2024	Q1 2027
Regulating Reservoirs and Conveyance			
Funks/TRR Pipelines	965 days	Q1 2025	Q4 2028
Funks Reservoir	523 days	Q2 2025	Q2 2027
Funks Pumping Generating Plant	1062 days	Q2 2025	Q2 2029
TRR East Reservoir	780 days	Q3 2025	Q3 2028
TRR East Pumping Generating Plant	1010 days	Q3 2025	Q4 2028
Transmission Powerlines	875 days	Q2 2025	Q3 2028
Substations	755 days	Q1 2026	Q1 2029
Sacramento River Diversion and Conveyance			
Red Bluff Pumping Plant Improvements	560 days	Q1 2025	Q1 2027
GCID Improvements	680 days	Q2 2025	Q4 2027

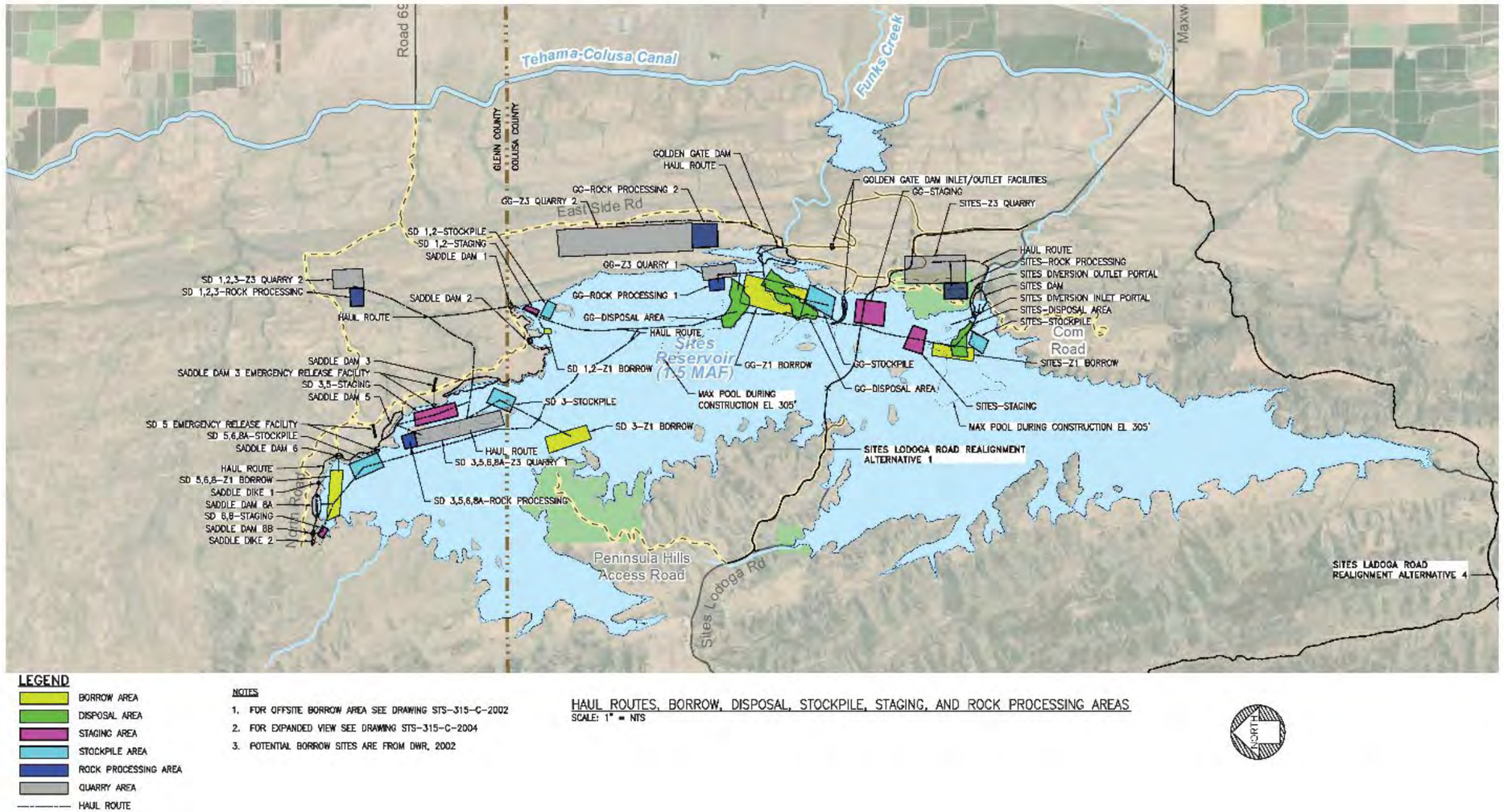
Table Notes
Q = Quarter

The general sequence of nonroad construction would begin with Golden Gate Dam, the I/O Works, and Dunnigan Pipeline, followed by Sites Dam, the larger saddle dams, regulating reservoirs and most associated facilities and pipelines. These facilities would be constructed over several years. Construction of the emergency release structures and substations would be initiated last in the sequence. The recreation areas would be completed after construction of the main dams and saddle dams and generally concurrently with the regulating reservoirs and conveyance complex for a period of 2 years (expected between 2025 and 2027).

Construction within 1,000 feet of occupied residences would be restricted between 10:00 p.m. and 7:00 a.m. to eliminate potential noise concerns. Construction in areas beyond 1,000 feet of occupied residents may occur 24 hours a day, 7 days a week.

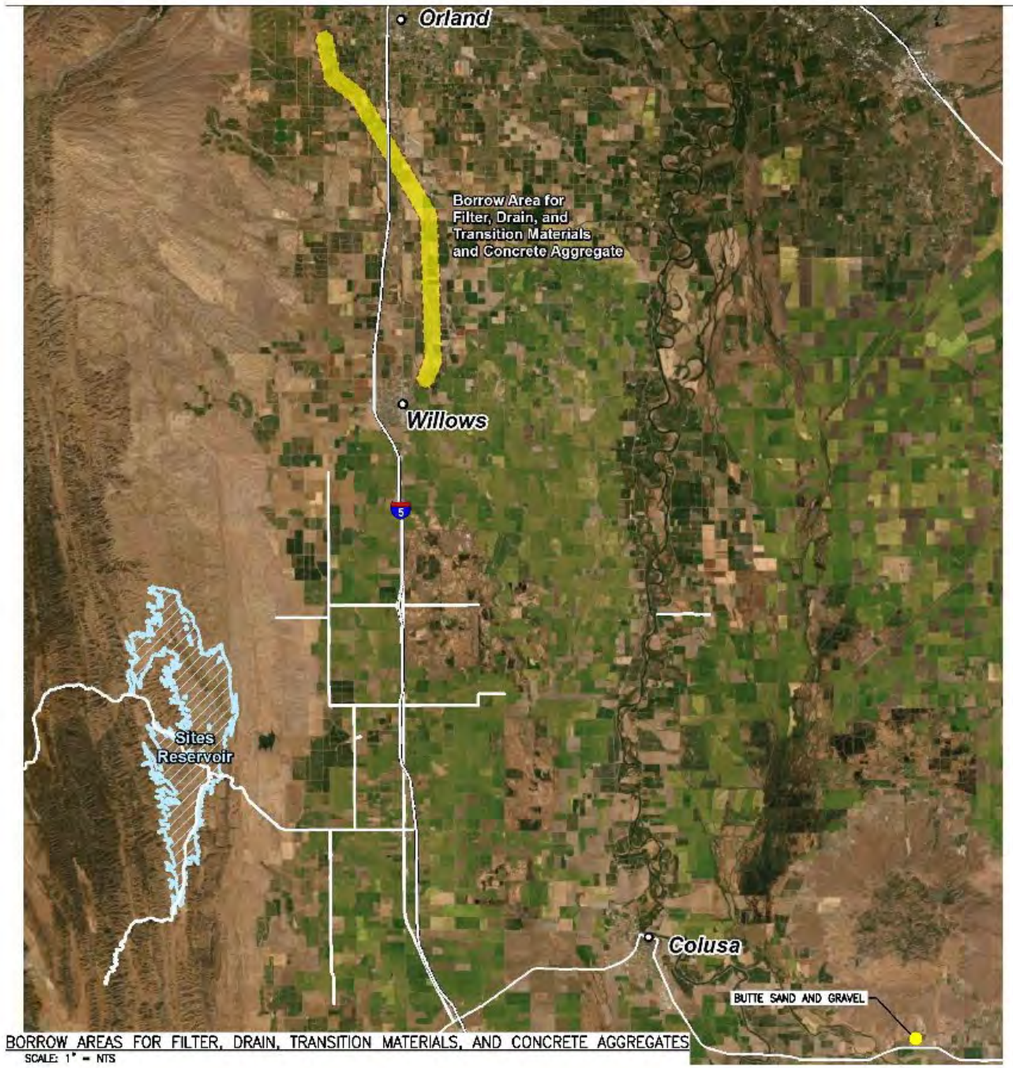
2.5.3.8 Borrow Areas and Quarries

It is anticipated that all earth and rockfill for the reservoir facilities (approximately 80% of materials required) would come from onsite sources (within the Sites Reservoir area or just outside Antelope Valley) and all aggregate for dam construction (approximately 20% of material required) would be obtained from offsite commercial sources. Figure 2-38 shows potential onsite sources and Figure 2-39 shows potential offsite commercial sources.



Source: AECOM, 2020
Drawing No. STS-315-C-2003

Figure 2-38. Onsite Borrow Area Details



NORTH

DRAFT

PROJECT
FEASIBILITY STUDY
NOT FOR
CONSTRUCTION

Source: AECOM, 2020
Drawing No. STS–315–C–2002

Figure 2-39. Offsite Aggregate Areas

2.5.3.9 Construction Utilities

Approximately 750,000 to 1,000,000 gallons/day (500 to 700 gallons per minute) would be needed for constructing the Golden Gate Dam, Sites Dam, saddle dams, saddle dikes, and I/O Works over a period of 4 years. As such, a total of approximately 3,360 acre-feet per year (AFY) to 4,480 AFY would be required over the 4 years. Approximately 75,000 gallons per day would be required for conveyance facilities over a period of 4.5 years. This water would be obtained from three potential sources: existing surface water from the Sites Storage Partners pursuant to existing water rights agreements; existing groundwater wells in the Sites Reservoir inundation area; and new groundwater wells in the Sites Reservoir inundation area. Batch water treatment plants would be used to treat water, as necessary, for the intended use. Construction water would be reused to the extent possible.

Anticipated construction energy needs are shown in Table 2-9.

Table 2-9. Estimated Temporary Construction Power Requirements

Location/Facility	Required Load, 3-Phase, KVA
Golden Gate and Sites Dams	
Contractor's and Owner's Office Complex	300
GG Quarry Feeder/Jaw for Rockfill	500
Sites Quarry Feeder/Jaw for Rockfill	500
GG Concrete Batch Plant	600
Sites Concrete Batch Plant	600
Contractor's Shop Complex	300
Saddle Dams	
Contractor's and Owner's Office Complex	300
Saddle Dams Quarry Feeder/Jaw for Rockfill	500
Concrete Batch Plant	600
Contractor's Shop Complex	300
Inlet-Outlet Facilities	
Contractor's and Owner's Office Complex	300
Concrete Batch Plant	600
Contractor's Shop Complex	200
Roads	
Contractor's and Owner's Office Complex	300
Asphalt Batch Plant	600
Contractor's Shop Complex	200
Conveyance	
Contractor's and Owner's Office Complex (3)	300 each
Concrete Batch Plant & CDSM Batch Plant	600 each

2.5.3.10 Batch Plants

For dam construction, batch plants would be established in the inundation area of the Sites Reservoir or in staging areas outside the inundation area near various reservoir facilities. Concrete batch plants would be necessary for the I/O Works, Golden Gate Dam, Sites Dam, diversions, saddle dams, and the bridge crossing the reservoir. Asphalt batch plants would be used for paving activities of public access and maintenance roads.

A concrete batch plant is equipment that combines water, admixtures, sand, aggregate, fly ash and cement to form concrete. In general, the concrete batch plant is anticipated to have the following features: mobile or semi-mobile (modular stationary) plants; capacity of 100 to 500 cubic yards per hour; at least three aggregate feed bins; and computerized batching/proportioning.

An asphalt batch plant is equipment that combines aggregate and asphalt to form asphalt to be used for road construction. In general, the asphalt batch plant is anticipated to have the following features: mobile or semi-mobile (modular stationary) plants; drum mixer type plant, but could be a weigh-batch type; capacity of 200 to 500 tones per hour, but could be lower for some of the smaller portions; at least four aggregate feed bins; and computerized batching/proportioning.

2.5.3.11 Construction Traffic and Equipment

Approximately 1,700 construction personnel would be working at the peak of construction. 1,000 of these personnel would be involved with reservoir facilities and 700 would be working on conveyance facilities. Expected highway truck trips per day associated with construction will range from 0.5 for installation of the new pump at the RBPP to 360 estimated trips for the construction of dams, dikes and other reservoir-related activities. Similarly, personnel vehicle trips associated with the same facilities will range from 2 to over 600 per day. Estimated vehicle trips per day for all construction activities are included in Appendix 2C.

Construction workers would likely commute to construction sites from regional population centers such as Maxwell, Willows, Orland, Williams, and Colusa, and from other northern California counties when specialty trades or skillsets are not available regionally.

Daily construction traffic would consist of trucks hauling equipment and materials to and from the worksites and the daily arrival and departure of construction workers. Construction traffic on local roadways would include dump trucks, bottom-dump trucks, concrete trucks, flatbed trucks for delivering construction equipment and permanent project equipment, pickups, water trucks, equipment maintenance vehicles, and other delivery trucks. Dump trucks would be used for earth moving and clearing, removal of excavated material, and import of other structural and paving materials. Other delivery trucks would deliver construction equipment, job trailer items, concrete-forming materials, reinforcing steel and structural steel, piping materials, foundation piles and sheet piling, sand and gravel from offsite sources, new facility equipment, and other construction-related deliveries. Construction equipment/materials would not be permitted to pass through the community of Maxwell on the Maxwell Sites Road.

2.5.3.12 In-Channel Construction

Cofferdams would be required along Stone Corral and Funks Creeks for construction of Sites Dam and Golden Gate Dam, respectively. The cofferdams would be incorporated into the upstream toe of the embankment dams and would be constructed of material likely derived from the excavation of the dam foundations. The crest of the cofferdams would be set at elevation 310 feet (5 feet above highwater during construction). The Sites Dam would require approximately 260,000 cubic yards of Zone 4 fill for the cofferdam in Stone Corral Creek, and the Golden Gate Dam would require approximately 800,000 cubic yards of Zone 4 fill for the cofferdam in Funks Creek.

Construction of the Funks pipelines would generally skirt Funks Creek and not intersect the waterway but two large fills needed for the Funks Pipeline and TRR Pipeline could be placed near the south creek bank. Construction of the TRR pipelines would cross the GCID Main Canal, TC Canal, and the Funks Reservoir. Trenching of the TRR pipelines under the GCID Main Canal and TC Canal would occur during the 6-week winter shutdown period. If possible, trenching would be scheduled for a time when the canals were dry, such that trenching would result in in-channel construction but not in-water construction. Construction of the TRR pipelines would require in-channel work where they cross Funks Reservoir. An earth and geomembrane liner coffer dam would be constructed to allow work to occur under dry conditions.

Construction of the Dunnigan Pipeline would require installation of water level and flow control gates at the concrete-lined TC Canal intake. The tie-in between the intake and the TC Canal would be done during the winter shutdown period, and a small portion of the TC Canal would be dewatered. In-channel work would be required at the CBD to install the energy dissipating control structure, and a coffer dam would be constructed so that the work would be completed in the dry.

2.5.4 Project Commitments and Best Management Practices Common to all Alternatives

A number of BMPs and environmental commitments are proposed to be implemented during Project design, construction and operation/maintenance. The BMPs and environmental commitments are considered part of the Project and discussed in detail in Appendix 2D. The following provides a list of activities or topics covered:

- Conform with Applicable Design Standards and Building Codes
- Perform Geotechnical Evaluations and Prepare Geotechnical Data Reports
- Utility and Infrastructure Verification and/or Relocation
- Natural Gas and Water Wells Decommissioning
- Road Abandonment
- Minimize Soil Disturbance and Topsoil Storage and Handling Plan
- Stormwater Pollution Prevention Plan(s) and Best Management Practices (storm water and non-storm water)

- Spill Prevention and Hazardous Materials Management / Accidental Spill Prevention, Containment, and Countermeasure Plans and Response Measures
- Comply with Requirements of RWQCB Order 5-00-175
- Groundwater/ Dewatering Water Supply
- Construction Equipment, Truck, and Traffic Management Plan
- Visual/Aesthetic Design, Construction, and Operation Practices
- Fire Safety and Suppression / Fire Prevention and Control Plan
- Worker Health and Safety Plan
- Blasting Standard Requirements
- Mosquito and Vector Control During Construction
- Construction, Operation and Maintenance Noise Management
- Construction and Operations Emergency Action Plan
- Electrical Power Guidelines and EMF Field Management Plan
- Air Quality Measures (Construction Equipment Exhaust Reduction Plan, Fugitive Dust Control Plans, Construction Best Management Practices to Reduce Greenhouse Gas Emissions)
- Environmental Site Assessment(s) and Hazardous Materials Management Plans
- Construction Site Security
- Notification of Maintenance Activities in Waterways
- Worker Environmental Awareness Program
- Fish Rescue and Salvage Plans for Funks Reservoir, Stone Corral Creek, and Funks Creek for Alternative 1; for Sacramento River for Alternative 2
- Construction BMPs and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities
- Control of Invasive Plant Species during Construction and Operation

2.5.5 Proposition 1 Benefits Common to All Action Alternatives

The Project was conditionally awarded Proposition 1, WSIP funding by the CWC to provide public benefits for flood damage reduction, recreation, and ecosystem benefits. All of the Action Alternative include providing these benefits including entering into a contract with DWR for the flood damage reduction and recreation benefits, a contact with the California Department of Fish and Wildlife for the ecosystem benefits, and a contract with the CWC for final funding award.

The Project would provide flood damage reduction benefits to portions of Colusa County, including Maxwell and the surrounding agricultural areas. Incidental storage in Sites Reservoir would capture and store flood flows from the Funks and Stone Corral Creek watersheds. These

flood damage reduction benefits are inherent to the Project design and would occur regardless of the Project's operations for water supply and water-related environmental benefits.

The Project would provide recreation benefits through the recreation facilities described previously in this chapter.

The ecosystem benefits funded by the CWC include providing water for Incremental Level 4 refuge water needs for Central Valley Project Improvement Act (CVPIA) refuges both north and south of the Delta and providing additional flow into the Yolo Bypass to benefit Delta smelt (*Hypomesus transpacificus*). Incremental Level 4 refuge water deliveries could occur in any year type and at any time of year. For those refuges located south-of-Delta, it is assumed that water would be moved from July to November though the Delta. Additional flows into the Yolo Bypass could occur at any time of year, but are assumed to occur during the summer and fall months (August through October) of all water year types. These deliveries increase desirable food sources for Delta smelt and other fish species in the late summer and early fall. The Authority envisions that CDFW would take an active role in managing the ecosystem water and would work with CDFW to schedule and adjust releases of ecosystem water to address real-time conditions and needs.

As described in Section 2.5.2., *Coordination with CVP and SWP*, above, additional ecosystem benefits beyond those funded by the CWC may occur via exchanges with Shasta Lake, Lake Oroville, or – likely to a lesser extent – Folsom Lake.

2.6 Alternative 1 Specific Elements

Alternative 1 is the Authority's proposed Project under CEQA. See Figure 2-1 and Figure 2-2 for a plan view of the Alternative 1 features. The unique features of Alternative 1 include the following:

- Reservoir capacity would be 1.5 MAF;
- A bridge across the reservoir would provide access to the west of the Project; and
- Reclamation investment would range from no investment to up to 7% investment.

Alternative 1 would impound surface water at the Golden Gate Dam on Funks Creek, Sites Dam on Stone Corral Creek, and a series of seven saddle dams along the eastern and northern rims of the reservoir would close off topographic saddles in the surrounding ridges to form Sites Reservoir. The 1.5 MAF reservoir under Alternative 1 would inundate approximately 13,200 acres of Antelope Valley in Colusa County. Alternative 1 would convey water from the Sacramento River through existing or upgraded TC Canal and GCID Main Canal facilities to new and upgraded regulating reservoirs and into the new Sites Reservoir. Existing and new facilities would convey water from Sites Reservoir for uses along the TC Canal, along the GCID Main Canal and down the TC Canal to the new Dunnigan Pipeline and the CBD for release, and flows would enter the Yolo Bypass or Sacramento River. Construction roads, local roads, and maintenance roads would be developed or realigned to accommodate the reservoir facilities, including the realignment of Sites Lodoga Road with a new bridge over the reservoir. Alternative

1 would involve two primary recreation areas, Peninsula Hills Recreation Area and Stone Corral Creek Recreation Area, and a day-use boat ramp. These areas would provide multiple recreational amenities, including campsites, boat access, horse trails, hiking trails, and vista points.

Releases from Sites Reservoir would be made to meet environmental purposes, such as for the delivery of Incremental Level 4 water to refuges or fall food production in the Yolo Bypass for north Delta fish species. Releases would also be made for Sites Storage Partners based on their requests to meet their respective water supply portfolio needs and any water conveyed south of the Delta would comply with all applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time. Under Alternative 1, operational exchanges may also occur with Reclamation in Shasta Lake and Folsom Reservoir and with DWR in Lake Oroville. Alternative 1 includes a range of Reclamation investment in the Project, from no investment to up to an assumed 7 percent Reclamation investment.

2.6.1 Sites Reservoir and Related Facilities

Under Alternative 1, Sites Reservoir would be 1.5 MAF and would inundate approximately 13,200 acres. It would have a maximum normal WSE of 498 feet above mean sea level and would require I/O Works, seven saddle dams (1, 2, 3, 5, 6, 8A, and 8B), and two saddle dikes (1 and 2). See Figure 2-1, Alternatives 1 and 3 Regulating Reservoirs and Conveyance and Sites Reservoir Facilities for the location of the Sites Reservoir, Golden Gate Dam, saddle dams, and I/O Works under Alternative 1. Table 2-10 provides the general characteristics of the proposed Sites Reservoir under Alternative 1.

Table 2-10. General Reservoir Characteristics of Alternative 1

Key Characteristic	Detail
Nominal Reservoir Gross Storage	1.5 MAF
Maximum Normal Operating Water Elevation	498 feet above mean sea level
Minimum Normal Operating Water Elevation	340 feet above mean sea level
Top of Dead Pool	300 feet above mean sea level
Active Storage Capacity[1]	1.4 MAF

[1] Between minimum normal operating water elevation (El. 340.0 feet) and maximum normal operating elevation

A total of nine dams (Golden Gate Dam, Sites Dam, and seven saddle dams) would create the 1.5 MAF Sites Reservoir under Alternative 1. Two saddle dikes would be required to close off topographic saddles in the ridges near Saddle Dams 8A and 8B. The dam crests would be 30 feet wide and would include asphalt paved or gravel maintenance roads. The nominal crest would be at elevation 517 feet for all dams, including Saddle Dam 8B. See Table 2-3**.** for a summary of the dam heights for Alternative 1.

2.6.2 New and Existing Roadways

Sites Lodoga Road is an east-west, two-lane major collector road that extends through the community of Maxwell, which is adjacent to I-5, and provides an important emergency and

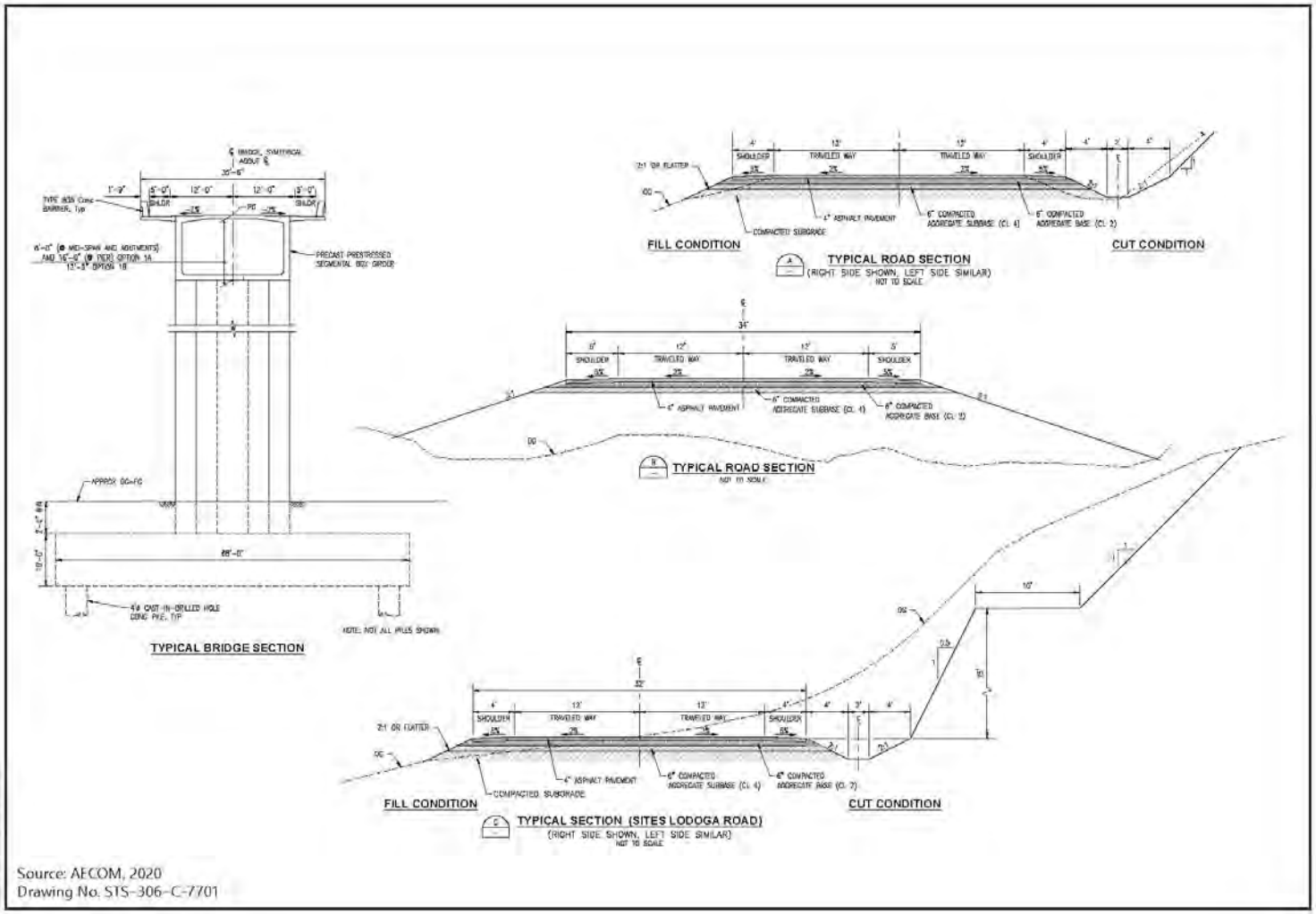
evacuation route in a limited roadway network to and from the rural communities of Lodoga and Stonyford. Sites Lodoga Road becomes Maxwell Sites Road east of the community of Sites, which is in the inundation area. The Sites Reservoir would eliminate east-west access to I-5 (east of the reservoir) from Stonyford and Lodoga (west of the reservoir) because it would inundate the current alignment of Sites Lodoga Road. Because Sites Dam and the inundation area would eliminate access on Sites Lodoga Road, an alternative method for access west of the reservoir would be needed. Under Alternative 1, this access is provided by realigning a segment of Sites Lodoga Road and constructing a bridge over the reservoir. The relocated segment of Sites Lodoga Road would include 5-foot-wide shoulders adjacent to the two 12-foot-wide lanes to accommodate bicycles and would connect to the new bridge.

The realigned Sites Lodoga Road would be placed across the reservoir and extend 7,800 feet; it would necessitate the construction of four fill prisms that would be up to 150 feet tall and would support two shorter bridge segments approximately 3,450 and 4,050 feet long. Figure 2-40, Sites Lodoga Road Realignment and Bridge, shows a typical cross section of the road and the bridge that would be needed to cross the reservoir. The roadway and bridge profile would be at 2 feet above the maximum flood plus wave height. The maximum flood plus wave height is set at 10 feet above the normal WSE (elevation 498 feet for the 1.5 MAF reservoir).

The bridge structure would consist of a cast-in-place, prestressed concrete box girder that would have two lanes with a total width of 35.5 feet and 4-foot-wide shoulders. The bridge would have California Department of Transportation-approved edge barriers with small-diameter electrical conduits, a suicide prevention barrier, emergency phone service facilities, deck drains, and an opening for potential utilities. The bridge design does not include sidewalks due to the remote rural nature of this site. The bridge would be exposed to high winds; therefore, high wind advisory facilities, such as static roadside signs or extinguishable message signs that are illuminated when instruments measure high winds, would be installed.

The disturbance area for bridge construction would include the footprint of the bridge structure, the staging areas for materials and equipment, and the area needed to construct the facilities and access roads. Traffic that was not construction related would be diverted around construction disturbance areas in accordance with a traffic management plan. Initial construction activities would involve establishing staging areas, surveying and marking roadways, clearing, and grading. Bridge construction would consist of constructing the foundation and prisms, including drilled-pier installation; bridge columns; and bridge spans.

The Huffmaster Road realignment, which is associated with the easterly segment of Sites Lodoga Road Realignment, would move the affected segment out of the Sites Reservoir footprint. The realigned Huffmaster Road would be a gravel road to serve the residences at the end of Huffmaster Road.



Source: AECOM, 2020
Drawing No. STS-306-C-7701

Figure 2-40. Sites Lodoga Road Realignment and Bridge

2.6.3 Operations and Maintenance

In addition to the operations and maintenance activities common to all Action Alternatives, operations and maintenance activities under Alternative 1 would include Reclamation as a Storage Partner in the Project and maintenance of the bridge as described below.

Water Operations

Alternative 1 includes a range of potential investment in the Project by Reclamation. For the purposes of modeling, two options have been identified under this alternative – Alternative 1A includes no Reclamation investment and Alternative 1B includes up to 7 percent Reclamation investment, which equates to about 91,000 AF of storage allocation dedicated to Reclamation in Sites Reservoir. With investment from Reclamation, 7 percent of Sites Reservoir storage would be managed as a CVP supply under Alternative 1. Reclamation's share of Sites water would be flexibly used by Reclamation to meet CVP objectives providing water for water supply and environmental needs. Increased storage, diversion, and release capacity provides the CVP with additional opportunities to store and release water when it may have been otherwise constrained. Releases for Reclamation would generally be made for a variety of purposes as identified and directed by Reclamation and would be made in the same manner as described for all Storage Partners.

Bridge Maintenance

There are no day-to-day operations of the bridge (no moving components of the bridge that would be operated on a daily basis). Typical bridge maintenance activities would include replacing damaged or missing signage, replacing or repairing railings, replacing or repairing damage to the bridge deck (road surface), sealing joints, repairing erosion on approaches, unplugging drains and removing debris, and checking for and repairing faulty electrical contacts. The bridge would be periodically inspected through walking through inspection to detect any obvious defects, hazards or potential problems and to also monitor known problems. The bridge would also be periodically inspected by Caltrans to detect any major structural concerns. Repairs and replacements would be made as needed based on these inspections.

2.7 Alternative 2 Specific Elements

The unique features of Alternative 2 include the following:

- Reservoir capacity would be 1.3 MAF;
- A local access road around the southern end of the reservoir would provide access to the west of the Project; and
- Dunnigan Pipeline would extend to and discharge at the Sacramento River with a partial discharge at the CBD.

See Figure 2-1 and Figure 2-2 for a plan view of the Alternative 2 features.

Alternative 2 would impound surface water at the Golden Gate Dam on Funks Creek, Sites Dam on Stone Corral Creek, and a series of four saddle dams along the eastern and northern rims of

reservoir would close off topographic saddles in the surrounding ridges to form Sites Reservoir. The 1.3-MAF reservoir would inundate approximately 12,600 acres and require four saddle dams and three saddle dikes. Alternative 2 would convey water from the Sacramento River through existing or upgraded TC Canal and GCID Main Canal facilities to new and upgraded regulating reservoirs and into the new Sites Reservoir. Existing and new facilities would convey water from Sites Reservoir for uses along the TC Canal, along the GCID Main Canal and down the TC Canal to the new Dunnigan Pipeline and to the Sacramento River for direct release to the river. Alternative 2 also includes a partial release into the CBD, and flows would enter the Yolo Bypass or Sacramento River. Construction roads, local roads, and maintenance roads would be developed or realigned to accommodate the reservoir facilities, including the realignment of Sites Lodoga Road with a new local access road around the southern end of the reservoir. Alternative 1 would involve two primary recreation areas, Peninsula Hills Recreation Area and Stone Corral Creek Recreation Area, and a day-use boat ramp. These areas would provide multiple recreational amenities, including campsites, boat access, horse trails, hiking trails, and vista points.

Releases from Sites Reservoir would be made to meet environmental purposes, such as for the delivery of Incremental Level 4 water to refuges or fall food production in the Yolo Bypass for north Delta fish species. Releases would also be made for Sites Storage Partners based on their requests to meet their respective water supply portfolio needs, and any water conveyed south of the Delta would comply with all applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time. Under Alternative 2, operational exchanges may also occur with Reclamation in Shasta Lake and Folsom Reservoir and with DWR in Lake Oroville. Alternative 2 does not include Reclamation investment in the Project.

2.7.1 Sites Reservoir and Related Facilities

Under Alternative 2, Sites Reservoir would be 1.3 MAF and would inundate approximately 12,600 acres (600 acres less than Alternative 1). It would have a maximum normal WSE of 482 feet above mean sea level (17 feet lower than Alternative 1) and would require I/O Works, four saddle dams (3, 5, 8A, and 8B) and three saddle dikes (1, 2, and 3). Figure 2-3 shows the location of Sites Dam and Golden Gate Dam and the location of the four saddle dams and three saddle dikes under Alternative 2. Under Alternative 2, Saddle Dams 3 and 5 would not have emergency release systems into the Hunters Creek watershed. Figure 2-11 provides the general characteristics of the proposed Sites Reservoir under Alternative 2.

Table 2-11. General Reservoir Characteristics of Alternative 2

Key Characteristic	Detail
Nominal Reservoir Gross Storage	1.3 MAF
Maximum Normal Operating Water Elevation	482 feet above mean sea level
Minimum Normal Operating Water Elevation	340 feet above mean sea level
Top of Dead Pool	300 feet above mean sea level
Active Storage Capacity[1]	1.2 MAF

[1] Between minimum normal operating water elevation (El. 340.0 feet) and maximum normal operating elevation

2.7.2 Conveyance to Sacramento River

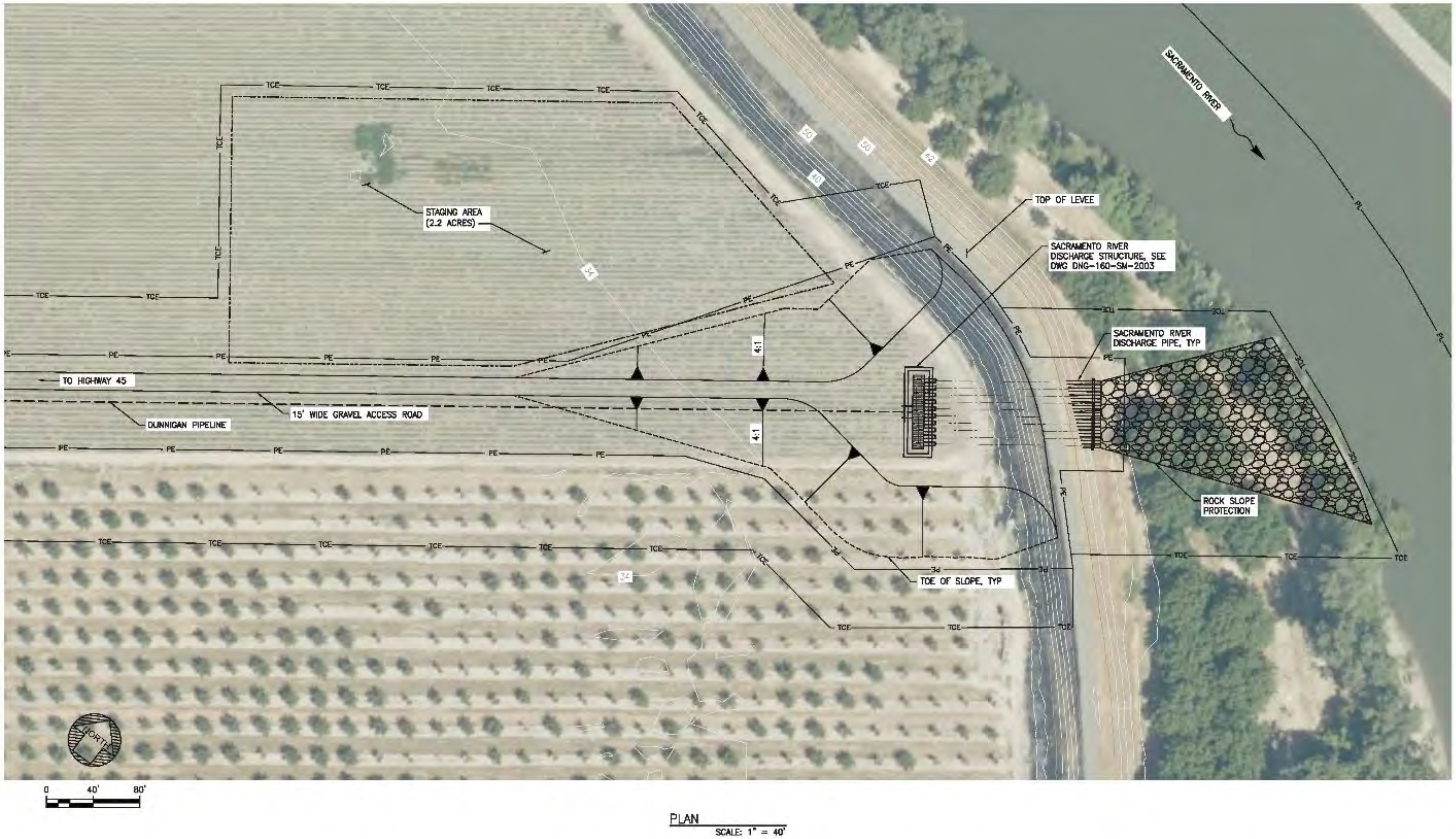
As with Alternative 1, a portion of the water released from Sites Reservoir would be conveyed using the existing TC Canal, and for those Sites Storage Partners located south of the Delta, would be conveyed using the new Dunnigan Pipeline. The water would flow south approximately 40 miles to near the end of the TC Canal. At this point, flow would be diverted into the Dunnigan Pipeline. A gravity outlet structure from the TC Canal into the Dunnigan Pipeline would be constructed to control the flow in the pipeline. No pumping would be required. Power would be needed for SCADA control and operating the gates to let water into the pipeline and at the discharge point.

Under Alternative 2, the Dunnigan Pipeline would extend 10 additional miles, pass through the western levee of the Sacramento River, and discharge into the Sacramento River at approximately River Mile 100.8 (Figure 2-41, Dunnigan Sacramento River Discharge Site Plan). At the CBD, there would also be a discharge structure similar to Alternative 1, but the structure would be smaller and would divert only a portion of the flow, while the remaining flow would continue to the Sacramento River.

The pipeline would have a 10.5-foot-inside diameter with three tunneled crossings (I-5, Road 99W, the railroad, and CBD) that require 12-foot (144-inch) casings. The pipeline would cross under SR 45 and a levee.

The pipeline would terminate in a discharge and energy dissipation structure. The discharge structure would extend through the Sacramento River levee and would be made up of ten 36-inch diameter pipes that would each have a check valve to dissipate energy. The structure would be located such that it was outside the levee prism, or area of influence, on the west side of the levee slope. The ten 36-inch diameter pipelines would be designed to penetrate the levee above the high high-water mark.

The discharge structure would include a vertical drop exclusion barrier to prevent the passage of anadromous fish into the pipeline. The minimum vertical drop would be 10 feet at the top of the levee onto a 20,000 square foot area of riprap extending to the river. This design would place the check valves far enough above the water surface elevation to prevent access by fish. Discharges would occur when the river was low and therefore the check valves would be distant from the water’s edge. Discharge would likely be May to October but could extend into November.



Source: Jacobs, 2020
Drawing No. DWG-030-C-2003

Figure 2-41. Dunnigan Sacramento River Discharge Site Plan

Admin Draft—Predecisional Working Document—For Discussion Purposes Only

Construction would not occur in the winter unless it was a critically dry year. A non-winter construction window would be targeted because even small amounts of rain cause the roads to become slick, which would slow and/or prevent the movement of construction equipment. The construction window would exclude mid-October through March 31. Because groundwater is 3 feet below ground surface, the contractor would install dewatering wells every 50 to 100 feet. However, excavating and placing pipes closely, spatially and temporarily, would avoid running the dewatering system for long periods. Construction of the Dunnigan Pipeline would require crossing nearly 20 irrigation laterals and drainage canals. Bypass pipes would be used to allow irrigation water to flow down canals and also allow drainage water from irrigation to flow. Boring may be required under SR 45, if open cut is not possible. A boring will be required under the levees adjacent to the CBD and under the CBD.

The discharge structure would be located on the west bank of the river about 1 mile upstream of the Rough and Ready Pumping Plant. As described in Appendix 2D, Best Management Practices, in-water construction activities in the Sacramento River would occur during the work window of September 1 through October 15. This work would include constructing a coffer dam. Once the coffer dam is completed, work would continue in the dry and could occur outside the in-water work window. Pile driving or a vibration hammer would be used to install piles on the land side of the levee.

2.7.3 New and Existing Roadways

Realignment of Huffmaster Road and construction of the new South Road would occur under Alternative 2 (Figure 2-35). As with Alternative 1, Sites Dam and the inundation area would inundate 4.2 miles of the Sites Lodoga Road and eliminate access on this 13-mile-long collector road. Similar to Alternative 1, the relocated segment of Sites Lodoga Road would include 5-foot-wide shoulders adjacent to the two 12-foot-wide lanes to accommodate bicycles and would provide access to the Stone Corral Recreation Area. Similar to Alternative 1, Huffmaster Road would be realigned for approximately 9 miles. A new South Road would be constructed and connect to the end of the realigned portion of Huffmaster Road. It would be approximately 20 miles. The total length of the realigned portion of Huffmaster Road and the new South Road would be approximately 30 miles, all of which would be paved.

All other permanent access, maintenance, detour and construction roads would be the same for the reservoir facilities between Alternatives 1 and 2. These roads would be needed regardless of the inundation area size to serve the planned facilities and recreation areas.

The South Road would generally require more excavation and more aggregate when compared to the bridge under Alternative 1. These materials are listed in Appendix 2C, Construction Methods, Means, and Assumptions, Table Alt 2, Preliminary Quantities for Roads.

2.7.4 Operations and Maintenance

Operations and maintenance activities under Alternative 2 would be the same as those described for all Action Alternatives above. In addition to the water operations activities described above that are common to all Action Alternatives, Alternative 2 includes releases directly to the Sacramento River from the extended Dunnigan Pipeline, with a partial release into the CBD.

2.8 Alternative 3 Specific Elements

Alternative 3 facilities and project components would be the same as Alternative 1, as described above. Operationally, Alternative 3 would include increased Reclamation participation and investment, with investment of up to 25 percent of the Project cost.

Under Alternative 3, Reclamation would have an increased investment in Sites Reservoir of up to 25 percent as compared to up to 7 percent in Alternative 1. The increased level of Reclamation investment would result in up to 25 percent of Sites Reservoir storage space being dedicated to Reclamation's use. Reclamation's share of Sites water would be flexibly used by Reclamation to meet CVP objectives providing water for water supply and environmental needs. The increased level of Reclamation investment would also result in increased opportunities for maintaining cold water pool in Shasta Lake, Folsom Lake and Lake Oroville through Reclamation operating its up to 25 percent investment as part of the integration of the CVP.

Increased Reclamation investment in the Project would require some reduction in local participation for Alternative 3 as compared with Alternative 1. Alternative 3 assumes that Sites Storage Partners that are local agencies would reduce their participation in the Project to accommodate the investment by Reclamation. The State's Proposition 1 investment for ecosystem, flood control and recreation benefits does not change with the increased Reclamation investment in Alternative 3.

All other components of Alternative 3 are the same as those for Alternative 1.

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Sites Reservoir Feasibility Report Preliminary Operations Plan Under a Range of Hydrologic Conditions

Prepared for the California Water Commission

June 16, 2021

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Acronyms and Abbreviations

Authority	Sites Project Authority
BiOp	Biological Opinions
BIOS	Biogeographic Information and Observation System
CALFED	CALFED Bay-Delta Program
CDFW	California Department of Fish and Game
cfs	cubic feet per second
COA	Coordinated Operation Agreement
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWC	California Water Commission
D-1641	State Water Resources Control Board Decision 1641
Delta	Sacramento-San Joaquin River Delta
DWR	California Department of Water Resources
FGDC	Federal Geographic Data Committee
GCID	Glenn-Colusa Irrigation District
GPS	global positioning system
M&I	municipal and industrial
MAF	million acre-foot (feet)
NMFS	National Marine Fisheries Service
NODOS	North-of-Delta Offstream Storage
O&M	operations and maintenance
OM&R	operations maintenance and repair
RD 108	Reclamation District 108
Reclamation	United States Bureau of Reclamation
Reservoir Committee	Central Valley Project, State Water Project, United States Bureau of Reclamation. and California Department of Water Resources
SRSC	Sacramento River Settlement Contractor
SVI	Sacramento Valley 40-30-30 water year type index
SWA	Sites Water Account
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
T-C Canal	Tehama-Colusa Canal
TCCA	Tehama-Colusa Canal Authority
TRR	Terminal Regulating Reservoir
USFWS	U.S. Fish and Wildlife Service
WIIN	Water Infrastructure and Investment for the Nation
WSIP	Water Supply Investment Program
WUA	Weighted Usable Area

1. Introduction

Role of the Sites Project Authority: Pursuant to California Water Code 79759(c), the Sites Project Authority (Authority) will own, govern, manage, and operate the Sites Reservoir Project. The project will be operated by working in partnership with the agencies participating in the project for both water supply and Proposition 1-eligible public benefits. As such, the Authority will, in addition to other responsibilities, be the holder of the water right, enter into water delivery contracts for both water supply and Proposition 1-eligible public benefits, coordinate with the Central Valley Project (CVP) and State Water Project (SWP) operators, the United States Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR), and be responsible for environmental compliance obligations, operations and maintenance, and dam safety. The Authority plans to coordinate closely with the following entities, either by establishing a new Water Operations Committee or by joining existing committees in place by the State and Federal governments:

- the water agencies participating in the project's development, which is currently referred to as the Reservoir Committee;
- the state and federal resource agencies delegated the responsibility to have management control over the investment by the state and/or Federal government, respectively;
- the operators of the Central Valley Project and State Water Project, respectively; and
- operators of other facilities needed to move water to where it has been contracted for (i.e., both Proposition 1-eligible and non-Proposition 1-eligible benefits).
- Other stakeholders as deemed appropriate.

Additional details regarding how this process is proposed to work are provided below. It should be noted that the Authority anticipates that the concept presented in this document will evolve as the project evolves and information and insight from the other participants and stakeholders gets incorporated.

Participation Agreements: Agreements will be developed for Proposition 1-eligible and non-Proposition 1-eligible benefits (generally water supply augmentation contracts). These agreements will define the amount of Sites Reservoir storage allocated to the organization seeking the specific benefits as well as cost associated with those deliveries. Water delivery contracts will also define the delivery request process, facilities repayment, and OM&R charges (pro- rated by acre-foot of delivery). Since the WSIP contributions would cover facilities construction cost, costs associated with Proposition 1-eligible public benefit water delivery contracts would not include facilities repayment costs.

Water Operations Planning: The Authority will manage the development of the long-term and annual operating plans. The long-term plan is intended to provide a guide to the overall operations of the Sites Project, delineate the goals of the Sites Project operations, and provide linkage between several contracts: water delivery contracts, contracts with the State of California to support the development of public benefits, agreements with the federal government for WIIN Act benefits and the use of federal facilities, and any adaptive management activities. The long-term plan will be subject to revision when required and will be reviewed at least every five years.

The annual operating plans will provide specific guidance regarding the operations of the Project for that year. These plans will be initiated in the spring of the prior year and completed and approved no later than the Authority Board meeting in August of the prior year. These plans will include the following:

- A summary of operations (including adaptive management actions and results) from the previous year
- A listing of any carry-over storage amount and location for public and non-public benefit contract holders
- Anticipated annual requests for each public and non-public benefit holder
- Projected operations by water year type, by month and
- Sites Project annual operating plans will also interface with the preparation of the annual Temperature Management Plan for the Sacramento River, consistent with WR 90-5 and applicable RPAs.

Through detailed coordination with the Reclamation and DWR, the Sites Project will develop and implement operational agreements with these agencies to address issues related to operations of the Sites Project. Through the implementation of these agreements, it is expected that the Sites Project will cooperatively interface with the existing ongoing real-time decision- making process and work to avoid and minimize adverse effects and, potentially, provide benefit to the Central Valley Project and State Water Project facilities, operational plans, listed species, public health, safety and water supply reliability.

Operating Agreement with DWR and Reclamation: Operating agreements with DWR and Reclamation are currently under development. The operating agreements will describe the use of State and Federal facilities, seasonal operating goals, use of power and energy, and exchanges of water between Sites, the CVP, and the SWP. Initial Draft term sheets of these agreements have been developed and circulated among the local participants.

The Authority will also be responsible for general facility maintenance and upkeep and Authority accounting, including payments to the following:

- Reclamation consistent with the Warren Act contracts for the use of Reclamation facility,
- Glenn-Colusa Irrigation District (GCID) for use of facilities
- Power supply for pumping and other power needs.

Authority accounting will also be responsible for receipt of funds from all contract deliveries and other arrangements for O&M cost associated with deliveries for public benefits.

2. Operations Assumptions and Criteria

This operations plan includes a description of project operations and public benefits under a range of hydrologic conditions, from wettest to driest years and multiple dry year periods. Water year types for this operations plan are classified based on the Sacramento Valley 40-30-30 Index per the SWRCB Water year Hydrologic Classification presented in D-1641. The primary actions that will be taken to meet the funded public benefits are described for the range of hydrologic conditions. In addition, monitoring of operations to inform adaptive management is described.

The with-project conditions include a 1.5-million-acre-foot (MAF) reservoir located in the Sacramento Valley west of the town of Maxwell and the associated conveyance facilities, including use of the existing Tehama-Colusa Canal (T-C Canal) and GCID Main Canal diversion and conveyance facilities, plus a proposed new discharge pipeline (see Chapter 3 for a more detailed description of the project). The

proposed reservoir will be filled by diversion of excess Sacramento River water that originates from unregulated tributaries to the Sacramento River downstream from Keswick Dam. These flows are in excess of those needed to meet current regulatory requirements or other water demands. Operation of the proposed reservoir will be in cooperation with the operations of existing CVP and SWP system facilities to facilitate the potential for a wide range of benefits.

With-project operations are designed to meet the following primary objectives:

- Improve water supply reliability and resiliency to meet member participants' agricultural and municipal long-term average annual water demand in a cost-effective manner for all member participants, including those that are the most cost-sensitive.
- Provide public benefits consistent with Proposition 1 of 2014 and use WSIP funds to improve statewide surface water supply reliability and to enhance opportunities for habitat and fisheries management for the public benefit through a designated long-term average annual water supply.
- Provide public benefits consistent with the WIIN Act by using federal funds, if available, provided by Reclamation to improve CVP operational flexibility in meeting CVP environmental and contractual water supply needs and improving cold water pool management in Shasta Reservoir to benefit anadromous fish.
- Provide surface water to convey biomass from the floodplain to the Delta to enhance the Delta ecosystem for the benefit of pelagic fishes in the north Delta (e.g., Cache Slough).
- Provide local and regional amenities, such as developing recreational facilities, reducing local flood damage, and maintaining transportation connectivity through roadway modifications.

The preliminary operations assumptions and criteria for the Sites Project were developed through a series of meetings and coordination with Authority representatives including water district managers and county representatives, CDFW, DWR, and Reclamation. The with-project condition builds on previous work conducted under the CALFED Bay-Delta Program (CALFED) by DWR and Reclamation. Subsequent to CALFED, DWR was the lead on technical studies in coordination with the Authority as part of the North-of-Delta Offstream Storage (NODOS) Project and associated investigations. Since 2014 the Authority has taken the lead role in these studies.

Operations analyses conducted for the Sites Project utilized the model products and assumptions described in section 6004(a)(1) of the California Code of Regulations. The models provided by the Commission were modified to include the facilities and operation of the Sites Project.

3. Operations Overview

Sites Reservoir will be filled by diversion of Sacramento River flows that originate from unregulated tributaries to the Sacramento River downstream from Keswick Dam. As described below, diversions are assumed to potentially occur any time the Sacramento River is not fully appropriated (September 1st through June 15th) in any water year type but would likely be greatest in the winter months with wetter conditions (depending on storage conditions and flow events). Storage will be owned by a number of local agencies, the State of California, and Reclamation. Releases will be made for water supply deliveries or specific public benefits.

The primary operational criteria include the following:

- A defined Proposition 1 public benefits storage account will be established in Sites Reservoir to be managed by the State to provide water for ecosystem and water quality purposes. The storage allocation assumed for Prop 1 purposes is 244 TAF.
- Each of the participating Authority members will also be allocated a defined storage account in the Sites Project to manage their water.
- It is assumed that a water market of some form would be facilitated by the Authority to promote efficient use and exchange of water in Sites Reservoir storage.
- There will be a storage account managed by the Reclamation to be flexibly used to meet CVP objectives providing water for water supply and environmental needs, referred to as the CVP Operational Flexibility account.
- All storage accounts would receive an equal proportional share of new water diversions into Sites Reservoir storage.
- A set of operating guidelines and rules are identified in the *Principles for the Storage, Delivery and Sale of Sites Project Water*, Sites Project Authority, 2021, April.
- All water stored in Sites Reservoir storage accounts are subject to evaporation and other losses.

The Sites Project could operate in cooperation with CVP and SWP system facilities to facilitate a wide range of benefits. Sites Reservoir will provide water through four primary mechanisms:

- Water could be released directly to Colusa Basin users;
- Water could be released to the Sacramento River;
- Water could be released through the Colusa-Basin Drain and Knights Landing Ridge Cut; and
- Water stored in Sites Reservoir could be exchanged for water stored in Shasta Lake, Lake Oroville, or other CVP and SWP system reservoirs.

This last mechanism could be used to increase upstream north-of-Delta storage to support multiple water supply and ecosystem benefits.

The project employs a strategy to maximize the potential benefits of Sites Reservoir while not adversely affecting the CVP and SWP's ability to meet existing system regulatory requirements including the following:

- Water rights
- Instream flow requirements
- Biological opinions
- Delta water quality requirements
- CVP and SWP requirements
- Central Valley Project Improvement Act (CVPIA)

Sacramento River water will be diverted at the two locations on the river as described above. Diversions to Sites Reservoir will only take place when the Delta is in excess conditions, as determined by DWR and Reclamation. In addition, several existing and additional proposed bypass flow criteria were assumed at specified locations. These flow criteria are designed to make certain only excess water will be diverted into Sites Reservoir to maintain and protect existing downstream water uses.

As a mitigation measure to more fully avoid and minimize entrainment and impingement of juvenile salmonids and other poor-swimming aquatic species, diversions to Sites Reservoir will also be restricted to protect fish migration during naturally occurring, storm-induced, pulse flow events in the Sacramento River. The proposed pulse protection period will extend from October through May to address outmigration of juvenile winter-, spring-, fall- and late-fall-run Chinook salmon, as well as steelhead.

Pulse flows during this period will provide flow continuity between the upper and lower Sacramento River to support fish migration. It is recognized that research regarding the benefits of pulse flows is ongoing, and further research and adaptive management will be required to develop and refine a pulse flow protection strategy for fish migration.

Diversions of Sacramento River water to Sites Reservoir using existing T-C Canal and GCID Main Canal conveyance facilities could occur any time the Sacramento River is not fully appropriated between September 1st and June 15th, given the flow conditions described above are present in the river. Deliveries for Tehama-Colusa Canal Authority (TCCA) and GCID service areas have first priority at the existing T-C Canal and GCID intakes, with diversions to Sites Reservoir using the unused capacities of the two canals.

The operation of the Sites Project will allow for the development and administration of a Proposition 1 public benefits storage account that could be actively managed by the State to provide water for ecosystem and water quality purposes. Such an account would provide a pool of dedicated storage to manage in cooperation with existing operations to increase flows through certain watercourses and/or facilities (such as, Yolo Bypass) and increase availability of wetlands in wildlife refuges, and/or enhance habitat conditions.

The Sites Project will be operated in cooperation with CVP and SWP operations to coordinate releases from Shasta Lake, Lake Oroville, and Folsom Lake. Releases from Sites Reservoir will allow reduced releases from other reservoirs while still meeting requirements for minimum instream flow objectives, Sacramento River temperature requirements, and Delta salinity control assigned to CVP and SWP. Through this reduction in releases, storage could be conserved in Shasta Lake, Lake Oroville, and Folsom Lake which could improve river water temperatures for fish survival, Delta ecosystem food-web enhancement, flood control, and recreation.

Sites Project operations will achieve multiple public benefits over a wide range of hydrologic conditions.

In drought conditions, the Sites Project could:

- Increase cold-water pool conservation in Shasta Lake, Lake Oroville, and Folsom Lake
- Help regulate Sacramento River summer flows for best use of cold water for control of temperature conditions adverse to anadromous fish
- Provide water to the Yolo Bypass to support salmon migration and summer food production for delta smelt
- Provide water for Incremental Level 4 refuge deliveries per CVPIA

In non-drought hydrologic conditions, Sites Project water could:

- Increase cold-water pool conservation in Shasta Lake, Lake Oroville, and Folsom Lake
- Help regulate Sacramento River summer flows for best use of cold water for control of temperature conditions adverse to anadromous fish
- Provide (via upstream actions) incidental Delta water quality improvements in the summer and fall

- Stabilize Sacramento River fall flows for improving spawning and rearing success of anadromous fish
- Provide water to the Yolo Bypass to support salmon migration and summer food production for delta smelt
- Provide water for Incremental Level 4 refuge deliveries per CVPIA

4. Diversion of Sacramento River Flows to Fill Sites Reservoir

This section describes the conditions and criteria under which Sacramento River flows that originate from unregulated tributaries downstream from Keswick Dam may be diverted to fill Sites Reservoir.

Diversions to fill Sites Reservoir are made through the T-C Canal at the Red Bluff Pumping Plant and the G-C Canal at the Hamilton City Pumping Facility. Water is primarily diverted between November and May when water is not being released from Sites Reservoir and the T-C and G-C canals are not being used for agricultural deliveries. Diversions may only occur if the following criteria are met in the Sacramento River:

- Any time that the Sacramento River is not fully appropriated between September 1st and June 15th
- Between October and May, pulses at Bend Bridge are protected. While a pulse period is being protected, no diversions may be made to Sites Reservoir. A pulse period occurs when the 3-day average Sacramento River flow at Bend Bridge exceeds 8,000 cfs and the 3-day average tributary flow exceeds 2,500 cfs. The pulse period, once initiated, lasts for 7 days. For another pulse to occur, the 3-day average Sacramento River flow at Bend Bridge must drop below 7,500 cfs for 7 consecutive days.
- Sacramento River flow at Red Bluff exceeds 3,250 cfs
- Sacramento River flow at Hamilton City exceeds 4,000 cfs
- Diversions may not be made at the Hamilton City Diversion Facility during the 14-day G-C Canal maintenance window which runs from January 25 through February 7.
- Sacramento River flow at Wilkins Slough exceeds 5,000 cfs, except for April and May when it must exceed 8,000 cfs.

If spills over the Fremont Weir Notch into the Yolo Bypass occur, only the first 1% of spill may be diverted to Sites Reservoir while spills are below 600 cfs and only 10% of spill may be diverted to Sites Reservoir while spills are between 600 and 6,000 cfs.

5. CVP Operational Flexibility Account

The Authority has proposed, in coordination with Reclamation, a 91 TAF account dedicated to CVP Operational Flexibility this account may be used for the following purposes by Reclamation:

- Augment CVP water supply for contractor deliveries
- Through exchanges with the CVP, reduce releases from Shasta Lake and Folsom Lake earlier in the summer to preserve cold-water pool for anadromous fish in the fall.

- Refuge water deliveries
- Delta ecosystem enhancement

In the proposed operation, on average, 28 TAF are released annually from the CVP Operational Flexibility account in Sites Reservoir. In dry and critically dry years, an annual average of 26 TAF are released. Currently, these releases lead to an average annual increase in CVP deliveries of 8 TAF over the long-term and 19 TAF in dry and critically dry years. End-of-September Shasta Lake storage increases by 18 TAF over the long-term and by 21 TAF in dry and critically dry years. End-of-September Folsom Lake storage increases by 6 TAF over the long-term and by 7 TAF in dry and critically dry years.

6. Participant Accounts

Sites participants are located both north and south of the Sacramento-San Joaquin River Delta. Sites participants can be divided into several categories:

- Tehama Colusa Canal Authority,
- Reclamation District 108,
- Glenn Colusa Irrigation District,
- Colusa County groundwater replenishment,
- Delta/south-of-Delta member districts,
- CVP operational flexibility water, and
- ecosystem benefit water.

To provide water to all participants, releases may occur through four separate operations: 1) direct release through Dunnigan Pipeline, 2) exchange with Sacramento River at Hamilton City by replacing CVP diversions to GCID with releases from Sites, 3) Shasta exchanges, 4) Oroville exchanges. Please review Shasta Exchanges and Oroville Exchanges sections for more details regarding exchanges at Shasta and Oroville.

Sites Reservoir may release water through the TCC and Dunnigan Pipeline, a 1,000 cfs pipe that connects the TCC to the Colusa Basin Drain or Sacramento River. Releases through Dunnigan Pipeline provide water to Delta Participants, CVP operations flexibility objectives, refuges and Yolo Bypass. The majority of releases through the Dunnigan Pipeline occur during the transfer window (July – November).

Additionally, Sites Reservoir may release water via an in-lieu transfer with GCID. Instead of pumping water from the Sacramento River, GCID would receive its CVP allocations via Sites. The water released from Shasta to meet the CVP allocations would serve as Sites releases to other participants.

Water stored in the South-of-Delta member districts account may also be exchanged with storage in Shasta Lake and Lake Oroville earlier in the summer to enhance cold-water pool and expand the release capacity of Sites Reservoir. These exchange operations are described in more detail in the Project Description.

7. Operations of Proposition 1 Public Benefits over a Range of Hydrologic Conditions

This section provides a detailed description of proposed Sites Project operations that correspond to Proposition 1 ecosystem and water quality benefits over a range of hydrologic conditions, including the actions that will provide public benefits under each of these differing hydrologic conditions.

The operational actions described below represent how the Proposition 1 public benefits account would be operated to meet the funded public benefit objectives over a range of hydrologic conditions. Operations in any given year will be a function of the current year hydrology, as well as a function of the system conditions resulting from the previous year's hydrology and operations.

Implementation of actions to provide public benefits will need to be evaluated on a continuing basis in response to changing system parameters (such as reservoir storage), ecological needs, forecasts of future hydrologic and atmospheric conditions, and system operations.

Total average annual diversions of excess Sacramento River flow to Sites Reservoir, based on CalSim-II model results, for current, 2030, and 2070 conditions are 255 TAF, 277 TAF, and 281 TAF, respectively. These results indicate that the Sites Project has the ability to adapt to predicted future hydrologic conditions provided by the CWC. The increase in average annual diversions of excess flow is a function of the reduction in spring snowmelt and increase in winter precipitation under the future climate conditions. Increased precipitation and resulting stream flow in the tributaries contributing to the Sacramento River between Keswick and the Red Bluff Pumping Plant, in months of November through March, allow additional diversions of excess flow to Sites Reservoir storage.

7.1 Wet Hydrologic Conditions

Under wet year conditions, the primary Proposition 1 public benefits account operational goal will be to maximize the diversion of excess water from the Sacramento River into Sites Reservoir storage during high flow winter months, subject to the proposed bypass flow criteria. The maximum diversions will occur between the months of November and March to minimize potential impacts to the riverine ecosystem. Monitoring will be conducted at locations near Red Bluff Pumping Plant and the Hamilton City Pumping Facility to identify when fish are present in the river so diversions to storage could be curtailed to promote pulse flow bypass protection to support salmonid out- migration to the lower Sacramento River.

Total average annual diversions of excess Sacramento River flow to Sites Reservoir for wet year types for current, 2030, and 2070 conditions are 390, 452, and 454 TAF, respectively. Sites Reservoir average end-of-month storage in May of wet years under simulated current, 2030, and 2070 conditions ranges from 1.30 to 1.36 MAF.

Proposed Sites Reservoir operations under wet year conditions will be largely a function of current system wide reservoir storage conditions and the need for water to support public benefit objectives. Generally, there is minimal demand for water from storage in wet years depending on the geographic variation and timing of late spring storm events and snow melt conditions. Actions that could be taken in wet years to provide public benefits include:

7.1.1 Yolo Bypass and Delta Outflow Improvement

Sites water will be released to flow through the Colusa Basin Drain and Knights Landing Ridge Cut during summer and fall months (i.e., August through October) to help increase productivity in the lower Cache Slough and lower Sacramento River areas. This flow will increase desirable food sources for Delta smelt and other key fish species in the late summer and early fall. Sites Reservoir average annual releases to the Yolo Bypass in wet years under simulated current, 2030, and 2070 conditions range from 40 to 63 TAF.

7.1.2 Water Supply for Wildlife Refuges

Sites water will be provided to supplement supply for Incremental Level 4 wildlife refuges north and south of the Delta. Sites Reservoir average annual releases towards meeting incremental Level 4 wildlife refuge water needs in wet years under simulated current, 2030, and 2070 conditions range from 0 to 2 TAF.

7.2 Above Normal to Dry Hydrologic Conditions

This range of hydrologic conditions includes Sacramento Valley 40-30-30 water year types for above normal, below normal, and dry year types. Under these hydrologic conditions, diversions of excess water from the Sacramento River into Sites Reservoir storage will occur during high flow winter months, subject to the proposed bypass flow criteria. Similar to wet years, the majority of diversions will occur between the months of November and March to minimize potential impacts to the riverine ecosystem. Monitoring will be conducted at locations near the Red Bluff Pumping Plant and Hamilton City Pumping Facility to identify when fish are present in the river so diversions to storage could be curtailed to promote pulse flow bypass protection to support salmonid out-migration. Total average annual diversions of excess Sacramento River flow to Sites Reservoir for above normal water year types for current, 2030, and 2070 conditions range from 349 to 400 TAF. Total average annual diversions of excess Sacramento River flow to Sites Reservoir for dry water year types for current, 2030, and 2070 conditions range from 134 to 169 TAF. Sites Reservoir average end-of-month storage in May under simulated current, 2030, and 2070 conditions ranges from 0.75 to 1.21 MAF for above normal and dry hydrologic conditions.

Under these water year type conditions, Sites Reservoir provides water supply to support public benefits and ecosystem objectives funded by Proposition 1.

Actions that could be taken in these years to provide public benefits will include:

7.2.1 Yolo Bypass and Delta Outflow Improvement

Release of Sites water flow through the Colusa Basin Drain and Knights Landing Ridge Cut during summer and fall months (i.e., August through October) is proposed to help increase productivity in the Yolo Bypass in the lower Cache Slough and lower Sacramento River areas to increase desirable food sources for Delta smelt and other key fish species in the late summer and early fall. Proposed operation will provide a long-term average release of about 36 to 42 TAF into the Yolo Bypass, with average dry year type releases ranging from 30 to 33 TAF.

7.2.2 Water Supply for Wildlife Refuges

A portion of the Proposition 1 public benefits supply is dedicated to provide water toward meeting Incremental Level 4 wildlife refuge water needs north of the Delta and south of the Delta to supplement refuges supplies up to Level 4 criteria (CVPIA). The proposed operations long-term average amount of

water available from Sites Reservoir for this purpose will be about 74 to 107 TAF (with averages ranges from about 30 to 144 TAF depending on year types). Proposed operation will provide a long-term average annual release of about 17 to 24 TAF to wildlife refuges, with average dry year type releases of 38 to 48 TAF.

7.3 Critical Hydrologic Conditions

Critical water years are the most extreme drought years per the Sacramento Valley 40-30-30 water year classification. Under Critical hydrologic conditions, diversions of excess water from the Sacramento River into Sites Reservoir storage could potentially occur during isolated high flow storm events in winter months, subject to the proposed bypass flow criteria.

Monitoring will be conducted at locations near the Red Bluff Pumping Plant and Hamilton City Pumping Facility to identify when fish are present in the river so diversions to storage could be curtailed to promote pulse flow bypass protection to support salmonid out-migration. Diversions to Sites Reservoir storage will be very limited in Critical water year types.

The proposed operations for the Sites Project focused on retaining water from wetter years for use in Dry and Critical years. Under critical water year type conditions, Sites Reservoir provides water to support public benefits and ecosystem objectives funded by Proposition 1. Sites Reservoir average end-of-month storage in May under simulated current, 2030, and 2070 conditions range from 451 TAF to 390 TAF for critical hydrologic conditions.

Operational actions for public benefits would be determined on an annual basis depending on the geographic variation and timing of late spring storm events, snow melt conditions, system wide reservoir storage, and water demands. In critical water years it is assumed that Proposition 1 public benefits water in Sites Reservoir will be used to support Yolo Bypass flow enhancement and supplies to wildlife refuges. Actions that could be taken in these years to provide public benefits are described below:

7.3.1 Yolo Bypass and Delta Outflow Improvement

Release of Sites water flow through the Colusa Basin Drain and Knights Landing Ridge Cut during summer and fall months (i.e., August through October) to help increase productivity in the Yolo Bypass in the lower Cache Slough and lower Sacramento River areas to increase desirable food sources for Delta smelt and other key fish species in the late summer and early fall. The ability to provide flow into the Yolo Bypass under critical year type conditions will be a function of ecosystem priorities based on the current year hydrology, as well as a function of the system storage conditions resulting from the previous year's hydrology and operations. Sites Reservoir average annual releases to the Yolo Bypass in critical years under simulated current, 2030, and 2070 conditions range from 14 to 21 TAF.

7.3.2 Water Supply for Wildlife Refuges

Provide water toward meeting Incremental Level 4 wildlife refuge water needs north of the Delta and south of the Delta to supplement refuges supplies up to Level 4 criteria (CVPIA). The ability to provide deliveries to wildlife refuges under critical year type conditions will be a function of ecosystem priorities based on the current year hydrology, as well as a function of the system storage conditions resulting from the previous year's hydrology and operations. Sites Reservoir average annual releases towards meeting incremental Level 4 wildlife refuge water needs in critical years under simulated current, 2030, and 2070 conditions range from 9 to 24 TAF.

7.4 Multiple Dry and Critical Year Drought Conditions

Under multiple dry and critical year drought conditions, diversions of excess water from the Sacramento River into Sites Reservoir storage will likely be very limited and carryover storage from previous years will be very important to meeting public benefits and ecosystem objectives.

Operational actions for use of Proposition 1 carry over storage in Sites Reservoir will be determined on an year to year basis depending on the severity of drought conditions, geographic variation and timing of late spring storm events, snow melt conditions, status of system wide reservoir storage, and ecosystem water needs. Primary actions that could be taken during extended drought periods to provide public benefits are described below:

7.4.1 Yolo Bypass and Delta Outflow Improvement

Release of Sites water flow through the Colusa Basin Drain and Knights Landing Ridge Cut between August and October to help increase productivity in the Yolo Bypass in the lower Cache Slough and lower Sacramento River areas to increase desirable food sources for Delta smelt and other key fish species in the late summer and early fall. The ability to provide flow into the Yolo Bypass under drought conditions will be a function of ecosystem priorities based on current year hydrology, as well as a function of the system storage conditions resulting from the previous year's hydrology and operations. Releases shall be delivered to the Yolo Bypass through the T-C Canal, Dunnigan Pipeline, Colusa Basin Drain, and Knights Landing Ridge Cut.

7.4.2 Water Supply for Wildlife Refuges

Provide water toward meeting Incremental Level 4 wildlife refuge water needs north of the Delta and south of the Delta to supplement refuges supplies up to Level 4 criteria (CVPIA). The ability to provide deliveries to wildlife refuges under drought conditions will be a function of ecosystem priorities based on current year hydrology, as well as a function of the system storage conditions resulting from the previous year's hydrology and operations. Deliveries will be made throughout the year, but primarily from July through December, in all water year types, but with a focus on Dry and Critical water years.

8. Adaptable Operations

While This document provides a summary description of the reservoir operations proposed by the Sites Project Authority for the Sites Project, Operations of the Sites Project facilities are flexible and adaptable to meet a wide range of water supply and environmental needs. Providing water to the Yolo Bypass and increasing Incremental Level 4 Refuge supply are the Prop 1 funded benefit operations. However, the Authority recognizes that over the life of Sites Reservoir, these priorities may need to change, and the Sites Project can adapt to a changing future using the storage in the reservoir allocated to the State of California. Consistent with the 2017 WSIP application, the Authority is working with the Department of Water Resources and the Bureau of Reclamation on project operations, so that the full potential of the Sites Project can be incorporated into the prerequisite operational permits.

TABLE ADF-1. DESCRIPTION OF PROPOSED SITES PROJECT AUTHORITY SEASONAL OPERATIONS

Sites Project Operations Plan

Proposition 1 public benefits are highlighted

Objective	Detail of Operation	Year Type Most Suitable for Operation[a]	Months Most Suitable for Operation[b]											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Diversions to storage	Convey Sacramento River diversions through the T-C Canal, and GCID Canal. Diversions would only occur once existing regulatory requirements such as D-1641, CVPIA 3406(b)(2), USFWS BiOp, and NMFS BiOp requirements have been met and existing senior water rights and Delta diversions have been satisfied. Diversions to Sites Reservoir would be restricted by Sacramento River bypass flow criteria at Red Bluff, Hamilton City, Wilkins Slough and Freeport, and restrictions for protecting fish outmigration and Sutter/Yolo Bypass weir spills. Diversions would be subject to future criteria to be determined as part of the state and federal agency permitting process.	W, AN, BN												
Seasonal Reservoir Operations	Fill Sites Reservoir by diversion and storage of Sacramento River water throughout the winter and spring and release water from storage during the primary demand period throughout the summer and fall.	n/a	Fill Cycle High Point			Drain Cycle Low Point							Fill Cycle	
Releases to Sites Project Authority Members	Provide Sites Reservoir storage releases to provide supplemental water supplies to project participants in the Sacramento Valley and south-of-Delta to improve water supply reliability. Operations will require agreements for conveyance with Reclamation and DWR.	AN, BN, D, C												
Shasta Coldwater Pool	Potential to increase Shasta Lake storage levels through exchange to improve coldwater pool management. This action would have particular emphasis in Dry, and Critical water-year types under ROC on LTO Tier 2 and 3 temperature management conditions. This benefit would be achieved by (1) exchanging water from Sites Reservoir for water storage in Shasta, and then releasing water from Sites Reservoir to meet CVP contract requirements for GCID, Reclamation District 108, and the Member Units of the TCCA; (2) releasing water from Sites Reservoir to meet CVP south-of-the-Delta needs instead of releasing water from Shasta; and (3) releasing water from Sites Reservoir to meet a portion of the CVP commitment for Delta outflow. Benefits will be dependent on ability to exchange water per agreements to be developed with Reclamation.	D, C												
Sacramento River Flows for Temperature Control	Potential to improve water temperatures suitable for all species and life stages of anadromous salmonids in the Sacramento River between Keswick Dam and Bend Bridge during the July through September period for Dry, and Critical water-year types. This objective would be achieved by improved coldwater pool management from increased storage in Shasta.	D, C												
Augment Sacramento River Fall Flows	Potential to augment flows in the Sacramento River between Keswick Dam and the Red Bluff Diversion Dam to minimize dewatering of fall-run Chinook salmon redds (for the spawning and embryo incubation life-stage periods) during fall months. Operations would avoid adverse impacts to coldwater pool operations in Dry and Critical water-year types. Benefits will be dependent on ability to exchange water per agreements to be developed with Reclamation.	D, C												
Folsom Lake Coldwater Pool	Potential to increase Folsom Lake storage levels to preserve additional coldwater pool to achieve temperatures that are more suitable for juvenile steelhead and fall-run Chinook salmon spawning in the lower American River during dry and critical water-year types. The additional storage would be achieved by releasing Sites Reservoir water to assist with meeting CVP Delta objectives that are currently met through releases from Folsom. Benefits will be dependent on ability to exchange water per agreements to be developed with Reclamation.	D, C												
Augment American River Flows	Potential to augment flows in the lower American River to reduce dewatering of fall-run Chinook salmon redds (i.e., October through March) and steelhead redds (i.e., January through May). This objective would be accomplished by releasing a portion of the additional water stored at Folsom Reservoir resulting from Sites Reservoir releases to meet CVP Delta objectives. Benefits will be dependent on ability to exchange water per agreements to be developed with Reclamation.	D, C												
Yolo Bypass Flow Enhancement	Release flow through the Colusa Basin Drain and Knights Landing Ridge Cut during summer and fall months to help increase productivity in the Yolo Bypass in the lower Cache Slough and lower Sacramento River areas to increase desirable food sources for Delta smelt and other fish species.	AN, BN, D, C												
Lake Oroville Coldwater Pool and Augment Feather River Flows	Potential to improve the reliability of coldwater pool storage in Lake Oroville to improve water temperature suitability for steelhead and Chinook salmon. Additional storage would be accomplished through releases from Sites Reservoir to meet Lake Oroville compliance obligations such as Fall X2. Augment flows in the lower Feather River to minimize redd dewatering, juvenile stranding, and isolation of anadromous salmonids. Benefits will be dependent on ability to exchange water per agreements to be developed with DWR.	BN, D, C												
Incremental Level 4 Water Supply for Wildlife Refuges	Provide water toward meeting incremental Level 4 wildlife refuge water needs north and south-of-the-Delta to supplement refuges supplies up to Level 4 criteria (CVPIA).	AN, BN, D, C												

Notes for Table ADS-1:

a Water year type when conditions are generally suitable for developing the benefit based on the D1641 40-30-30 year types.
b The heavier shaded bars highlight the months in which conditions would be most suitable to the operations; the lighter shaded bars highlight the months that would be less suitable to the operations.

AN	=	Above Normal
BiOp	=	Biological Opinion
BN	=	Below Normal
C	=	Critical Dry
CVP	=	Central Valley Project
CVPIA	=	Central Valley Project Improvement Act
D	=	Dry
D-1641	=	State Water Resources Control Board Decision 1641
DP	=	Driest periods
DWR	=	California Department of Water Resources
GCID	=	Glenn-Colusa Irrigation District
LTO	=	Long-term Operation
n/a	-	not applicable
NMFS	=	National Marine Fisheries Service
Reclamation	=	Bureau of Reclamation
ROC	=	defineReinitiation of Consultation
T-C	=	Tehama-Colusa
TCCA	=	Tehama-Colusa Canal Authority
USFWS	=	U.S. Fish and Wildlife Service
W	=	Wet

Appendix B.2. Updated CALSIM 2 Modeling for WSIP Analysis

Draft – Subject to Revision

Appendix B2
Updated CalSim II Modeling for WSIP Analysis

This document summarizes the documents and models that inform the modeling for the Sites Reservoir Project Revised Draft EIR/SDEIS and updated WSIP analysis.

Analytical Methods

CALSIM II is a water operations planning model developed by DWR and Reclamation. It simulates the SWP and the CVP, and areas tributary to the Sacramento-San Joaquin Delta. CALSIM II provides quantitative, hydrologic-based information to agencies responsible for planning, managing, and operating the SWP and federal CVP. As the official model for those projects, CALSIM II is typically the system model used for any inter-regional or statewide analysis in California. CALSIM II uses descriptive optimization and rules-based simulation techniques to route water through a CVP/SWP system network representation. The network includes over 300 nodes and over 900 arcs (i.e., stream or canal reaches), representing 24 surface water reservoirs and the interconnected flow system.

The with-project assumptions were developed through a series of meetings and coordination with Authority representatives including participating water district managers and county representatives, California Department of Water Resources (DWR), and Bureau of Reclamation (Reclamation). The with-project condition builds on previous work conducted under the CALFED Bay-Delta Program (CALFED) by DWR and Reclamation. Subsequent to CALFED, DWR has been the lead on technical studies in coordination with the Authority as part of the North-of-Delta Offstream Storage (NODOS) Project and associated investigations which was then followed by the Water Storage Investment Program (WSIP) application process led by the Sites Project Authority. The with-project assumptions for the WSIP alternative, Alternative 1 with upto 7% Federal investment, are documented in Chapter 2 Project Description of the Sites Project DEIRS.

Updates Since 2017 WSIP Application

Since the completion of the 2017 WSIP application with the California Water Commission, the Sites Project assumptions has been refined. The reservoir has been reduced from 1.81 MAF to 1.5 MAF, a federal investment account has been incorporated, and the diversion criteria and delivery logic have been refined in coordination with the Sites Project Authority, Reclamation, and DWR. Additionally, the baseline was changed from DWR's DCR 2015 to the 2020 Reclamation Benchmark CALSIM II model, described below.

The analyses conducted for the Sites Reservoir Project utilized the model products and assumptions described in section 6004(a)(1) of the code of regulations. This includes the 2030 and 2070 future conditions CALSIM II and DSM2 models provided by the California Water Commission on November 2, 2016. There models were updated to include modifications to existing CVP and SWP operating criteria based on the 2020 Reclamation Benchmark CALSIM II model .The models were modified to include the facilities and operation of the Sites Project as described below in the Project Description.

ROC on LTO and SWP ITP

As of the February 2020 Record of Decision, Reclamation is operating the CVP to the ROC on LTO Alternative 1/Proposed Action published in December 2019 and BiOp published by USFWS in October 2019 .

As of August 2020, DWR is operating the SWP to the 2020 ITP proposed project as described in the SWP LTO FEIR published in March 2020.

Reclamation 2020 Benchmark

As of January 2021, Reclamation has developed a version of the CalSim II model in coordination with DWR and CDFW. This model includes both ROC on LTO and SWP ITP proposed actions. High-level modeling assumptions are summarized in the 2020 Benchmark Model Assumptions Summary document.

Hydrologic Period and Timestep

CALSIM II simulates CVP and State Water Project (SWP) operations on a monthly timestep from WY 1922 through WY 2003.

Development Conditions

CALSIM II input hydrology is based on an analysis of agricultural and urban land use and population estimates. The assumptions used for Sacramento Valley land use result from aggregation of historical survey and projected data developed for the California Water Plan Update (Bulletin 160-98). Generally, land use projections are based on Year 2020 estimates (hydrology serial number 2020D09E). However, the San Joaquin Valley hydrology reflects draft 2030 land use assumptions developed by Reclamation. Where appropriate Year 2030 projections of demands associated with water rights and SWP and CVP water service contracts have been included. Specifically, projections of full build out are used to describe the American River region demands for water rights and CVP contract supplies and California Aqueduct and the Delta Mendota Canal SWP/CVP contractor demands are set to full contract amounts.

Demands, Water Rights, CVP/SWP Contracts

CALSIM II demand inputs are preprocessed monthly time series for a specified level of development (e.g. 2030) and per hydrologic conditions. Demands are classified as CVP project, SWP project, local project, or non-project (e.g. pre-1914 water rights, in-Delta consumptive use etc.). CVP and SWP demands are separated into different classes based on the contract type. Non-project demands within each Depletion Study Area (DSA) are based on the proportion of the acreage served by the projects versus the total acreage, for each land-use type. Non- project demands are satisfied from sources other than project storage and project conveyance facilities and are reduced as a function of water availability in the absence of project operations.

Appendix B.3. Sites Project: 2020 Benchmark Model Assumptions Summary

Appendix B.3
Sites Project: 2020 Benchmark Model Assumptions Summary

This document summarizes the documents and models that inform Baseline modeling assumptions for the Sites Reservoir Project Revised Draft EIR/SDEIS. Then, tabulates high-level assumptions for the Reclamation 2020 Benchmark model.

Summary of ROC on LTO and SWP ITP

As of the February 2020 Record of Decision, Reclamation is operating the CVP to the ROC on LTO Alternative 1/Proposed Action published in December 2019 and BiOp published by USFWS in October 2019 (pending action by the court). The Reclamation ROC on LTO CalSim II model represents these operations.

As of August 2020, DWR is operating the SWP to the 2020 ITP proposed project (pending action by the court). The CalSim II model, representative of these operations, is described in the SWP LTO FEIR published in March 2020.

The ROC on LTO FEIS and SWP LTO FEIR contain detailed documentation of the models described above.

Summary of Reclamation 2020 Benchmark

Reclamation developed a version of the CalSim II model in coordination with DWR and CDFW. This model includes both ROC on LTO and ITP proposed actions. Additionally, this model includes more ITP actions than the DCR 2019 model and the DWR ITP Alternative 2b model (published in the SWP LTO FEIR). High-level modeling assumptions are tabulated below.

Region	Action	Operation	Source Document	Modeled Approach
Sacramento River	Shasta Cold Water Pool	Address cold water pool with tiered strategy	2019 ROC on LTO	Shasta TCD temperature targeting schedule updated to reflect Alternative 1 description in FEIS
American River	American River 2017 Flow Management Standard		2019 ROC on LTO	Minimum end of December Folsom storage of 275 TAF
Sacramento – San Joaquin River Delta	Delta Smelt Summer-Fall Habitat Action	X2 requirement	2019 ROC on LTO and 2020 SWP ITP	Operate to X2 distance of 80 km during September and October of Wet and Above Normal years
	Delta Smelt Summer-Fall Habitat Action	SMSCG operations	2019 ROC on LTO and 2020 SWP ITP	In addition to operations per D-1641 requirements, SMSCG operates for up to 60 days in June through October of Wet, Above Normal, Below Normal and Dry years.
	Delta Smelt Summer-Fall Habitat Action	Summer Outflow Block	2020 SWP ITP	SWP to release up to 100 TAF block of water for Delta outflow in June through September of Wet and Above Normal years
	Spring Outflow Block	SWP export curtailment	2020 SWP ITP	SWP to allow up to 150 TAF of Delta outflow, by reducing Banks exports, in April and May, subject to a 44,5000 cfs Delta outflow off-ramp.
Sacramento – San Joaquin River Delta Old and Middle River (OMR) Flow	Integrated Early Winter Pulse Protection	OMR flow requirement	2019 ROC on LTO and 2020 SWP ITP	After December 1, and when the 3-day average turbidity is 12 NTU or greater at Old River at Bacon Island (OBI), Prisoner's Point (PPT), and Victoria Canal (VCU), Reclamation and DWR operate to -2,000 cfs of the 14-day average OMR index for 14 days
	Turbidity Bridge Avoidance	OMR flow requirement	2019 ROC on LTO and 2020 SWP ITP	For January and February in any water year type, if the Turbidity trigger is reached (Sacramento River index is greater than or equal to 20,000 cfs), Projects operate to 14-day average OMR Index if -2000 cfs for five days. For March through June of Wet and Above Normal years, it is assumed that there will be one event of turbidity bridge avoidance in each month (-2000 cfs for five days).
	Storm-Related OMR Flexibility	OMR flow requirement	2019 ROC on LTO and 2020 SWP ITP	In Above Normal and Below Normal years, it is assumed that there will be one opportunity in January and one opportunity in February to operate to a more negative OMR index than -5,000 cfs. This is modeled as 14-day OMR index of -6,000 cfs for 7 days in each month. In dry years, it is assumed that one opportunity occurs either in January or February but not both months.
	Species-specific cumulative salvage or loss threshold	OMR flow requirement	2019 ROC on LTO and 2020 SWP ITP	OMR index set to negative 3,500 CFS in April and May of all non-critically dry year-types

Appendix B.4. Water Balance of CalSim II Simulation Results for Alternative 1B – WSIP 2030 and WSIP 2070

Appendix B.4

Water Balance of CalSim II Simulation Results for Alternative 1B – WSIP 2030 and WSIP 2070

The following section contains tables that portray the water balance results for the following CalSim II simulation:

1. Alternative 1 B WSIP 2030 vs. No Action Alternative WSIP 2030
2. Alternative 1 B WSIP 2070 vs. No Action Alternative WSIP 2070

A water balance is an accounting of all the flows of water into and out of an account for a defined period. An account can represent a location or geographic boundary, such as a reservoir, watershed, or region. The following accounts are included in this report:

1. Sites Reservoir
    a. Method 1 – by beneficiary
    b. Method 2 – by conveyance facility
2. Sites Reservoir Private Account
3. Sites Reservoir Public Account
4. Colusa Basin
5. Sacramento Valley
6. Sacramento-San Joaquin Delta

The Sacramento-San Joaquin Delta account consists of the region upstream of Delta outflow and downstream of inflows at Freeport and Vernalis. The Sacramento Valley account includes the region upstream of Freeport and downstream of inflows at Shasta Lake and Trinity Lake, not including the Colusa Basin. The Colusa Basin account consists of the entire Colusa Basin region, not including Sites Reservoir. The Sites Reservoir account provides a water balance for the reservoir itself.

The following tables include inputs, outputs, and changes in reservoir storage for each account. The parameters are presented as water-year (October through September) annual averages based on the full simulation period (82 years; 1922-2003). The water balance is computed as the total volume of inputs subtracted by the total volume of outputs and the total volume of change in storage. A water balance value of zero indicates that all water entering the account is equal to all water leaving the account and accumulating in storage. Moreover, a water balance of zero confirms that there are no net gains or losses within the account that are unaccounted for. As shown in this report, all the CalSim II models achieve water balance values of zero for each of the four accounts defined above.

Sites Reservoir Mass Balance – Method (by beneficiary) *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	**No Action Alternative WSIP 2030 032221**	**Difference**
Sites Reservoir Mass Balance **Inputs**			
Sites Diversion for Sacramento Valley Supply (for TCCA, GCID, RD108, and other Sacramento Valley supply)	50	0	50
Sites Diversion for Delta Participants	133	0	133
Sites Diversion for Refuge Level 4 and Yolo Bypass	64	0	64
Sites Diversion for CVP	31	0	31
Total Inputs to Sites Reservoir	**279**	**0**	**279**
Outputs			
Sites Release to Sacramento Valley (for TCCA, GCID, RD108, and other Sacramento Valley deliveries)	37	0	37
Sites Release for Shasta Storage Exchange Delivery to Delta Participants	17	0	17
Sites Release for WTS Delivery to Delta Participants	106	0	106
Sites Release for CVP Op Flex (directly to the Sacramento River)	16	0	16
Sites Release for CVP Op Flex Exchange with Sacramento CVP Diversions	29	0	29
Sites Release to Refuge Level 4	5	0	5
Sites Release to CB Drain, Kelly Ridgecut, & Yolo Bypass	41	0	41
Sites Reservoir Evaporation & Losses	30	0	30
Total Outputs from Sites Reservoir	**281**	**0**	**281**
Change in Storage			
Sites Reservoir	-3	0	-3
Mass Balance	**0**	**0**	**0**

*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period.

*Annual Averages for October through September.

Sites Reservoir Mass Balance - Method 2 (by conveyance facility) *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	No Action Alternative WSIP 2030 032221	Difference
Sites Reservoir Mass Balance **Inputs**			
Sites Diversion at Red Bluff (TCC)	211	0	211
Sites Diversion at Hamilton City (GCC)	68	0	68
Total Inputs to Sites Reservoir	**279**	**0**	**279**
Outputs			
Sites Release to TCC for Local Use or to the Sacramento River	71	0	71
Sites Release to GCC	30	0	30
Sites Release to Dunnigan Pipeline	151	0	151
Sites Reservoir Evaporation & Losses	30	0	30
Total Outputs from Sites Reservoir	**281**	**0**	**281**
Change in Storage			
Sites Reservoir	-3	0	-3
Mass Balance	**0**	**0**	**0**

*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period.
*Annual Averages for October through September.

Sites Reservoir Private Account Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	**No Action Alternative WSIP 2030 032221**	**Difference**
Sites Reservoir Private Account **Inputs**			
Sites Diversion to Sacramento Valley Accounts (for TCCA, GCID, RD108, and other Sacramento Valley storage)	50	0	50
Sites Diversion to Delta Participants Account	133	0	133
Total Inputs to Private Account	**183**	**0**	**183**
Outputs			
Sites Release to Sacramento Valley (for TCCA, GCID, RD108, and other Sacramento Valley deliveries)	37	0	37
Sites Release for Shasta Storage Exchange Delivery to Delta Participants	17	0	17
Sites Release for WTS Delivery to Delta Participants	106	0	106
Sites Water Supply Accounts Evaporation & Losses	24	0	24
Total Outputs from Private Account	**184**	**0**	**184**
Change in Storage			
Sites Private Account	-1	0	-1
Mass Balance	**0**	**0**	**0**

*The Sites Reservoir Private Account include accounting for TCCA, GCID, RD108, Other Sac Valley, and Delta Export.
*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period.
*Annual Averages for October through September.

Sites Reservoir Public Account Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	**No Action Alternative WSIP 2030 032221**	**Difference**
Sites Reservoir Public Account **Inputs**			
Sites Diversion to Refuge Level 4 and Yolo Bypass Accounts	64	0	64
Sites Diversion to CVP Account	31	0	31
Total Outputs from Sites Reservoir Public Account	**95**	**0**	**95**
Outputs			
Sites Release for CVP Op Flex (directly to the Sacramento River)	16	0	16
Sites Release for CVP Op Flex Exchange with Sacramento CVP Diversions	29	0	29
Sites Release to NOD Refuge Level 4	5	0	5
Sites Release to CB Drain, Kelly Ridgecut, & Yolo Bypass	41	0	41
Sites Public Account Evaporation & Losses	6	0	6
Total Outputs from Sites Reservoir Public Account	**97**	**0**	**97**
Change in Storage			
Sites Public Account	-2	0	-2
Mass Balance	**0**	**0**	**0**

*The Sites Reservoir Public Account includes accounting for CVP storage, Refuge Level 4 supply, and the Yolo Bypass.
*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period
*Annual Averages for October through September.

Colusa Basin Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	**No Action Alternative WSIP 2030 032221**	**Difference**
Colusa Basin Mass Balance **Inputs**			
Diversion at Red Bluff (TCC & Corning Canal)	404	206	198
Diversion at Hamilton City (GCC)	735	714	21
Release from Sites Reservoir to TCC, GCC, and Colusa Basin Drain	142	0	142
Other Diversions from Sacramento River	454	453	0
Stony Creek and other tributary Inflows	941	941	0
Return Flows	281	279	2
Total Inputs to Colusa Basin	**2,956**	**2,593**	**363**
Outputs			
Diversion to Corning Canal	23	23	0
Diversion to Orland Unit Agriculture	103	103	0
Diversion to TCCA Agriculture	231	195	36
Diversion from TCC to Sites Reservoir	211	0	211
Diversion to GCID Agriculture	573	572	2
Diversion from GCC to Sites Reservoir	68	0	68
Diversion to Refuges	109	103	6
Diversion to Other Colusa Basin Agriculture (Right Bank)	454	453	0
Stony Creek Outflow to Sacramento River	251	252	-1
Colusa Basin Drain Outflow to Sacramento River (from Dunnigan)	420	420	1
Knights Landing Ridge Cut Outflow (from Dunnigan)	363	327	36
Losses from Canals (TCC, CC, GCC, CBD)	126	121	5
Stony Creek Reservoirs Evaporation & Losses	24	24	0
Total Outputs from Colusa Basin	**2,956**	**2,593**	**363**

Colusa Basin Mass Balance *(All values are in TAF)*	**Annual Average for Full Simulation Period**		
	Alternative 1B WSIP 2030 040121	**No Action Alternative WSIP 2030 032221**	**Difference**
Colusa Basin Mass Balance **Change in Storage**			
Stony Creek Reservoirs	1	1	0
Mass Balance	**0**	**0**	**0**

*The Colusa Basin mass balance includes parameters within the Colusa Basin, not including Sites Reservoir, Funks Reservoir, and the Sacramento Valley outside of the Colusa Basin. The Delevan Pipeline is not included in this table because it serves as an input and output for the Sites Reservoir Mass Balance and Sacramento Valley Mass Balance reports.
*Other Diversion from Sacramento River include diversions to Colusa Basin, West Bank, and WBA8S
*Stony Creek and other tributary inflows include inflows to East Park Reservoir, Stony Gorge Reservoir, Black Butte Lake and DSA 12 Accretion Adjustments.
*Return flows include those from WBA8NN, WBA7N, WBA7S, WBA8S, WBA8NS, Delevan and Colusa Refuges
*Diversion to TCCA Agriculture includes diversions to WBA4, WBA7N, and WBA7S.
*Diversion to GCID Agriculture includes diversions to WBA8NN and WBA8NS.
*Diversion to Refuges includes diversions from the Sacramento Valley and the Colusa Basin Drain.
*Stony Creek Reservoirs includes East Park Reservoir, Stony Gorge Reservoir, and Black Butte Lake.
*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period
*Annual Averages for October through September.

Sacramento Valley Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	No Action Alternative WSIP 2030 032221	Difference
Sacramento Valley Mass Balance **Inputs**			
Inflow to Shasta Lake and Whiskeytown Reservoir	6,209	6,209	0
Flow through Clear Creek Tunnel	490	490	0
Tributary Inflows upstream of Red Bluff	1,484	1,484	0
Tributary Inflows between Red Bluff and Hamilton City	840	840	0
Stony Creek Inflow	251	252	-1
Big Chico Creek Inflow	101	101	0
Accretions in Upper Sacramento River	1,395	1,395	0
Sites Reservoir Release to river through Dunnigan Pipeline	109	0	109
Inflow from Colusa Basin Drain	420	420	1
Feather River Inflow to Lake Oroville	4,115	4,115	0
Yuba River and Bear River Inflow to Feather River	2,273	2,273	0
Kelly Ridge and Butte Creek Inflow to Feather River	433	433	0
Accretions in Feather River	460	460	0
American River Inflow to Folsom Lake	2,784	2,784	0
Other American River Inflows	674	674	0
Accretions in Lower Sacramento River	595	595	0
Inflow from Knights Landing Ridge Cut through Dunnigan Pipeline	363	327	36
Groundwater Pumping	1,240	1,237	3
Return Flows	1,494	1,495	0
Total Inputs to Sacramento Valley	**25,729**	**25,582**	**147**
Outputs			
Diversion to Sutter Refuge	12	11	0
Diversion at Red Bluff (TCC & CC)	404	206	198
Diversion at Hamilton City (GCC)	735	714	21
Diversion to Other Colusa Basin Agriculture (Right Bank)	454	453	0

Sacramento Valley Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	**No Action Alternative WSIP 2030 032221**	**Difference**
Sacramento Valley Mass Balance			
Diversion to Other Sacramento River Agriculture and M&I	2,813	2,813	0
Diversion to Feather River Agriculture and M&I	2,277	2,279	-2
Diversion to Yuba River Agriculture and M&I	87	87	0
D8_ED	37	37	0
Reservoir Evaporation & Losses	226	225	1
Stream-Groundwater Interaction	132	134	-2
Yolo Bypass	3,135	3,208	-72
Sacramento River below Freeport	15,423	15,421	2
Total Outputs from Sacramento Valley	**25,735**	**25,589**	**146**
Change in Storage			
Shasta Lake	5	4	1
Lake Oroville	-10	-9	0
Folsom Lake	-2	-2	0
Other Reservoirs	1	1	0
Total Change in Reservoir Storage in Sacramento Valley	**-6**	**-6**	**1**
Mass Balance	**0**	**0**	**0**

*The Sacramento Valley Mass Balance includes parameters upstream of Freeport to Shasta Lake and Trinity Lake inflow, not including the Colusa Basin. See "Colusa Basin Mass Balance" for additional detail.

*Other Inflows upstream of Red Bluff include Cow Creek, Cottonwood Creek, Battle Creek, and Payne Creek.

*Inflows between Red Bluff and Hamilton City include Elder Creek, Thomes Creek, Antelope Creek, Mills Creek, Deer Creek, and Red Bank Creek.

*Other American River Inflows include inflows to the Sacramento River and from Lake Natoma.

*Diversion to Other Sacramento River Agriculture and M&I include diversions to West Sacramento Diversion for Davis Municipal Project, EBMUD & CCWD Freeport Regional Water Project, North Fork Dam, DSA12, DSA15, DSA59, DSA70, WBA4, and WBA5.

*Diversion to Feather River Agriculture and M&I includes diversions to Gray Lodge Refuge, Butte Sink Duck Clubs, Western Canal & Joint WD Rice Straw Decomp, DSA69, and diversion to Sites Reservoir at Joint Canal near Thermalito.

Sacramento Valley Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	**No Action Alternative WSIP 2030 032221**	**Difference**
Sacramento Valley Mass Balance			

*Diversion to Yuba River Agriculture and M&I include transfers for Lower Yuba River Accord and SCWA excess flows.

*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period.

*Other Reservoirs include Whiskeytown Lake, Kesiwck Reservoir, Thermalito Complex, and Lake Natoma.

*Annual Averages for October through September.

Sacramento - San Joaquin Delta Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2030 040121	No Action Alternative WSIP 2030 032221	Difference
Sacramento - San Joaquin Delta Mass Balance **Inputs**			
Sacramento River below Freeport	15,423	15,421	2
Yolo Bypass	3,135	3,208	-72
San Joaquin River below Vernalis	3,281	3,281	0
Eastside Streams and other inflows	975	975	0
Total Inputs to Sacramento - San Joaquin Delta	**22,815**	**22,885**	**-70**
Outputs			
Diversion to North Bay Aquaduct	85	83	2
Export at Banks Pumping Plant	2,584	2,466	118
Export at Jones Pumping Plant	2,415	2,411	4
Export to Contra Costa WD/Los Vaqueros Reservoir	145	145	0
Other Delta Diversions	103	104	-1
Net Delta Island Consumptive Use	898	898	0
Delta Outflow	16,585	16,778	-193
Total Outputs from Sacramento - San Joaquin Delta	**22,815**	**22,885**	**-70**
Mass Balance	**0**	**0**	**0**

*The Delta Mass Balance includes parameters upstream of Delta Outflow, not including the Sacramento Valley. It is bounded by inflow at Freeport and Vernalis. See "Sacramento Valley Mass Balance" for additional detail.

*Eastside Streams and other inflows includes Marsh Creek, Mokelumne, & Calaveras, Cosumnes River.

*Export to Contra Costa WD/Los Vaqueros Reservoir includes exports to CCWD Old River, Victoria Canal, & Rock Slough Intakes.

*Other Delta Diversions include diversions to Stockton DWSP/COSMA, the City of Antioch (pre-1914 water rights), and Vallejo.

*Net Delta Island Consumptive Use includes diversions and island seepage and drainage.

*Annual Averages for October through September.

Sites Reservoir Mass Balance – Method 1 (by beneficiary) *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2070 040121	**No Action Alternative WSIP 2070 032221**	**Difference**
Sites Reservoir Mass Balance **Inputs**			
Sites Diversion for Sacramento Valley Supply (for TCCA, GCID, RD108, and other Sacramento Valley supply)	60	0	60
Sites Diversion for Delta Participants	134	0	134
Sites Diversion for Refuge Level 4 and Yolo Bypass	57	0	57
Sites Diversion for CVP	31	0	31
Total Inputs to Sites Reservoir	**282**	**0**	**282**
Outputs			
Sites Release to Sacramento Valley (for TCCA, GCID, RD108, and other Sacramento Valley deliveries)	47	0	47
Sites Release for Shasta Storage Exchange Delivery to Delta Participants	21	0	21
Sites Release for WTS Delivery to Delta Participants	105	0	105
Sites Release for CVP Op Flex (directly to the Sacramento River)	23	0	23
Sites Release for CVP Op Flex Exchange with Sacramento CVP Diversions	20	0	20
Sites Release to Refuge Level 4	5	0	5
Sites Release to CB Drain, Kelly Ridgecut, & Yolo Bypass	36	0	36
Sites Reservoir Evaporation & Losses	28	0	28
Total Outputs from Sites Reservoir	**285**	**0**	**285**
Change in Storage			
Sites Reservoir	-3	0	-3
Mass Balance	**0**	**0**	**0**

*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period.

*Annual Averages for October through September.

Sites Reservoir Mass Balance – Method 2 (by conveyance facility) *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2070 040121	No Action Alternative WSIP 2070 032221	Difference
Sites Reservoir Mass Balance **Inputs**			
Sites Diversion at Red Bluff (TCC)	211	0	211
Sites Diversion at Hamilton City (GCC)	71	0	71
Total Inputs to Sites Reservoir	**282**	**0**	**282**
Outputs			
Sites Release to TCC for Local Use or to the Sacramento River	72	0	72
Sites Release to GCC	30	0	30
Sites Release to Dunnigan Pipeline	155	0	155
Sites Reservoir Evaporation & Losses	28	0	28
Total Outputs from Sites Reservoir	**285**	**0**	**285**
Change in Storage			
Sites Reservoir	-3	0	-3
Mass Balance	**0**	**0**	**0**

*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period.
*Annual Averages for October through September.

Sites Reservoir Private Account Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2070 040121	**No Action Alternative WSIP 2070 032221**	**Difference**
Sites Reservoir Private Account **Inputs**			
Sites Diversion to Sacramento Valley Accounts (for TCCA, GCID, RD108, and other Sacramento Valley storage)	60	0	60
Sites Diversion to Delta Participants Account	134	0	134
Total Inputs to Private Account	**194**	**0**	**194**
Outputs			
Sites Release to Sacramento Valley (for TCCA, GCID, RD108, and other Sacramento Valley deliveries)	47	0	47
Sites Release for Shasta Storage Exchange Delivery to Delta Participants	21	0	21
Sites Release for WTS Delivery to Delta Participants	105	0	105
Sites Water Supply Accounts Evaporation & Losses	23	0	23
Total Outputs from Private Account	**196**	**0**	**196**
Change in Storage			
Sites Private Account	-2	0	-2
Mass Balance	**0**	**0**	**0**

*The Sites Reservoir Private Account include accounting for TCCA, GCID, RD108, Other Sac Valley, and Delta Export.
*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period.
*Annual Averages for October through September.

Sites Reservoir Public Account Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2070 040121	**No Action Alternative WSIP 2070 032221**	**Difference**
Sites Reservoir Public Account **Inputs**			
Sites Diversion to Refuge Level 4 and Yolo Bypass Accounts	57	0	57
Sites Diversion to CVP Account	31	0	31
Total Outputs from Sites Reservoir Public Account	**88**	**0**	**88**
Outputs			
Sites Release for CVP Op Flex (directly to the Sacramento River)	23	0	23
Sites Release for CVP Op Flex Exchange with Sacramento CVP Diversions	20	0	20
Sites Release to NOD Refuge Level 4	5	0	5
Sites Release to CB Drain, Kelly Ridgecut, & Yolo Bypass	36	0	36
Sites Public Account Evaporation & Losses	6	0	6
Total Outputs from Sites Reservoir Public Account	**90**	**0**	**90**
Change in Storage			
Sites Public Account	-1	0	-1
Mass Balance	**0**	**0**	**0**

*The Sites Reservoir Public Account includes accounting for CVP storage, Refuge Level 4 supply, and the Yolo Bypass.
*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period
*Annual Averages for October through September.

Colusa Basin Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2070 040121	**No Action Alternative WSIP 2070 032221**	**Difference**
Colusa Basin Mass Balance **Inputs**			
Diversion at Red Bluff (TCC & Corning Canal)	350	147	203
Diversion at Hamilton City (GCC)	737	710	26
Release from Sites Reservoir to TCC, GCC, and Colusa Basin Drain	138	0	138
Other Diversions from Sacramento River	452	452	0
Stony Creek and other tributary Inflows	972	972	0
Return Flows	280	279	2
Total Inputs to Colusa Basin	**2,930**	**2,560**	**369**
Outputs			
Diversion to Corning Canal	16	16	0
Diversion to Orland Unit Agriculture	103	103	0
Diversion to TCCA Agriculture	185	139	46
Diversion from TCC to Sites Reservoir	211	0	211
Diversion to GCID Agriculture	569	568	1
Diversion from GCC to Sites Reservoir	71	0	71
Diversion to Refuges	108	103	5
Diversion to Other Colusa Basin Agriculture (Right Bank)	452	452	0
Stony Creek Outflow to Sacramento River	284	286	-2
Colusa Basin Drain Outflow to Sacramento River (from Dunnigan)	425	425	1
Knights Landing Ridge Cut Outflow (from Dunnigan)	355	324	31
Losses from Canals (TCC, CC, GCC, CBD)	123	119	4
Stony Creek Reservoirs Evaporation & Losses	25	24	0
Total Outputs from Colusa Basin	**2,929**	**2,560**	**369**

Colusa Basin Mass Balance *(All values are in TAF)*	**Annual Average for Full Simulation Period**		
	Alternative 1B WSIP 2070 040121	**No Action Alternative WSIP 2070 032221**	**Difference**
Colusa Basin Mass Balance **Change in Storage**			
Stony Creek Reservoirs	1	1	0
Mass Balance	**0**	**0**	**0**

*The Colusa Basin mass balance includes parameters within the Colusa Basin, not including Sites Reservoir, Funks Reservoir, and the Sacramento Valley outside of the Colusa Basin. The Delevan Pipeline is not included in this table because it serves as an input and output for the Sites Reservoir Mass Balance and Sacramento Valley Mass Balance reports.
*Other Diversion from Sacramento River include diversions to Colusa Basin, West Bank, and WBA8S
*Stony Creek and other tributary inflows include inflows to East Park Reservoir, Stony Gorge Reservoir, Black Butte Lake and DSA 12 Accretion Adjustments.
*Return flows include those from WBA8NN, WBA7N, WBA7S, WBA8S, WBA8NS, Delevan and Colusa Refuges
*Diversion to TCCA Agriculture includes diversions to WBA4, WBA7N, and WBA7S.
*Diversion to GCID Agriculture includes diversions to WBA8NN and WBA8NS.
*Diversion to Refuges includes diversions from the Sacramento Valley and the Colusa Basin Drain.
*Stony Creek Reservoirs includes East Park Reservoir, Stony Gorge Reservoir, and Black Butte Lake.
*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period
*Annual Averages for October through September.

Sacramento Valley Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2070 040121	No Action Alternative WSIP 2070 032221	Difference
Sacramento Valley Mass Balance **Inputs**			
Inflow to Shasta Lake and Whiskeytown Reservoir	6,254	6,254	0
Flow through Clear Creek Tunnel	516	516	0
Tributary Inflows upstream of Red Bluff	1,521	1,521	0
Tributary Inflows between Red Bluff and Hamilton City	877	877	0
Stony Creek Inflow	284	286	-2
Big Chico Creek Inflow	106	106	0
Accretions in Upper Sacramento River	1,395	1,395	0
Sites Reservoir Release to river through Dunnigan Pipeline	120	0	120
Inflow from Colusa Basin Drain	425	425	1
Feather River Inflow to Lake Oroville	4,228	4,228	0
Yuba River and Bear River Inflow to Feather River	2,328	2,328	0
Kelly Ridge and Butte Creek Inflow to Feather River	447	447	0
Accretions in Feather River	460	460	0
American River Inflow to Folsom Lake	2,809	2,809	0
Other American River Inflows	674	674	0
Accretions in Lower Sacramento River	595	595	0
Inflow from Knights Landing Ridge Cut through Dunnigan Pipeline	355	324	31
Groundwater Pumping	1,332	1,318	14
Return Flows	1,488	1,490	-2
Total Inputs to Sacramento Valley	**26,214**	**26,052**	**162**
Outputs			
Diversion to Sutter Refuge	11	10	0
Diversion at Red Bluff (TCC & CC)	350	147	203
Diversion at Hamilton City (GCC)	737	710	26
Diversion to Other Colusa Basin Agriculture (Right Bank)	452	452	0

Sacramento Valley Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2070 040121	**No Action Alternative WSIP 2070 032221**	**Difference**
Sacramento Valley Mass Balance			
Diversion to Other Sacramento River Agriculture and M&I	2,808	2,808	0
Diversion to Feather River Agriculture and M&I	2,268	2,273	-5
Diversion to Yuba River Agriculture and M&I	83	83	0
D8_ED	35	35	0
Reservoir Evaporation & Losses	212	210	2
Stream-Groundwater Interaction	177	178	0
Yolo Bypass	3,645	3,733	-88
Sacramento River below Freeport	15,444	15,422	22
Total Outputs from Sacramento Valley	**26,223**	**26,062**	**161**
Change in Storage			
Shasta Lake	2	1	0
Lake Oroville	-10	-10	0
Folsom Lake	-2	-2	0
Other Reservoirs	1	1	0
Total Change in Reservoir Storage in Sacramento Valley	**-10**	**-10**	**0**
Mass Balance	**0**	**0**	**0**

*The Sacramento Valley Mass Balance includes parameters upstream of Freeport to Shasta Lake and Trinity Lake inflow, not including the Colusa Basin. See "Colusa Basin Mass Balance" for additional detail.

*Other Inflows upstream of Red Bluff include Cow Creek, Cottonwood Creek, Battle Creek, and Payne Creek.

*Inflows between Red Bluff and Hamilton City include Elder Creek, Thomes Creek, Antelope Creek, Mills Creek, Deer Creek, and Red Bank Creek.

*Other American River Inflows include inflows to the Sacramento River and from Lake Natoma.

*Diversion to Other Sacramento River Agriculture and M&I include diversions to West Sacramento Diversion for Davis Municipal Project, EBMUD & CCWD Freeport Regional Water Project, North Fork Dam, DSA12, DSA15, DSA59, DSA70, WBA4, and WBA5.

*Diversion to Feather River Agriculture and M&I includes diversions to Gray Lodge Refuge, Butte Sink Duck Clubs, Western Canal & Joint WD Rice Straw Decomp, DSA69, and diversion to Sites Reservoir at Joint Canal near Thermalito.

Sacramento Valley Mass Balance *(All values are in TAF)*	**Annual Average for Full Simulation Period**		
	Alternative 1B WSIP 2070 040121	**No Action Alternative WSIP 2070 032221**	**Difference**
Sacramento Valley Mass Balance			

*Diversion to Yuba River Agriculture and M&I include transfers for Lower Yuba River Accord and SCWA excess flows.

*Change in Storage is End of Period Volume minus Beginning of Period Volume divided by number of years in the period.

*Other Reservoirs include Whiskeytown Lake, Kesiwck Reservoir, Thermalito Complex, and Lake Natoma.

*Annual Averages for October through September.

Sacramento - San Joaquin Delta Mass Balance *(All values are in TAF)*	Annual Average for Full Simulation Period		
	Alternative 1B WSIP 2070 040121	No Action Alternative WSIP 2070 032221	Difference
Sacramento - San Joaquin Delta Mass Balance **Inputs**			
Sacramento River below Freeport	15,444	15,422	22
Yolo Bypass	3,645	3,733	-88
San Joaquin River below Vernalis	3,422	3,422	0
Eastside Streams and other inflows	983	983	0
Total Inputs to Sacramento - San Joaquin Delta	**23,495**	**23,560**	**-65**
Outputs			
Diversion to North Bay Aquaduct	82	80	2
Export at Banks Pumping Plant	2,389	2,255	133
Export at Jones Pumping Plant	2,212	2,208	5
Export to Contra Costa WD/Los Vaqueros Reservoir	146	146	0
Other Delta Diversions	106	105	1
Net Delta Island Consumptive Use	896	896	0
Delta Outflow	17,663	17,870	-207
Total Outputs from Sacramento - San Joaquin Delta	**23,495**	**23,560**	**-65**
Mass Balance	**0**	**0**	**0**

*The Delta Mass Balance includes parameters upstream of Delta Outflow, not including the Sacramento Valley. It is bounded by inflow at Freeport and Vernalis. See "Sacramento Valley Mass Balance" for additional detail.

*Eastside Streams and other inflows includes Marsh Creek, Mokelumne, & Calaveras, Cosumnes River.

*Export to Contra Costa WD/Los Vaqueros Reservoir includes exports to CCWD Old River, Victoria Canal, & Rock Slough Intakes.

*Other Delta Diversions include diversions to Stockton DWSP/COSMA, the City of Antioch (pre-1914 water rights), and Vallejo.

*Net Delta Island Consumptive Use includes diversions and island seepage and drainage.

*Annual Averages for October through September.

Appendix C. Cost

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Appendix C. Cost

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Appendix C.3 Mitigation Cost

Updated Mitigation Cost Estimate 2021

Appendix C.1. Construction Cost

Appendix C.1.A Final Feasibility-Level Reservoir Cost Estimate

Final Feasibility-Level Cost Estimate
Technical Memorandum

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	May 20, 2021
From:	Mike Forrest, P.E., G.E; Abrie Horak (AECOM)
Quality Review:	Peter Morris (AECOM)
Authority Agent Review:	Henry Luu, P.E. (HDR)
Subject:	Final Feasibility-Level Cost Estimate Task Order No. 2 – Task HR56

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Appendix C Responses to Comments on the Draft Cost Estimate Technical Memorandum

Appendix D Responses to Metropolitan Water District's Comments on Draft Cost Estimate

Acronyms and Abbreviations

AACE	Association for the Advancement of Cost Engineering
APS	Alternative Procurement Strategy
Authority	Sites Project Authority
Caltrans	California Department of Transportation
cfs	cubic feet per second
DSOD	State of California Department of Water Resources, Division of Safety of Dams
DWR	California Department of Water Resources
FOB	Free on Board
GL	General Liability
I/O	Inlet/Outlet Works
LMC	Land Management Committee
MAF	million-acre-foot
NMWS	normal maximum operating water surface
OPCC	Opinion of Probable Construction Cost
PL/PD	Public Liability/Property Damage
QA	Quality Assurance
TM	technical memorandum
VE	value engineering

Executive Summary

This technical memorandum presents AECOM's feasibility-level cost estimate (an "Opinion of Probable Construction Cost", OPCC) for the reservoir facilities contract (HR) that include the main and saddle dams, spillway, inlet/outlet tunnels and tower, construction diversion tunnel and pipelines, and roads and bridges. Cost for the conveyance facilities contract (HC) are presented in a separate technical memorandum by Jacobs Engineering. The costs are presented in both 2021 dollars and 2019 dollars (for comparison to previous value planning estimates) for two reservoir capacities: Alternative 1 reservoir with a storage capacity of 1.5 million acre-feet (MAF), and for an Alternative 2 reservoir with a storage capacity of 1.3 MAF.

Cost Estimate Classification

The estimate presented herein is a Class 4 cost estimate as defined by the Association for the Advancement of Cost Engineering (AACE) International. Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete.

Feasibility-Level Cost Estimate Summary

The feasibility-level cost estimate summaries for Alternatives 1 and 2 are presented in Table ES-1 (in March 2021 dollars) and Table ES-2 (in July 2019 dollars). The costs shown in these tables include the direct construction costs (labor, materials, equipment and subcontractors), mobilization/demobilization and contractor mark-ups (overhead, profit, insurance and bond). Certain Owner-related costs are also added (design and construction contingencies and allowances, and non-contract costs). Key exclusions from the feasibility-level cost estimate are also discussed.

The feasibility-level cost estimates are based on the construction sequencing and schedule presented in the Constructability Analysis Technical Memorandum. Changes in the construction sequencing or schedule could affect the construction cost.

Construction Cost Uncertainty

The range of expected accuracy for the cost estimates decreases with increasing project definition in the design process. The ultimate cost at award can reasonably be expected to fall within a range from 15% to 30% below to 20% to 50% above the current Class 4 estimate after contingencies. The expected range of accuracy for this Class 4 feasibility-level cost estimate is +/-20%.

Design contingencies (applicable prior to bid) were selected as 10% to 15% to account for uncertainty related to undefined scope items within the current design in this feasibility-level cost estimate. A construction contingency allowance of 15% has been allowed for construction phase changes. This Technical Memorandum (TM) indicates key exclusions from this estimate. An "Owner's contingency" is not included in this feasibility-level cost estimate and should be considered by the Authority to establish its own contingency.

A risk register should be maintained throughout the design process to track risks and their potential impact on project cost.

Value Engineering Ideas to Reduce Construction Cost

Feasibility-level costs have increased significantly from the costs presented in the Value Planning Report (Authority, April, 2020). We also note that the costs presented in this TM have not been optimized. Selected value engineering (VE) options to provide cost savings were accepted and are included in the updated baseline estimates presented herein. Sufficient information currently exists to include these in the costs for Alternatives 1 and 2. Other VE options were identified as items that require further evaluation in preliminary engineering to clarify whether they are feasible. These items are not included in the baseline estimates as they will need Authority and State of California Department of Water Resources, Division of Safety of Dams (DSOD) acceptance.

Table ES-1. Feasibility-Level Cost Estimate – Executive Summary for HR Facilities (Alternatives 1 & 2)
(Costs in March 2021 Dollars)

WBS No	Work / Facility Package	Alt 1 Total Feasibility-Level Cost Estimate *(Issue 04/16/2021)*	Alt 2 Total Feasibility-Level Cost Estimate *(Issue 04/16/2021)*
20	Site Demolition and Clearing Work	**33,015,981**	**33,015,981**
21	Golden Gate Dam	**695,724,122**	**589,052,931**
22	Sites Dam	**361,046,214**	**324,368,994**
23	Saddle Dam 3	**248,303,733**	**136,396,023**
24	Saddle Dam 5	**93,453,884**	**75,384,567**
25	Other Saddle Dams/Dikes	**142,972,082**	**78,805,695**
26	IO Facility and Diversion Work	**263,557,497**	**259,105,049**
27	Road Work		
27.01	Public Roadway: Sites Lodoga Road Realignment (Alt 1) / South Road (Alt 2)	**194,346,912**	**515,408,760**
27.02	Public Roadway: Huffmaster Road Realignment	**45,475,007**	**-**
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	**29,239,425**	**29,239,425**
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	**33,192,535**	**33,192,535**
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	**28,462,170**	**38,101,562**
27.06	Recreation Roads - Peninsula Hills	**9,232,630**	**9,232,630**
27.07	Sites Lodoga Road Realignment Bridges	**172,675,817**	**-**
Total Feasibility-Level Cost Estimate (March 2021)		**2,350,700,000**	**2,121,300,000**

Total Feasibility-Level Cost Estimate (March 2021)	**2,350,700,000**	**2,121,300,000**
Estimated Range – Low (-20%)	**1,880,560,000**	**1,697,040,000**
Estimated Range – High (+20%)	**2,820,840,000**	**2,545,560,000**

Table ES-2. Feasibility-Level Cost Estimate – Executive Summary for HR Facilities (Alternatives 1 & 2)
(Costs in July 2019 Dollars)

WBS No	Work / Facility Package	Alt 1 Total Feasibility-Level Cost Estimate *(Issue 04/16/2021)*	Alt 2 Total Feasibility-Level Cost Estimate *(Issue 04/16/2021)*
20	Site Demolition and Clearing Work	**32,027,650**	**32,027,650**
21	Golden Gate Dam	**674,897,687**	**571,419,688**
22	Sites Dam	**350,238,330**	**314,659,039**
23	Saddle Dam 3	**240,870,785**	**132,313,022**
24	Saddle Dam 5	**90,656,351**	**73,127,937**
25	Other Saddle Dams/Dikes	**138,692,227**	**76,446,655**
26	IO Facility and Diversion Work	**255,667,929**	**251,348,764**
27	Road Work		
27.01	Public Roadway: Sites Lodoga Road Realignment / South Road	**188,529,156**	**499,980,049**
27.02	Public Roadway: Huffmaster Road Realignment	**44,113,717**	**-**
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	**28,364,146**	**28,364,146**
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	**32,198,920**	**32,198,920**
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	**27,610,158**	**36,960,995**
27.06	Recreation Roads - Peninsula Hills	**8,956,252**	**8,956,252**
27.07	Sites Lodoga Road Realignment Bridges	**167,506,783**	**-**
Total Feasibility-Level Cost Estimate (July 2019)		**2,280,330,000**	**2,057,800,000**

Total Feasibility-Level Cost Estimate (July 2019)	**2,280,330,000**	**2,057,800,000**
Estimated Range – Low (-20%)	**1,824,264,000**	**1,646,240,000**
Estimated Range – High (+20%)	**2,736,396,000**	**2,469,360,000**

1.0 Introduction

1.1 Background

The Value Planning VP-7 (appraisal level) estimate was completed in April 2020 (Authority, 2020). The objective of the value planning document was to determine the appropriate size and configuration for the reservoir (Alternative VP-7 has a 1.5 MAF reservoir). In August 2020, AECOM submitted seven technical memoranda (TMs) under Task Order No. 1 that advanced the design for VP-7 and described the feasibility engineering of the HR facilities (see References, Section 15.0). Those Task Order No. 1 TMs form the basis for the HR feasibility-level cost estimate presented in this TM. Appendix A and Appendix B provide the back-up for the Alternative 1 and Alternative 2 feasibility-level cost estimates, respectively. The feasibility-level cost estimate will be further refined during preliminary engineering as the project definition is improved.

This estimate has been through an extensive review by the Authority, including the following review meetings:

- On February 15, 2021, the initial draft of the feasibility-level cost estimate was presented to the Ad-Hoc Operations and Engineering Workgroup.
- On March 3, 2021, AECOM presented its in-progress draft feasibility-level cost estimate on the HR facilities dated February 3, 2021, to the Land Management Committee (LMC) in Maxwell, CA. This meeting discussed Authority concerns with the cost growth that occurred between the Value Planning Estimate for recommended alternative VP-7 developed in April 2020 and the in-progress feasibility-level cost estimate developed in February 2021 (AECOM, 2021b).
- On March 15, 2021, a review of progress of the cost estimates was made to the Ad Hoc Operations and Engineering Workgroup to receive feedback on the estimation process. Due to the cost growth, AECOM developed and presented value engineering (VE) ideas and associated approximate cost reductions for the in-progress estimate intended to reduce the construction costs.
- On April 20, 2021, a second presentation to the LMC took place to discuss revisions to this Revised Draft Feasibility-Level Cost Estimate.
- On April 29, 2021 the Value Planning Work Group was subsequently briefed regarding the status of the estimate and next steps.

AECOM submitted a draft TM on March 25, 2021, that responded to the LMC's e-mailed comments on the in-progress cost estimate pertaining to the HR facilities. The revised version of that TM is included in Appendix C, which incorporates responses to comments on the TM received from HDR on April 2, 2016. Besides responding to specific comments, that TM also compared the estimated 2019 costs for the HR items for the 1.5 MAF Alternative 1 reservoir in the VP-7 cost estimate (total cost of $1.5 billion) and the items in the feasibility cost estimate (total cost of $2.3 billion). VE ideas with their associated cost reductions were also included.

AECOM responded to Metropolitan Water District's Comments on the Draft Feasibility-Level Cost Estimate (AECOM, 2021b). Comment responses are included in Appendix D.

1.2 Project Overview and Reservoir Alternatives

The Sites Project Authority (Authority) is preparing a feasibility-level evaluation for a 1.5-MAF reservoir as a preferred alternative for the Sites Reservoir Project. The principal storage feature is Sites Reservoir. Figure 1-1 shows the location of Sites Reservoir, and the various dams to be constructed to form the reservoir. Sites Reservoir would have a nominal storage capacity of 1.5 MAF for Alternative 1, and 1.3

MAF for Alternative 2. Table 1-1 outlines key aspects of the reservoir alternatives for the reservoir engineering (HR) contract.

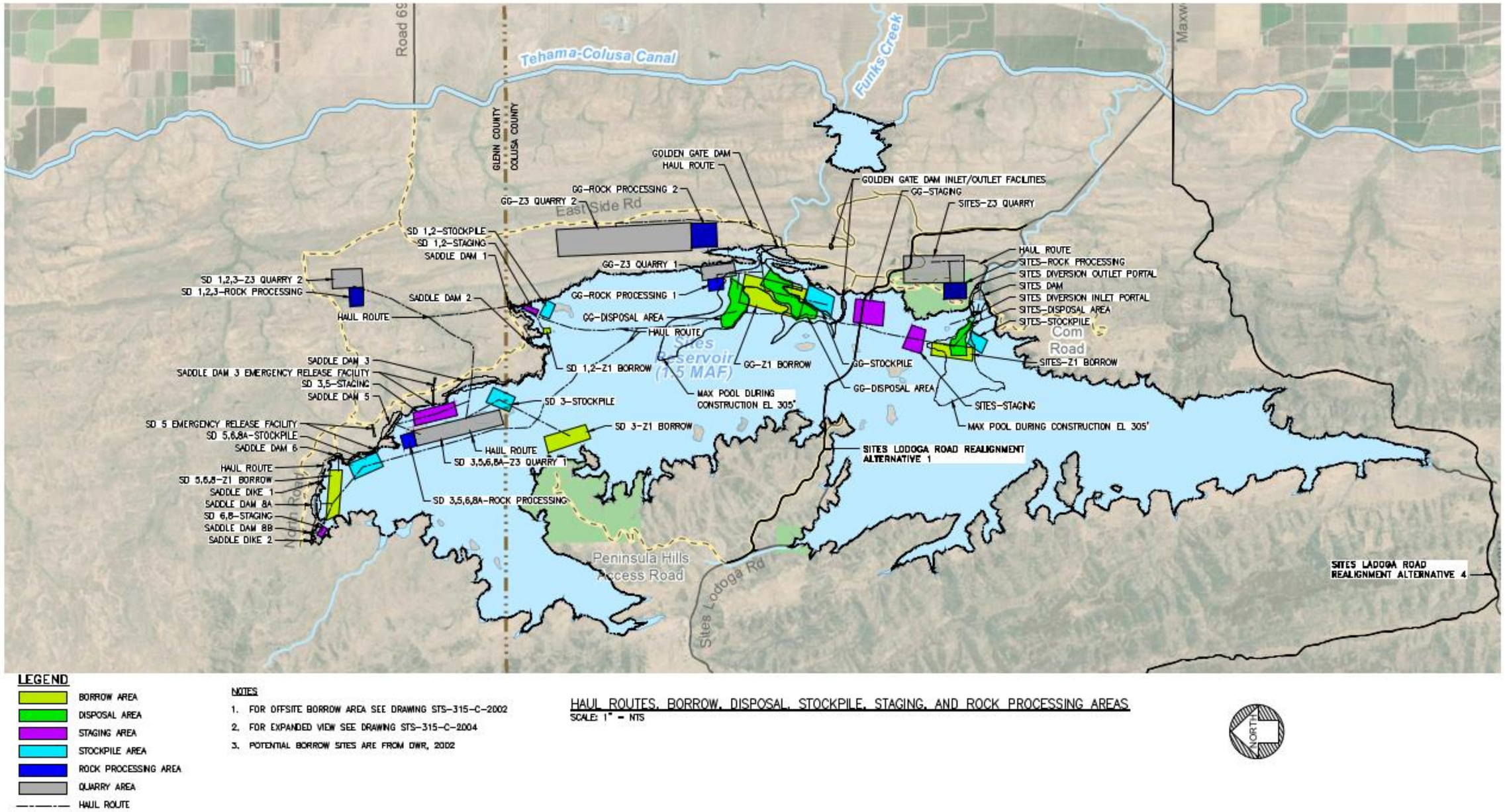

Figure 1-1. Haul Routes, Borrow, Disposal, Stockpile, Staging, and Rock Processing Areas (Alternative 1)

Table 1-1. Sites Reservoir Alternatives

Alternative Reservoir	Alternative 1 – 1.5 MAF	Alternative 2 – 1.3 MAF
Active Storage Capacity	1.4 MAF	1.2 MAF
Approximate Inundation Area	13,200 acres	12,400 acres
Dam/Saddle Dam Crest Elevation (Without Camber)	517 feet	500 feet
Maximum Operating Water Elevation	498 feet	482 feet
Minimum Operating Water Elevation	340 feet	340 feet
Top of Dead Pool Elevation	300 feet	300 feet
Inlet/Outlet Facilities Conveyance Capacity:		
Tehama-Colusa Canal	2,100 cfs	2,100 cfs
Glenn-Colusa Irrigation District Canal	1,800 cfs	900 cfs

cfs = cubic feet per second
MAF = million acre fee

Water in Sites Reservoir would be impounded by the Golden Gate Dam on Funks Creek, the Sites Dam on Stone Corral Creek, and by a series of saddle dams and dikes along the eastern and northern rims of the reservoir. The reservoir would be filled through conveyance facilities from the Glen-Colusa Canal and the Tehama Colusa Canal to the east of the reservoir that connect to the reservoir Inlet/Outlet Works (I/O) situated to the south of Golden Gate Dam. The same I/O works would be used to make releases from Sites Reservoir back to the canals. The I/O works includes two large-diameter tunnels through the ridge, a vertical I/O tower in the reservoir that would control flows, and a system of piping connecting the downstream tunnel portals to the pumping facilities. Releases to or from the reservoir would be made through an array of gated outlet ports on multiple sides of the vertical I/O tower at various elevations to accommodate varying reservoir water levels, and to regulate outlet water temperature. The I/O works concept would be the same for the 1.5-MAF and 1.3-MAF reservoirs; the height of the structure and number of gated ports would be smaller for the smaller reservoir.

Sites Reservoir construction would require relocating Sites-Lodoga Road prior to the Sites Dam construction. Other new paved or unpaved roads would also be provided to access project facilities from existing roads, and for operation and maintenance access between main dam and saddle dam areas.

In the reservoir area, demolition and removal of the town of Sites and other ranch buildings within the reservoir area would be required, along with the removal of metal fencing, asphalt-concrete paving, overhead utilities, and other buildings. Water wells would be closed, septic tanks would be removed, and proper plugging of existing gas exploration wells would be verified. Trees would be removed within one foot of grade in all areas located below the normal maximum operating water surface (NMWS). Stumps will not be removed.

This TM reflects the constructability considerations presented in a separate constructability TM for the following reservoir (HR) facilities (Figure 1-1). The key dimensions of the Alternative 1 and 2 facilities are included in Table 1-2.

- Main Dams, Saddle Dams and Dikes, and Reservoir Rim: The Sites Reservoir dams include two main dams, Golden Gate Dam on Funks Creek and Sites Dam on Stone Corral Creek, and saddle dams and dikes on the reservoir rim on tributaries to the Hunters Creek drainage.

Table 1-2. Alternative 1 & Alternative 2 Reservoirs – Facility Descriptions

Subject	Alternative 1 (1.5 MAF Reservoir)	Alternative 2 (1.3 MAF Reservoir)
Reservoir Elevation at full pool (feet)	498.0	482.0
Reservoir Area at full pool (acres)	13,200	12,600
Dam / Dike Crest Elevation (feet) (without camber)	517.0	500.0
Main Dams	2 main dams – see below	2 main dams – see below
Saddle Dams	7 saddle dams and 2 saddle dikes – see below	4 saddle dams and 3 saddle dikes – see below
Dam / Dike:	Max. Ht. Above Streambed / Crest Length (ft)	Max. Ht. Above Streambed / Crest Length (ft)
Golden Gate Dam	287 / 2,221	270 / 2,063
Sites Dam	267 / 781	250 / 729
Saddle Dam 1	27 / 318	None (see Saddle Dike 1 below)
Saddle Dam 2	57 / 250	None (see Saddle Dike 2 below)
Saddle Dam 3	107 / 3,422	90 / 2,677
Saddle Dam 5	77 / 1,894	60 / 1,747
Saddle Dam 6	47 / 362	None (see Saddle Dike 3 below)
Saddle Dam 8A	82 / 1,300	62 / 1,140
Saddle Dam 8B	37 / 475	20 / 277
Saddle Dike 1	12 / 122	10 (near Saddle Dam 1) / 148
Saddle Dike 2	12 / 198	20 (near Saddle Dam 2) / 79
Saddle Dike 3	Not required	30 (near Saddle Dam 6) / 247
I/O Tower	Top elev. 558 ft. 258 ft high / 7 elevations to draw water from reservoir	Top elev. 543 ft. 243 ft high / 6 elevations to draw water from reservoir
I/O Tunnels	Approx. 3,110 ft long/Dual 23 ft Internal diameter tunnels	Nearly the same as Alt. 1
Sites Diversion/Outlet Tunnels	Approx. 1,590 ft long/12 ft internal diameter tunnel	Nearly the same as Alt. 1
Spillway	Weir crest length = 85.5 feet, crest elevation = 504 feet	Weir crest length = 200 feet, crest elevation = 487 feet

Alt = Alternative
ft = feet
I/O = Inlet/outlet works
MAF = million acre feet

- Spillway: This structure is a concrete overflow spillway located at Saddle Dam 8B that would discharge into Hunter's Creek to the north.

- I/O Works: These facilities include a vertical tower with multiple intake levels connected to two inlet/outlet tunnels. These provide for normal reservoir operation and for making the major portion of emergency reservoir releases. The tunnels connect to reservoir conveyance pipelines (HC) at the downstream tunnel portal.

- Sites Dam Outlet Works: This outlet works tunnel would be located in the north abutment of Sites Dam; it would be used initially for construction diversion for both main dams and subsequently for stream maintenance and a portion of the emergency reservoir releases to Stone Corral Creek after construction.

- Creek Diversions during Construction: The Sites Dam outlet works (above) would be used for diversion of flows to Stone Corral Creek during construction. A 4-foot diameter steel pipe encased in reinforced concrete in the foundation of Golden Gate Dam would be used to divert flows to Funks Creek; the steel pipe would be plugged with concrete at the completion of construction.

- Roads: Roads include local roads (recreational use and public access), maintenance roads, and construction access roads.

- Bridge: The cost estimate provided includes a single bridge crossing the eastern portion of the reservoir (length of 1,633 feet for the east bridge) with fill prisms, providing an east-west connection from rural communities of Maxwell, Lodoga, and Stonyford for Alternative 1 only. For Alternative 2, there will be a southern road alignment around the south end of reservoir, providing an east-west connection from rural communities Maxwell, Lodoga, and Stonyford.

1.3 Purpose and Scope

The purpose of this task is to develop an Association for the Advancement of Cost Engineering (AACE) Class 4 feasibility-level cost estimate (an "Opinion of Probable Construction Cost", OPCC) estimate, as defined by the AACE Recommended Practice No. 12R-97, Cost Estimate Classification System (AACE, 2016). This TM discusses the construction activities and draws upon the schedule, productivities, and labor and equipment crews discussed in the Constructability Analysis TM (HR 53) (AECOM, 2021a).

Project costs in this TM include direct construction costs (labor, materials, equipment and subcontractors), mark-up (overhead, profit, insurance and bond), mobilization/demobilization, design and construction contingencies and allowances, and non-contract costs.

1.4 Limitations

The scope of work for this TM was restricted to the development of the feasibility-level construction cost estimate for the Sites Reservoir under the Reservoir (HR) contract. Conveyance facilities are separately considered in a companion TM for the HC contract.

The information presented in this TM was based on available geotechnical investigation data and topographic contours that originated from California Department of Water Resources (DWR) for their 2003 studies. Updated site-specific topographic maps will need to be prepared for use in preliminary and final phases of design. Our estimate is limited by the quality of the best available information.

This estimate includes a very preliminary estimate for non-contract costs (applied as a percentage of the total construction cost). This is an approximation of Owner's costs. The Authority does not have a detailed plan of future Owner's costs to base a more detailed estimate on at this time. As the project progresses, a separate estimate should be prepared by the Authority to forecast its internal costs and the costs of its agents.

AECOM represents that our services were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession, within the limits prescribed by our client.

This TM is intended for the sole use of the Sites Project Authority. The scope of services performed may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

2.0 Feasibility-Level Cost Estimate – HR Facilities

2.1 Cost Summary

The estimated feasibility-level costs for the Alternative 1 and Alternative 2 HR facilities (main and saddle dams, spillway, inlet/outlet tunnels and tower, construction diversion tunnel and pipe, and roads and bridges) are summarized below for both March 2021 dollars and July 2019 dollars. Refer to Table 1-2 for a summary of the facilities that are included in Alternative 1 and Alternative 2.

March 2021 dollars:

- Table 2-1A: Alternative 1 - $2.35B
- Table 2-1B: Alternative 2 - $2.12B

July 2019 dollars:

- Table 2-2A: Alternative 1 - $2.28B
- Table 2-2B: Alternative 2 - $2.06B

The estimated cost ranges are shown in these tables considering an expectancy range of +/-20%, which is applies to an AACE Class 4 estimate. The feasibility-level cost estimates are based on the construction sequencing and schedule presented in the Constructability Analysis Technical Memorandum (AECOM, 2021a). Changes in the construction sequencing or schedule could affect the construction cost.

As discussed in Section 14.0, the feasibility-level costs in this TM include the VE options that were accepted for inclusion in the updated baseline estimates presented herein (see Table 14-1). Sufficient information currently exists to include these in the costs for Alternatives 1 and 2. Also as discussed in Section 14.0, other VE options were identified as items that require further evaluation in preliminary engineering to clarify whether or not they are feasible (see Table 14-2). These items are not included in the baseline estimates as they will need Authority and DSOD acceptance.

The total costs include Direct Construction Cost (a), Indirect Cost and Contractor Markups (b), Non-Contract Cost (d) and de-escalation (f) to the July 2019 base date using an escalation rate of 3% per annum. The Design-, Construction- and Bidding Contingency totals are included within the Mark-up costs (b). Feasibility-Level Cost estimate details are included in Appendix A for Alternative 1 and in Appendix B for Alternative 2. The back-up for the VE costs for these two alternatives is contained at the ends of these two appendices.

Table 2-1A. Feasibility-Level Cost Estimate Summary for HR Facilities – Alternative 1
(Costs in March 2021 Dollars)

Soft cost / non-contract cost allowance	
Dams and Outlet Works	17.0%
Road and Clearing Work	15.0%

WBS No	Work / Facility Package	Est rev	Estimate Issue	a. Direct Cost	b. Mark-up Costs	c. Field Cost Total	d. Non-Contract Costs	e. Project Cost Total (2021)	f. Escalation to July 2019	h. Project Cost Total (2019)	i. VE Adjustment	VE Reference	j. Total Feasibility-Level Cost Estimate *(Issue 04/16/2021)*
						c = a + b		e = c + d		h = e + f			j = e + i
20	Site Demolition and Clearing Work	0.05	2/19/2021	**16,599,710**	12,109,838	**28,709,548**	4,306,432	**33,015,981**	NA	NA			**33,015,981**
21	Golden Gate Dam	0.08	3/1/2021	**352,593,965**	253,090,726	**605,684,691**	102,966,398	**708,651,089**	NA	NA	(12,926,968)	1	**695,724,122**
22	Sites Dam	0.09	4/16/2021	**176,240,299**	126,504,676	**302,744,975**	51,466,646	**354,211,621**	NA	NA	6,834,593	1	**361,046,214**
23	Saddle Dam 3	0.09	4/16/2021	**149,262,469**	107,140,083	**256,402,552**	43,588,434	**299,990,986**	NA	NA	(51,687,253)	1, 4	**248,303,733**
24	Saddle Dam 5	0.09	4/16/2021	**71,826,106**	51,556,530	**123,382,636**	20,975,048	**144,357,684**	NA	NA	(50,903,800)	1, 4	**93,453,884**
25	Other Saddle Dams/Dikes	0.08	3/1/2021	**71,429,050**	51,271,524	**122,700,574**	20,859,098	**143,559,672**	NA	NA	(587,589)	1	**142,972,082**
26	IO Facility and Diversion Work	0.09	4/16/2021	**170,115,943**	122,108,634	**292,224,577**	49,678,178	**341,902,755**	NA	NA	(78,345,258)	2, 3	**263,557,497**
27	Road Work												
27.01	Public Roadway: Sites Lodoga Road Realignment	0.11	3/1/2021	**117,947,799**	73,459,486	**191,407,285**	28,711,093	**220,118,378**	NA	NA	(25,771,466)	8, 10	**194,346,912**
27.02	Public Roadway: Huffmaster Road Realignment	0.12	3/1/2021	**27,129,105**	16,896,374	**44,025,479**	6,603,822	**50,629,301**	NA	NA	(5,154,293)	7, 9	**45,475,007**
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	0.11	3/1/2021	**15,369,166**	10,056,421	**25,425,587**	3,813,838	**29,239,425**	NA	NA			**29,239,425**
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	0.11	3/1/2021	**17,447,045**	11,416,029	**28,863,074**	4,329,461	**33,192,535**	NA	NA	Included	5, 6	**33,192,535**
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	0.11	3/1/2021	**14,960,614**	9,789,099	**24,749,713**	3,712,457	**28,462,170**	NA	NA			**28,462,170**
27.06	Recreation Roads - Peninsula Hills	0.11	3/1/2021	**4,852,962**	3,175,412	**8,028,374**	1,204,256	**9,232,630**	NA	NA			**9,232,630**
27.07	Sites Lodoga Road Realignment Bridges	0.12	3/1/2021	**86,817,610**	63,335,275	**150,152,885**	22,522,933	**172,675,817**	NA	NA			**172,675,817**
Total Feasibility-Level Cost Estimate (March 2021)				**1,292,591,843**	**911,910,107**	**2,204,501,950**	**364,738,093**	**2,569,240,043**	**NA**	**NA**	**(218,542,035)**		**2,350,700,000**

Total Feasibility-Level Cost Estimate (March 2021)	**2,350,700,000**
Estimated Range – Low (-20%)	**1,880,560,000**
Estimated Range – High (+20%)	**2,820,840,000**

Notes:

1. Costs in USD
2. Column 'b. Mark-ups' includes Contractor Overhead, Profit, Insurances & Bonds, Mobilization, Design Contingency and Construction Contingency
3. Soft cost / non-contract cost allowance included (17% for Dam and Outlet Works; 15% for Road and Clearing Work)
4. The baseline cost date has been set as 31 March 2021 (column e)
5. High probability VE Items have been incorporated as part of updated baseline estimate

Other Costs:

27.08	*Local/ Construction - Sites Lodoga Road Temporary Detour*	0.10	2/19/2021	***11,525,131***	*7,541,177*	***19,066,308***	*2,859,946*	***21,926,254***	*NA*	*NA*			***21,926,254***

Table 2-1B. Feasibility-Level Cost Estimate Summary for HR Facilities – Alternative 2
(Costs in March 2021 Dollars)

Soft cost / non-contract cost allowance	
Dams and Outlet Works	17.0%
Road and Clearing Work	15.0%

WBS No	Work / Facility Package	Est rev	Estimate Issue	a. Direct Cost	b. Mark-up Costs	c. Field Cost Total	d. Non-Contract Costs	e. Project Cost Total (2021)	f. Escalation to July 2019	h. Project Cost Total (2019)	i. VE Adjustment	VE Reference	j. Total Feasibility-Level Cost Estimate *(Issue 04/16/2021)*
						c = a + b		e = c + d		h = e + f			j = h + i
20	Site Demolition and Clearing Work	0.05	2/19/2021	**16,599,710**	12,109,838	**28,709,548**	4,306,432	**33,015,981**	NA	NA			**33,015,981**
21	Golden Gate Dam	0.09	3/1/2021	**298,528,075**	214,282,420	**512,810,495**	87,177,784	**599,988,279**	NA	NA	(10,935,349)	1	**589,052,931**
22	Sites Dam	0.10	4/16/2021	**163,312,242**	117,224,962	**280,537,204**	47,691,325	**328,228,529**	NA	NA	(3,859,535)	1	**324,368,994**
23	Saddle Dam 3	0.09	3/1/2021	**68,184,786**	48,942,803	**117,127,589**	19,911,690	**137,039,279**	NA	NA	(643,256)	1	**136,396,023**
24	Saddle Dam 5	0.09	3/1/2021	**37,668,110**	27,038,039	**64,706,149**	11,000,045	**75,706,195**	NA	NA	(321,628)	1	**75,384,567**
25	Other Saddle Dams/Dikes	0.09	3/1/2021	**39,370,315**	28,259,876	**67,630,191**	11,497,132	**79,127,323**	NA	NA	(321,628)	1	**78,805,695**
26	IO Facility and Diversion Work	0.10	4/16/2021	**167,233,813**	120,039,854	**287,273,667**	48,836,523	**336,110,190**	NA	NA	(77,005,141)	2, 3	**259,105,049**
27	Road Work												
27.01	Public Roadway - South Road	0.13	3/1/2021	**243,034,541**	205,146,990	**448,181,531**	67,227,230	**515,408,760**	NA	NA			**515,408,760**
27.02	Public Roadway: Huffmaster Road Realignment			**-**	-	**-**	-	**-**	NA	NA			**-**
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	0.11	3/1/2021	**15,369,166**	10,056,421	**25,425,587**	3,813,838	**29,239,425**	NA	NA			**29,239,425**
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	0.11	3/1/2021	**17,447,045**	11,416,029	**28,863,074**	4,329,461	**33,192,535**	NA	NA	Included	5, 6	**33,192,535**
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	0.11	3/1/2021	**20,027,385**	13,104,408	**33,131,793**	4,969,769	**38,101,562**	NA	NA			**38,101,562**
27.06	Recreation Roads - Peninsula Hills	0.11	3/1/2021	**4,852,962**	3,175,412	**8,028,374**	1,204,256	**9,232,630**	NA	NA			**9,232,630**
27.07	Sites Lodoga Road Realignment Bridges			**-**	-	**-**	-	**-**	NA	NA			**-**
Total Feasibility-Level Cost Estimate (March 2021)				**1,091,628,150**	**810,797,052**	**1,902,425,202**	**311,965,486**	**2,214,390,689**	**NA**	**NA**	**(93,086,536)**		**2,121,300,000**

Total Feasibility-Level Cost Estimate (March 2021)	**2,121,300,000**
Estimated Range – Low (-20%)	**1,697,040,000**
Estimated Range – High (+20%)	**2,545,560,000**

Notes:

1. Costs in USD
2. Column 'b. Mark-ups' includes Contractor Overhead, Profit, Insurances & Bonds, Mobilization, Design Contingency and Construction Contingency
3. Soft cost / non-contract cost allowance included (17% for Dam and Outlet Works; 15% for Road and Clearing Work)
4. The baseline cost date has been set as 31 March 2021 (column e)
5. High probability VE Items have been incorporated as part of updated baseline estimate

Other Costs:

27.08	*Local/ Construction - Sites Lodoga Road Temporary Detour*	0.10	2/19/2021	***13,180,295***	*8,624,191*	***21,804,486***	*3,270,673*	***25,075,158***	*NA*	*NA*			***25,075,158***

Table 2-2A. Feasibility-Level Cost Estimate Summary for HR Facilities – Alternative 1
(Costs in July 2019 Dollars)

Soft cost / non-contract cost allowance	
Dams and Outlet Works	17.0%
Road and Clearing Work	15.0%

WBS No	Work / Facility Package	Est rev	Estimate Issue	a. Direct Cost	b. Mark-up Costs	c. Field Cost Total	d. Non-Contract Costs	e. Project Cost Total (2021)	f. Escalation to July 2019	h. Project Cost Total (2019)	i. VE Adjustment	VE Reference	j. Total Feasibility-Level Cost Estimate *(Issue 04/16/2021)*
						c = a + b		e = c + d		h = e + f			j = h + i
20	Site Demolition and Clearing Work	0.05	2/19/2021	**16,599,710**	12,109,838	**28,709,548**	4,306,432	**33,015,981**	(988,330)	32,027,650			**32,027,650**
21	Golden Gate Dam	0.08	3/1/2021	**352,593,965**	253,090,726	**605,684,691**	102,966,398	**708,651,089**	(33,753,402)	687,437,687	(12,540,000)	1	**674,897,687**
22	Sites Dam	0.09	4/16/2021	**176,240,299**	126,504,676	**302,744,975**	51,466,646	**354,211,621**	(3,973,291)	343,608,330	6,630,000	1	**350,238,330**
23	Saddle Dam 3	0.09	4/16/2021	**149,262,469**	107,140,083	**256,402,552**	43,588,434	**299,990,986**	(59,120,201)	291,010,785	(50,140,000)	1, 4	**240,870,785**
24	Saddle Dam 5	0.09	4/16/2021	**71,826,106**	51,556,530	**123,382,636**	20,975,048	**144,357,684**	(53,701,333)	140,036,351	(49,380,000)	1, 4	**90,656,351**
25	Other Saddle Dams/Dikes	0.08	3/1/2021	**71,429,050**	51,271,524	**122,700,574**	20,859,098	**143,559,672**	(4,867,445)	139,262,227	(570,000)	1	**138,692,227**
26	IO Facility and Diversion Work	0.09	4/16/2021	**170,115,943**	122,108,634	**292,224,577**	49,678,178	**341,902,755**	(86,234,826)	331,667,929	(76,000,000)	2, 3	**255,667,929**
27	Road Work												
27.01	Public Roadway: Sites Lodoga Road Realignment	0.11	3/1/2021	**117,947,799**	73,459,486	**191,407,285**	28,711,093	**220,118,378**	(31,589,222)	213,529,156	(25,000,000)	8, 10	**188,529,156**
27.02	Public Roadway: Huffmaster Road Realignment	0.12	3/1/2021	**27,129,105**	16,896,374	**44,025,479**	6,603,822	**50,629,301**	(6,515,583)	49,113,717	(5,000,000)	7, 9	**44,113,717**
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	0.11	3/1/2021	**15,369,166**	10,056,421	**25,425,587**	3,813,838	**29,239,425**	(875,279)	28,364,146			**28,364,146**
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	0.11	3/1/2021	**17,447,045**	11,416,029	**28,863,074**	4,329,461	**33,192,535**	(993,615)	32,198,920	Included	5, 6	**32,198,920**
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	0.11	3/1/2021	**14,960,614**	9,789,099	**24,749,713**	3,712,457	**28,462,170**	(852,012)	27,610,158			**27,610,158**
27.06	Recreation Roads - Peninsula Hills	0.11	3/1/2021	**4,852,962**	3,175,412	**8,028,374**	1,204,256	**9,232,630**	(276,378)	8,956,252			**8,956,252**
27.07	Sites Lodoga Road Realignment Bridges	0.12	3/1/2021	**86,817,610**	63,335,275	**150,152,885**	22,522,933	**172,675,817**	(5,169,034)	167,506,783			**167,506,783**
Total Feasibility-Level Cost Estimate (July 2019)				**1,292,591,843**	**911,910,107**	**2,204,501,950**	**364,738,093**	**2,569,240,043**	**(288,909,952)**	**2,492,330,091**	**(212,000,000)**		**2,280,330,000**

Total Feasibility-Level Cost Estimate (July 2019)	**2,280,330,000**
Estimated Range – Low (-20%)	**1,824,264,000**
Estimated Range – High (+20%)	**2,736,396,000**

Notes:

1. Costs in USD
2. Column 'b. Mark-ups' includes Contractor Overhead, Profit, Insurances & Bonds, Mobilization, Design Contingency and Construction Contingency
3. Soft cost / non-contract cost allowance included (17% for Dam and Outlet Works; 15% for Road and Clearing Work)
4. The baseline cost date has been set as 31 March 2021 (column e)
5. The total project cost is represented in July 2019 Dollars (column j)
6. High probability VE Items have been incorporated as part of updated baseline estimate

Other Costs:

27.08	*Local/ Construction - Sites Lodoga Road Temporary Detour*	0.10	2/19/2021	***11,525,131***	*7,541,177*	***19,066,308***	*2,859,946*	***21,926,254***	*(656,360)*				***21,269,894***

Table 2-2B. Feasibility-Level Cost Estimate Summary for HR Facilities – Alternative 2
(Costs in July 2019 Dollars)

Soft cost / non-contract cost allowance	
Dams and Outlet Works	17.0%
Road and Clearing Work	15.0%

WBS No	Work / Facility Package	Est rev	Estimate Issue	a. Direct Cost	b. Mark-up Costs	c. Field Cost Total	d. Non-Contract Costs	e. Project Cost Total (2021)	f. Escalation to July 2019	h. Project Cost Total (2019)	i. VE Adjustment	VE Reference	j. Total Feasibility-Level Cost Estimate *(Issue 04/16/2021)*
						c = a + b		e = c + d		h = e + f			j = h + i
20	Site Demolition and Clearing Work	0.05	2/19/2021	**16,599,710**	12,109,838	**28,709,548**	4,306,432	**33,015,981**	(988,330)	32,027,650			**32,027,650**
21	Golden Gate Dam	0.09	3/1/2021	**298,528,075**	214,282,420	**512,810,495**	87,177,784	**599,988,279**	(28,568,591)	582,027,688	(10,608,000)	1	**571,419,688**
22	Sites Dam	0.10	4/16/2021	**163,312,242**	117,224,962	**280,537,204**	47,691,325	**328,228,529**	(13,569,489)	318,403,039	(3,744,000)	1	**314,659,039**
23	Saddle Dam 3	0.09	3/1/2021	**68,184,786**	48,942,803	**117,127,589**	19,911,690	**137,039,279**	(4,726,258)	132,937,022	(624,000)	1	**132,313,022**
24	Saddle Dam 5	0.09	3/1/2021	**37,668,110**	27,038,039	**64,706,149**	11,000,045	**75,706,195**	(2,578,258)	73,439,937	(312,000)	1	**73,127,937**
25	Other Saddle Dams/Dikes	0.09	3/1/2021	**39,370,315**	28,259,876	**67,630,191**	11,497,132	**79,127,323**	(2,680,669)	76,758,655	(312,000)	1	**76,446,655**
26	IO Facility and Diversion Work	0.10	4/16/2021	**167,233,813**	120,039,854	**287,273,667**	48,836,523	**336,110,190**	(84,761,426)	326,048,764	(74,700,000)	2, 3	**251,348,764**
27	Road Work												
27.01	Public Roadway - South Road	0.13	3/1/2021	**243,034,541**	205,146,990	**448,181,531**	67,227,230	**515,408,760**	(15,428,711)	499,980,049			**499,980,049**
27.02	Public Roadway: Huffmaster Road Realignment			**-**	-	**-**	-	**-**	-	-			**-**
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	0.11	3/1/2021	**15,369,166**	10,056,421	**25,425,587**	3,813,838	**29,239,425**	(875,279)	28,364,146			**28,364,146**
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	0.11	3/1/2021	**17,447,045**	11,416,029	**28,863,074**	4,329,461	**33,192,535**	(993,615)	32,198,920	Included	5, 6	**32,198,920**
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	0.11	3/1/2021	**20,027,385**	13,104,408	**33,131,793**	4,969,769	**38,101,562**	(1,140,567)	36,960,995			**36,960,995**
27.06	Recreation Roads - Peninsula Hills	0.11	3/1/2021	**4,852,962**	3,175,412	**8,028,374**	1,204,256	**9,232,630**	(276,378)	8,956,252			**8,956,252**
27.07	Sites Lodoga Road Realignment Bridges			**-**	-	**-**	-	**-**	-	-			**-**
Total Feasibility-Level Cost Estimate (July 2019)				**1,091,628,150**	**810,797,052**	**1,902,425,202**	**311,965,486**	**2,214,390,689**	**(156,587,570)**	**2,148,103,118**	**(90,300,000)**		**2,057,800,000**

Total Feasibility-Level Cost Estimate (July 2019)	**2,057,800,000**
Estimated Range – Low (-20%)	**1,646,240,000**
Estimated Range – High (+20%)	**2,469,360,000**

Notes:

1. Costs in USD
2. Column 'b. Mark-ups' includes Contractor Overhead, Profit, Insurances & Bonds, Mobilization, Design Contingency and Construction Contingency
3. Soft cost / non-contract cost allowance included (17% for Dam and Outlet Works; 15% for Road and Clearing Work)
4. The baseline cost date has been set as 31 March 2021 (column e)
5. The total project cost is represented in July 2019 Dollars (column j)
6. High probability VE Items have been incorporated as part of updated baseline estimate

Other Costs:

27.08	*Local/ Construction - Sites Lodoga Road Temporary Detour*	0.10	2/19/2021	***13,180,295***	*8,624,191*	***21,804,486***	*3,270,673*	***25,075,158***	*(750,622)*				***24,324,536***

2.2 Construction Cost Uncertainty

Table 2-3 shows that the range of expected accuracy for the cost estimates decreases with increasing project definition and design stage, from Class 5 to Class 1. The table shows that the ultimate cost at award can reasonably be expected to fall within a range from 15% to 30% below to 20% to 50% above the current Class 4 estimate after contingencies. The expected range of accuracy for this Class 4 feasibility-level cost estimate is +/-20% as stated in Section 2.1.

Table 2-3. Project Definition and Expected Accuracy Range by Estimate Class[1]

Design Stage	Project Definition (% of complete definition)	AACE Estimate Class	End Usage of Estimate (Purpose of estimate)	Expected Accuracy Range (Typical variation in low and high ranges[2])
1	0%to 2%	5	Concept screening	L: -20% to -50% H: +30% to +100%
2	1% to 15%	4	Study or feasibility	L: -15% to -30% H: +20% to +50%
3	10%to 40%	3	Budget authorization or control	L: -10% to -20% H: +10% to +30%
4	30%to 75%	2	Control or bid/tender	L: -5% to -15% H: +5% to +20%
5	65%to 100%	1	Check estimate or bid/tender	L: - 3% to -10% H: +3% to + 15%

1 Based on AACEI 18R-97 (2016).
2 Typical percentage variation of actual costs from the cost estimate.

As stated in Section 9.0, design contingencies (applicable prior to bid) were selected as 10% to 15% to account for uncertainty related to undefined scope items within the current design in this feasibility-level cost estimate. Section 13.0 lists key exclusions from this estimate. The first exclusion, “Owner’s contingency”, should be considered by the Authority to establish its own contingency.

A risk register should be maintained throughout the design process to track risks and their potential impact on project cost.

3.0 Estimate Methodology

AECOM compiled the feasibility-level cost estimate for the Sites Reservoir based on an assumed work approach and considering design and quantity information available. We reviewed the labor, material and equipment requirements for each facility and we considered several sources for our costs including, but not limited to active projects, internal historic rate data, contractor’s quotes and other sources such as Caltrans (2021) and R.S. Means.

This feasibility-level cost estimate is based on standard industry practice, professional experience, knowledge of the local construction market costs, and represents AECOM’s judgment as professional construction consultant familiar with the construction industry. The intention of this estimate is to reflect fair market value for the construction, and it is not a prediction of the low bid. AECOM have no control over the material and labor costs, contractors’ methods of establishing prices or the market and

bidding conditions at the time of bid. AECOM does not guarantee that the bids received will not vary from this feasibility-level cost estimate.

Pricing is based upon competitive bidding with a minimum of five qualified General Contractors familiar with the conditions of working on this project. Pricing reflects probable construction costs obtainable in the project locality on the date of this statement of probable costs.

4.0 Estimate Classification

Our OPCC estimate represents an AACE Class 4 estimate that is described by the Association for the Advancement of Cost Engineering International (AACE, 2016). Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete. Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side (AACE, 2016). For this Sites Class 4 OPCC, the costs are expected to fall within an accuracy range from -20% on the low side to +20% on the high side of the actual construction cost.

5.0 General Approach

Individual bid packages are assumed to be bid separately, so each project carries its own Field and Home Office overhead, insurance, and profit, including any temporary site access. From the Constructability Analysis TM (AECOM, 2021a), and considering the site arrangement, contractor resources, and work type, potential contract packages were anticipated as follows:

- Roadway construction contracts and bridge as Design-Build Contracts, possibly numerous contracts grouped logically by road type, location, and overall Sites Reservoir program schedule;
- Golden Gate and Sites Dams, including Golden Gate and Sites Bypass Facilities (Funks Creek and Stone Corral Creek);
- Saddle Dams, including Spillway Structure 8B; and
- Inlet/Outlet Facilities, including the approach channel.

All projects include mobilization, demobilization and repair and make-good of permanent facilities (public roads, work on other contracts) affected by their operations.

Field and home office overhead are calculated independently for each project based on anticipated method of contracting/procurement/execution.

6.0 Direct Cost

Direct Cost includes Labor, Material, Equipment and Subcontractor costs applied to measured units by Pay Item.

All Direct costs are estimated using a Cost Data Date of March 31, 2021, as a common baseline, with no escalation. Escalation will be handled separately based on approved schedule.

Direct costs are based on reasonable crew mixes and construction approaches, using estimator judgment to establish a basis for a composite assembly cost as defined by AACE Level 4 estimating

requirements. It is recognized that, at the feasibility level, the design has not been progressed to identify all components or the optimum method of construction, and that there are many potential alternative approaches to developing crews, equipment and materials that can be further evaluated in the future as the level of design detail increases and contract packaging is further refined.

6.1 Labor

Labor costs include the following:

- Published prevailing wages for the project location
- Labor fringe costs
  - Employee benefits: healthcare, vacations, etc.
  - Dues and fees
  - Personal small tools
- Burden
  - Payroll tax
  - Federal and State Unemployment Insurance
  - Workers' Compensation Insurance.

Overtime and shift pay are included only for specific tasks which require extended working hours, such as mass pours of concrete, etc. The contractor may elect to work crews for extended hours or multiple shifts in order to achieve economies in other areas: these costs are not included since they relate to "means and methods" that are beyond the scope of the cost model.

The site location is assumed to be within normal commute range for construction workers in California, in consequence, workforce housing, per-diem, or other commute incentive is not included.

6.2 Material

Material Costs include the following

- Direct cost of material
- Freight and delivery, FOB jobsite/work location
- Sales Tax. Colusa County Sales tax is 7.75%

Material quotes were obtained where possible considering the current level of design. Generally, given the early stage of design, meaningful quotes are not possible in most cases.

Concrete pricing is based on standard transit mix (ready-mix). Concrete may be procured by the contractor using standard transit mix (ready-mix) delivery or batched on site, at their election.

6.3 Equipment

Equipment Costs include the following:

- Hourly equipment rental rates based on published Caltrans rates
- Equipment maintenance and operation (fuel, lubrication, etc.) are included in the Caltrans rates
- Delivery to and from work location

All equipment is priced using hourly rates following Caltrans guide for equipment ownership (Caltrans, 2021).

6.4 Subcontractors

Subcontractor costs include the selling price to the prime, including all subcontractor overhead, profit, etc.

7.0 Mark-up

7.1 Contractor Overhead

Subcontractor overhead is included in the direct cost lines for subcontractors.

The Contractor Overhead includes the following items:

- Site General Conditions (10%)
    - General and non-working supervision
    - Subcontractor oversight & coordination
    - Field layout and surveying
    - Safety and traffic management
    - Maintenance of temporary facilities and roads
    - Small truck and tools
    - Consumables
    - Miscellaneous materials and supplies
    - Contractor initiated testing (concrete, welding, compaction, etc.)
    - Permit and agency fees that the contractor will need to obtain for construction.
- Field and Home Office Overhead (5%-6%):
    - Site Management and Engineering staff
    - Contractor QA and validation

- Field offices, supplies and utilities
- Project accounting & billing, reporting, etc.
- Direct overhead related to project management and oversight. For this estimate, it is assumed that the majority of engineering, legal and accounting work will be provided in the field. Actual cost distribution will be at the discretion of the contractor.

7.2 Contractor Profit

The profit could range from 3% to 10%, depending on competition at the time of bid. For this OPCC, it is set at 8% for the dam facilities and at 5% for all other facilities. Subcontractor profit is included in the direct cost lines for subcontractors.

7.3 Insurance

Insurance covers Contractor provided insurance, including Public Liability/Property Damage (PL/PD) and General Liability (GL) coverage. Insurance is set at 1.1% for all projects. Insurance carried by the owner, including Property, Fire, and All Risk, is excluded.

7.4 Bonds

Bonds covers contractor provided bonds, including performance and payment bonds. The pricing assumes that bonds will be adjusted to reflect actual value at risk. Bonds are set at 0.6% for all projects.

8.0 Mobilization/Demobilization

Mobilization/Demobilization is priced separately as a percentage allowance, using 3% to 5% across all projects.

Mobilization (ranging from 2% to 4%) includes all costs associated with individual project set-up, including:

- Initial site survey and inspection
- Existing condition documentation and site acceptance by contractor and owner.
- Installation of temporary facilities including fencing, temporary erosion and sedimentation control, safety provisions, staging areas, etc.
- Equipment and material staging/move-on

Demobilization (1%) includes all costs associated with individual project clean-up and demobilization, including:

- Final site surveys and inspections
- Work area clean-up, removal of debris
- Demolition of all temporary facilities

- Restoration and rehabilitation of disturbed areas
- Project close-out documentation, warranties, operation manuals, etc.
- Contract Contingencies and Cost Allowances

9.0 Contingencies and Allowances

Contingencies and allowances have been calculated/assessed independently for each project component.

9.1 Line Item Allowances

Line item allowances have been included to address specific and reasonably foreseeable scope items that lack definition for estimating.

9.2 Design Contingencies

The feasibility-level cost estimates presented in this TM include items, quantities, requirements, and constraints that have not been fully identified, or else are not fully investigated or designed. In later stages of design, the scope of the project also tends to expand as more detail is developed and as regulatory agencies undertake more detailed reviews. To account for the items that have not yet been fully developed, a design contingency allowance has been included in the feasibility-level cost estimates.

The amount of design contingency reflects the degree of uncertainties, particularly with respect to geotechnical and topographical conditions, as well as the completeness of the design detail for the major categories. The design contingency is based on, and added to, the subtotal of construction costs because it represents an unknown portion of the total estimated construction cost. The recommended design contingency normally decreases as the project design advances, more information becomes available, project requirements become better defined, and more design detail is captured in the subtotal of construction costs.

The feasibility-level cost estimates presented in this TM each include a design contingency, incorporated as an integral part of the estimated construction cost to accommodate those features and items of the work that cannot yet be fully assessed due to the conceptual level of the current design.

Design Contingencies vary from 10% to 15% depending on the level of detail and the potential for additional unforeseen site conditions identified during the design phase. A design contingency of 15% was used for demolition and clearing and for bridge construction; 10% was used for the other work.

Refer to the cost tables in Appendix A and Appendix B for the design contingency allowances.

9.3 Construction Contingencies

The construction contingency is intended to cover unforeseen conditions or changes post contract award. It remains under the control of the owner, separate from the bid award. An allowance of 15% has been applied to all projects. The construction contingency does not cover items such as safety incidents, force majeure (floods, etc.) or labor issues. Refer to the cost tables in Appendix A and Appendix B for the construction contingency allowances.

10.0 Non-Contract Costs

Non-contract costs include geotechnical investigation, engineering, construction management, administration, real estate, legal services, insurance, permitting costs, environmental monitoring, and other owner costs attributable to the project. These costs are distinguished from Contract Costs (costs to the construction contractor). An estimate for the non-contract cost has been developed, but it has also been applied as a percentage to each of the project facilities for presentation purposes. The non-contract cost estimate is estimated at 15% to 17% of the construction cost, including real estate. These costs are significant and it is recommended that the Authority develop a more detailed estimate for its internal costs in the future. Reclamation has suggested that non-contract costs typically range from 25% to 30% when environmental mitigation is included. The current estimate for non-contract cost including mitigation cost is at 28% of the total cost.

11.0 Escalation from Cost Data Date to Report Issue Date

All costs are based on a Cost Data Date of March 31, 2021. Escalation to the Notice to Proceed date has not been included. Escalation will have a significant effect on project costs and is accounted for in the project's financial model. For purposes of comparison to the value planning report, costs de-escalated to 2019 have also been provided in this report.

The following sections describe sources of escalation.

11.1 Input Cost Inflation

Input cost inflation drives construction inflation by increasing the cost of labor, material equipment and subcontractors to the prime contractor. The extent to which these can be passed through in the bid price depends greatly on Demand Pull inflation noted below.

The majority of the cost in this project is labor and equipment; material and subcontract make up a relatively small portion of the overall cost. Labor escalation has been running at a relatively low rate, typically in the range of 2.5% to 3.5% per annum. Equipment escalation also falls into this range. Material costs are more volatile, with significant fluctuation depending on material and demand: material inflation has ranged from peaks in excess of 10% for materials such as reinforcing steel to deflation in the range of -10% for cement. These peaks and troughs, however, tend to be transient, and the long-term trend for construction materials is in the 3% range.

The long-term trend in Bureau of Labor Statistic Producer Price Index for construction input has been 2.7%

11.2 Demand-Pull Inflation

Demand-Pull inflation drives construction inflation by reducing overall competitiveness and allowing bidders to increase profit and risk premiums. This is the dominant inflation factor in periods of very high or low construction demand.

While much of urban California has been experiencing very strong demand for construction over the past ten years, leading to very high levels of Demand-Pull inflation significantly in excess of Input Cost Inflation, Northern California has experienced very little demand-pull inflation. Construction activity and demand in the region to the north of Sacramento has hardly grown in the past ten years, with annual growth rates averaging less than 1%. We do not see any demand driven escalation at this point.

11.3 Forecast Escalation

The historic escalation trend in the region has been running at around 3% per annum, primarily driven by Cost Push. Economic forecasts for the region do not indicate any appreciable change in the level of economic activity. The proposed project will be one of the largest economic drivers in the region, but it is unlikely to create its own demand led inflation. Peak employment is likely to reach around 1,000 workers, which should be well within the region's absorption capacity.

Based on this, we recommend using the long-term average trend for Cost-Push inflation which is 3% per annum.

12.0 Conditions of Construction

The following key assumptions were used as part of compiling the feasibility-level cost estimate:

- All work, except for tunneling and mass concrete pours, will be performed using five 10-hour work shift per week. Tunneling and mass concrete placements will be performed using double shifts. Overtime and shift premiums are included.
- Contractor will be required to pay prevailing wages at a minimum.
- Sales tax will be paid on all materials incorporated into the project.
- Other than for the town of Sites, no hazmat abatement work or hazardous soil removal work is anticipated.
- The identified work approach has been considered as part of developing this estimate (AECOM, 2021).
- The site and all work areas will have been vacated prior to construction, and all work areas will be under the full control of the contractor at all times. Public rights of way will be maintained at all times.
- Disposal areas nearby will be utilized, no-offsite dumping is required.
- The work will be performed under the standard rules of the Colusa County Air Pollution Control District, with no additional air quality monitoring or management requirements and standard dust management/palliation requirements.
- There will be no noise-related work restrictions.
- Due to the potential issues discussed in Appendix C, Section 3.2.1, our feasibility-level cost estimate assumes the quarries will be under the control of the Construction Contractor.

13.0 Key Exclusions

The following are some of the key exclusions to be noted:

- Owner's contingency.

- Utility company charges, including work required off-Site and utilities rates.
- Maintenance and operational work unless otherwise noted.
- Phasing allowance.
- Escalation beyond the specified reporting period.
- Any unforeseen conditions.
- Restrictive technical specifications or excessive contract conditions.
- Non-competitive bidding conditions.
- Sole source specifications of materials or products.

14.0 Value Engineering

We have evaluated VE options to determine those that should be included in the updated baseline estimate and those that require further evaluation in preliminary engineering when additional investigation data is available to resolve uncertainties regarding VE implementation. The VE items mentioned in this section have been expanded from those identified in the Draft Feasibility-Level Cost Estimate TM (AECOM, 2021b) based on input from the Authority stemming from the March 3, 2021, LMC meeting.

Table 14-1 identifies the VE actions and associated costs in July 2019 dollars that have been included in the updated baseline estimate. Sufficient information currently exists to include these in the preferred cost alternative.

Table 14-2 identifies the VE actions and associated costs in July 2019 dollars that require further evaluation in preliminary engineering to clarify whether or not they are feasible. Some of these items will need Authority and DSOD acceptance.

Table 14-1. VE Actions that were Included in Updated Baseline Estimate
(2019 dollars)
(Tables 2-2A and 2-2B in Section 2.0 include VE costs shown in this table.)

VE Action	Approx. Savings		Commentary
	Alt. 1	Alt. 2	
1. Produce embankment transition zones on site	$19M *Breakdown per Facility:* *Golden Gate: ($12M)* *Sites Dam: ($5M)* *Saddle Dam 3: ($1M)* *Saddle Dam 5: ($0.5M)* *Other Saddle Dams: ($0.5M)*	$16M *Breakdown per Facility:* *Golden Gate: ($10M)* *Sites Dam: ($4M)* *Saddle Dam 3: ($1M)* *Saddle Dam 5: ($0.5M)* *Other Saddle Dams: ($0.5M)*	It may be possible to produce embankment transition zone materials from on-site quartzite rather than importing them. This would remove the purchase cost and the 35-mile hauling cost of these materials, but would add on-site quarrying and processing costs to produce these materials. The net cost would result in a savings. To be confirmed based on geotechnical data.
2. Replace dual I/O tunnels with a single tunnel	$48M	$48M	The current design includes two parallel inlet/out tunnels to provide system redundancy. However, it is typical for dams to operate a single outlet since full shutdowns are rare and inspections/maintenance can be coordinated with operating schedules. This would reduce costs. The single tunnel diameter would be somewhat larger than for two parallel tunnels. The diameters will vary by allowable discharge velocities, which depends on tunnel lining type and requirements from permitting agencies. High velocities are anticipated in the tunnels during the first few days of an emergency drawdown situation.
3. Use a sloping intake structure	$28M	$27M	The intake structure is currently an inundated tower accessed by a bridge from the adjacent ridge. A sloping intake founded on the rock surface along the ridge slope would require less seismic reinforcement and be less costly than a tower. The bridge would also be eliminated from the design, but the access road would still be required. O&M access for the sloping intake would need to be considered and compared with that of the tower.

VE Action	Approx. Savings		Commentary
	Alt. 1	Alt. 2	
4. Eliminate Emergency Release Structures	$87M *<u>Breakdown per Facility:</u>* *Sites Dam: $11M* *Saddle Dam 3: ($49M)* *Saddle Dam 5: ($49M)*	N/A	Accepted by LMC.
5. Use full depth reclamation for County roads	Prev. incorporated (Approx. $19M)*	Prev. incorporated (Approx. $16.5M)*	Use of full-depth recycling pavement rehabilitation[1] of County Roads would be a cost saving measure.
6. Place temporary bridges over existing bridges or use intermediate supports for shoring	Prev. incorporated (Approx. $3M)*	Prev. incorporated (Approx. $2.5M)*	Instead of replacing the smaller existing bridges to handle construction traffic, temporary bridges could be placed over the existing bridges. Also, shoring up the existing bridges with intermediate supports to shorten spans could be done.
7. Reduce width/depth of gravel for Huffmaster Road Realignment	Prev. incorporated (Approx. $33M)*	N/A	Road width reduced from 24’ to 15’ and the depth of gravel reduced from 18” to 12”.
8. Adjust Sites Lodoga Road alignment so it is closer to the reservoir water’s edge	$12M	N/A	Refer to Appendix C.
9. Tie Huffmaster Road Realignment into the existing Huffmaster Road north of “Ladybug’s” house to shorten the road length	$5M	N/A	Refer to Appendix C.

[1] Full depth recycling is a pavement rehabilitation technique in which the full thickness of the asphalt pavement and a portion of the underlying layers, along with a small percentage of added cement, are pulverized to provide a homogeneous pavement material. The stabilized material is then compacted in-place with rollers, resulting in a stiff, stabilized base course ready for a new surface course.

VE Action	Approx. Savings		Commentary
	Alt. 1	Alt. 2	
10. Replacement of the west bridge span with embankment	$13M	N/A	A consideration would be to eliminate west bridge and replace it with an embankment fill. This approach would have to address compressible alluvium beneath the fill and resulting settlement of the embankment. Refer to Appendix C.
Total Estimated VE Savings (approx.) (2019 dollars) *Does not include previously incorporated amounts in parentheses.	**$212M**	**$90M**	

O&M = Operations and Maintenance

Table 14-2. VE Actions to be Further Evaluated in Preliminary Engineering
(2019 dollars)

VE Action	Potential Approx. Savings		Commentary
	Alt. 1	Alt. 2	
11. Replace a portion of the upstream shell zone with random fill and eliminate upstream filter and drain for Golden Gate Dam and Sites Dam	$199M	$136M	To make better use of materials availability for the main dams, it may be possible to replace a part (or all) of the upstream shell zone with random Zone 4 to reduce the use of the more expensive Zone 3 rockfill; this would necessitate flattening the upstream slope and increase dam volume. There is an excess of Zone 4 materials and an economical approach would be to place those materials in the upstream shell of the dam. Also, with this approach, the upstream filter and transition may be eliminated. With a flatter upstream slope, more riprap would be required. To be confirmed based on geotechnical data. Will require DSOD approval.
12. Adopt a 10-day emergency drawdown	$17M	$18M	Current design criteria for emergency reservoir drawdown conservatively assumes that the upper 10% of the reservoir head will need to be drawn down in seven days. DSOD may allow a 10-day drawdown period. This would significantly reduce the discharge flows, which would reduce the reservoir outlet works infrastructure sizes near Golden Gate Dam. The estimated savings was based on a vertical tower concept. Will require DSOD approval.
13. Evaluate alternative sources for sand and gravel for filters and drains	TBD	TBD	To be confirmed based on geotechnical data and permitting requirements.
14. Generate on-site materials for structural road section	$4M	$6M	To be confirmed based on geotechnical data
15. Spillway conduit	$5M	$1M	The spillway currently includes a concrete gravity dam structure. It may be possible to use a less expensive emergency spillway conduit depending on DSOD's criteria for required spill capacity after full storage of the Probable Maximum Flood (PMF). A tradeoff between spillway capacity and freeboard would need to be evaluated. Will require DSOD approval.
Total Est. Potential VE Savings (approx.) (2019 dollars)	**$225M**	**$161M**	**Not including #13 (VE Savings TBD)**

TBD = To be determined

The total estimated savings indicated in Tables 14-1 and 14-2 are not directly additive. For example, VE Action 11 (Replace a portion of the upstream shell zone with random fill and eliminate upstream filter and drain for Golden Gate Dam and Sites Dam) and VE Action 1 (Produce embankment transition zones on site) are not additive because VE Action 10 precludes the need for VE Action 1. Also, VE Action 12 (Adopt a 10-day emergency drawdown) in Table 14-2 is not additive because this action was based on a vertical tower, and not a sloping intake indicated in Table 14-1.

15.0 References

AECOM (2020). Task Order No. 1 Technical Memoranda:

- Design Criteria, Basis of Feasibility Design, Task Order No. 1, Task HR2.6, 8/24/20
- Geology and Seismicity – Sites Reservoir, Task Order No. 1, Task HR2.91, 8/18/20
- Main Dams and Saddle Dams, Task Order No.1, Task HR2.92, 8/19/20
- Inlet/Outlet (I/O) Tower & Tunnels, Task Order No. 1, Task HR2.93, 8/19/20
- Funks and Stone Corral Creeks, Reservoir Operating Elevations and Emergency Release Management, Task Order No.1, Task HR2.94, 8/18/20
- Diversion during Construction, Task Order No. 1, Task HR 2.95, 8/20/20
- Roads and Bridge, Task Order No.1, Task HR2.96, 8/21/20

AECOM (2021a). Constructability Analysis Technical Memorandum, HR 53, Final. April 14.

AECOM (2021b). Draft Feasibility-Level Cost Estimate Technical Memorandum. February 3.

Association for the Advancement of Cost Engineering (AACE) International (2016). Recommended Practice No. 12R-97, Cost Estimate Classification System. March 1.

Authority (2020). Value Planning Report. April.

California Department of Transportation (Caltrans) (2021). Labor Surcharge and Equipment Rental Rates, Effective April 1, 2020 through March 31, 2021.

Appendix A

Construction Feasibility-Level Cost Estimate Tables – HR – Alternative 1

Sites Reservoir (Alt 1): Site Demolition and Clearing Work | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **February 19, 2021**

20. Construction Cost Summary: Site Demolition and Clearing Work

				Unit Cost Rate ($/ACRE)	Total Cost
			ACRE:	1,050	
Total Direct Cost				15,809.25	16,599,710
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				15,809.25	16,599,710
General Conditions					
Mobilization			5.0%	790.46	829,986
Site General Conditions & Requirements			10.0%	1,659.97	1,742,970
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	200.86	210,899
Bonds			0.6%	110.76	116,301
GC Field and Home Office Overhead			5.0%	928.56	974,993
GC Profit			5.0%	974.99	1,023,743
Total Contractor Indirect Markups				4,665.61	4,898,892
TOTAL DIRECT COST BEFORE CONTINGENCIES				**20,474.86**	**21,498,602**
Contingencies					
Design Contingencies			15.0%	3,071.23	3,224,790
Construction Contingencies			15.0%	3,531.91	3,708,509
Total Contingency Allowance				6,603.14	6,933,299
TOTAL DIRECT COST BEFORE ESCALATION				**27,078.00**	**28,431,901**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	264.43	277,647
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**27,342.43**	**28,709,548**

20. Cost Work Sheet Summary: Site Demolition and Clearing Work

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**General Clearing and Grubbing**									
	1.001	Clearing and Grubbing	289	ACRE	$ 2,460.94	$ 1,484.32	$ -	$ -	$ 3,945.25	$ 1,140,179	Light vegetation clearing work (1050 Acres of clearing work)
2		**Reservoir Clearing and Demolition (Carried over from May 2020 NODOS Estimate)**									Reference Estimate: 2.NODOS_Clear-Grade_2020-04-30
	2.001	Remove and Dispose of Trees - Oak Woodlands	700	ACRE	$ 2,600.00	$ 1,500.00	$ -	$ 6,400.00	$ 10,500.00	$ 7,350,000	Costs as per May 2020 NODOS Estimate
		a. Oak woodland around reservoir									
		b. Remove and dispose off site									
		c. Cut stumps within 12" of ground									
		d. Stump removal not required									
		e. Provide access to tree cutting locations									
	2.002	Vegetation Removal - Occupied Areas	61	ACRE	$ 37,000.00	$ 33,000.00	$ -	$ 10,500.00	$ 80,500.00	$ 4,910,500	
		a. Trees, shrubs									
		b. Town of Sites and homesteads									
		c. Remove and dispose off site									
		d. Cut tree stumps within 12" of ground									
		e. Tree Stump removal not required									
	2.003	Demolish Residential Housing	24	EA	$ -	$ -	$ -	$ 10,000.00	$ 10,000.00	$ 240,000	
		a. Demolish, remove, dispose off site									
		b. Remove concrete foundations and walls in designated borrow areas									
	2.004	Demolish Barns	29	EA	$ -	$ -	$ -	$ 7,900.00	$ 7,900.00	$ 229,100	
		a. Demolish, remove, dispose off site									
	2.005	Demolish Out-buildings - Sheds & Garages	36	EA	$ -	$ -	$ -	$ 8,100.00	$ 8,100.00	$ 291,600	
		a. Demolish, remove, dispose off site									
	2.006	Demolish silos & water towers	12	EA	$ -	$ -	$ -	$ 11,000.00	$ 11,000.00	$ 132,000	
		a. Demolish, remove, dispose off site									
	2.007	Remove Motor Homes	2	EA	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ 10,000	
		a. Demolish, remove, dispose off site									
	2.008	Demolish and clean Septic Systems	28	EA	$ 2,700.00	$ 5,600.00	$ -	$ 3,600.00	$ 11,900.00	$ 333,200	
		a. Pump and dispose of contents									
		b. Remove and dispose of lid, walls, bottom									
		c. Remove any gravel surround									
		d. Backfill excavation with clay soils									
	2.009	Plug Groundwater Wells	38	EA	$ 1,350.00	$ 2,800.00	$ 320.00	$ 2,600.00	$ 7,070.00	$ 268,660	
		a. Follow Colusa or Glenn County standards									
		b. Remove and dispose of pumps, motors, electrical									
	2.010	Remove Underground Fuel Tanks	15	EA	$ 2,700.00	$ 5,600.00	$ -	$ 3,300.00	$ 11,600.00	$ 174,000	
		a. Follow County/State Standards									
		b. Dispose off site									
		c. Remove contaminated soils, backfill excavation with clay soils									
	2.011	Remove Metal Fencing and Posts (No Salvage)	40	MILE	$ -	$ -	$ -	$ 13,500.00	$ 13,500.00	$ 540,000	
		a. Dispose off site									
	2.012	Remove Asphalt Paving (Two-Lane Roads)	73,906	SY	$ 3.10	$ 5.60	$ -	$ 1.05	$ 9.75	$ 720,586	As per Alt 1 roadwork sheet
		a. Dispose off site									
		b. AB removal not required if present									
		c. Does not include removal of temporary north bypass road in reservoir (In road estimates)									
	2.013	Locate Decommissioned Gas Wells, Verify Closure	10	EA	$ -	$ -	$ -	$ 3,000.00	$ 3,000.00	$ 30,000	
		a. Locate wells, excavate top, verify closure									
		b. Wells in reservoir identified as plugged dry gas wells in DOGGR records									
	2.014	Cost escalation on May 2020 NODOS Estimate items carried over	1.51%	LS				$ 15,229,646	$ 15,229,646	$ 229,886	Escalation from May 2020 to Dec 2020 at a rate of 3% per annum
		Total Direct Cost	1,050	ACRE	$ 4,937.83	$ 4,050.52	$ 11.58	$ 6,809.32	$ 15,809.25	$ 16,599,710	

Sites Reservoir (Alt 1): Golden Gate Dam | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

21. Construction Cost Summary: Golden Gate Dam

				Total Cost
Total Direct Cost				352,593,965
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				352,593,965
General Conditions				
Mobilization			5.0%	17,629,698
Site General Conditions & Requirements			10.0%	37,022,366
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	4,479,706
Bonds			0.6%	2,470,354
GC Home Office Overhead			6.0%	24,851,765
GC Profit			8.0%	35,123,828
Total Contractor Indirect Markups				121,577,717
TOTAL DIRECT COST BEFORE CONTINGENCIES				**474,171,682**
Contingencies				
Design Contingencies			10.0%	47,417,168
Construction Contingencies			15.0%	78,238,328
Total Contingency Allowance				125,655,496
TOTAL DIRECT COST BEFORE ESCALATION				**599,827,178**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	5,857,513
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**605,684,691**

21. Cost Work Sheet Summary: Golden Gate Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	53	ACRE	$ 3,134.83	$ 5,471.22	$ -	$ -	$ 8,606.05	$ 456,120	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	53	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 199,307	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	726,000	Tons					$ 37.14	$ 26,964,478	
	2.002	*Purchase processed material from quarry*	*726,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 16,114,659*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*491,118*	*LCY*	*$ 10.56*	*$ 11.54*	*$ -*	*$ -*	*$ 22.09*	*$ 10,849,819*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	803,000	Tons					$ 37.15	$ 29,832,148	
	2.005	*Purchase processed material from quarry*	*803,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 17,823,790*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*543,206*	*LCY*	*$ 10.56*	*$ 11.54*	*$ -*	*$ -*	*$ 22.11*	*$ 12,008,359*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	107,800	Tons					$ 37.21	$ 4,011,061	
	2.008	*Purchase processed material from quarry*	*107,800*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,392,783*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*72,924*	*LCY*	*$ 10.60*	*$ 11.59*	*$ -*	*$ -*	*$ 22.19*	*$ 1,618,278*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	451,000	Tons					$ 37.16	$ 16,759,577	
	2.011	*Purchase processed material from quarry*	*451,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 10,010,622*	*Include 10% waste factor / additional material supply*
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*305,088*	*LCY*	*$ 10.57*	*$ 11.55*	*$ -*	*$ -*	*$ 22.12*	*$ 6,748,955*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.013	Process and Stockpile on Project - Zone 2B - Transition	473,000	Tons					$ 37.16	$ 17,578,911	
	2.014	*Purchase processed material from quarry*	*473,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 10,498,945*	*Include 10% waste factor / additional material supply*
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*319,971*	*LCY*	*$ 10.57*	*$ 11.56*	*$ -*	*$ -*	*$ 22.13*	*$ 7,079,967*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	125,000	BCY					$ 8.51	$ 1,064,098	
	3.002	*Excavations - remove top soil layer*	*137,500*	*LCY*	*$ 1.44*	*$ 2.24*	*$ -*	*$ -*	*$ 3.68*	*$ 505,341*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*137,500*	*LCY*	*$ 1.13*	*$ 2.93*	*$ -*	*$ -*	*$ 4.06*	*$ 558,757*	
	3.004	Dam Foundation Excavation - Common	325,000	BCY					$ 8.55	$ 2,778,464	
	3.005	*Excavations - remove top soil layer*	*357,500*	*LCY*	*$ 1.55*	*$ 2.21*	*$ -*	*$ -*	*$ 3.76*	*$ 1,344,671*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*357,500*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 1,433,792*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	991,000	BCY					$ 11.71	$ 11,608,464	
	3.008	*Rock excavations, no blasting*	*1,139,650*	*LCY*	*$ 2.51*	*$ 3.67*	*$ -*	*$ -*	*$ 6.18*	*$ 7,043,522*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*1,139,650*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 4,564,941*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	159,000	BCY					$ 24.11	$ 3,833,900	
	3.011	*Blasting operations*	*190,800*	*LCY*	*$ 4.26*	*$ 5.69*	*$ 4.85*	*$ -*	*$ 14.80*	*$ 2,823,238*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 1 mile haul*	*190,800*	*LCY*	*$ 1.49*	*$ 3.80*	*$ -*	*$ -*	*$ 5.30*	*$ 1,010,662*	
	3.013	*Crush and screen material*	*190,800*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	65,000	SY					$ 20.06	$ 1,304,206	
	4.002	*Initial foundation core cleanup*	*65,000*	*SY*	*$ 11.48*	*$ 5.52*	*$ -*	*$ -*	*$ 17.00*	*$ 1,105,176*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*17,875*	*CY*	*$ 3.73*	*$ 7.40*	*$ -*	*$ -*	*$ 11.13*	*$ 199,030*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	65,000	SY					$ 17.00	$ 1,105,176	
	4.005	*Final foundation core cleanup*	*65,000*	*SY*	*$ 11.48*	*$ 5.52*	*$ -*	*$ -*	*$ 17.00*	*$ 1,105,176*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	3,700	CY					$ 120.02	$ 444,064	
	4.008	*Dental excavations*	*4,070*	*LCY*	*$ 67.94*	*$ 30.73*	*$ -*	*$ -*	*$ 98.68*	*$ 401,609*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*4,070*	*LCY*	*$ 3.83*	*$ 6.60*	*$ -*	*$ -*	*$ 10.43*	*$ 42,454*	
	4.010	Dental Concrete	3,700	CY	$ 44.39	$ 20.16	$ 183.12	$ -	$ 247.68	$ 916,398	
	4.011	Grout Cap with Anchors	9,900	CY	$ 78.42	$ 22.69	$ 519.68	$ 4.07	$ 624.86	$ 6,186,119	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	96,100	LF					$ 78.68	$ 7,561,102	
	4.013	*Drill setup for all holes*	*1,281*	*ea.*	*$ 191.11*	*$ 319.80*	*$ -*	*$ -*	*$ 510.91*	*$ 654,641*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*96,100*	*lft*	*$ 10.34*	*$ 11.14*	*$ -*	*$ -*	*$ 21.48*	*$ 2,064,377*	
	4.015	*Redrill grout holes*	*9,610*	*lft*	*$ 10.42*	*$ 11.24*	*$ -*	*$ -*	*$ 21.66*	*$ 208,172*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*4,805*	*ea.*	*$ 91.45*	*$ -*	*$ -*	*$ -*	*$ 91.45*	*$ 439,409*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*6,407*	*hr*	*$ 485.23*	*$ 100.02*	*$ -*	*$ -*	*$ 585.25*	*$ 3,749,497*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*1,281*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 445,007*	
	4.019	Consolidation Grouting	40,000	LF					$ 78.69	$ 3,147,635	
	4.020	*Drill setup for all holes*	*533*	*ea.*	*$ 191.31*	*$ 320.13*	*$ -*	*$ -*	*$ 511.44*	*$ 272,767*	*Assume 75' drilling lengths*
	4.021	*Drill curtain grout holes*	*40,000*	*lft*	*$ 10.33*	*$ 11.14*	*$ -*	*$ -*	*$ 21.47*	*$ 858,711*	
	4.022	*Redrill grout holes*	*4,000*	*lft*	*$ 10.43*	*$ 11.25*	*$ -*	*$ -*	*$ 21.68*	*$ 86,739*	*Assume 10% to be redrilled*
	4.023	*Hookup to grout holes and grout nipples*	*2,000*	*ea.*	*$ 91.39*	*$ -*	*$ -*	*$ -*	*$ 91.39*	*$ 182,779*	*1 x hookup every 20'*
	4.024	*Inject portland cement grout*	*2,667*	*hr*	*$ 485.46*	*$ 100.07*	*$ -*	*$ -*	*$ 585.53*	*$ 1,561,413*	*Allow 5 hours per hole*
	4.025	*Perform hydraulic conductivity tests*	*533*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 185,227*	

21. Cost Work Sheet Summary: Golden Gate Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.026	Type III Cement	4,800	Tons	$ 176.73	$ 73.00	$ 113.14	$ -	$ 362.87	$ 1,741,756	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	152,000	SY					$ 4.50	$ 684,707	
	5.002	*Initial dam shell cleanup*	*152,000*	*SY*	*$ 1.34*	*$ 0.41*	*$ -*	*$ -*	*$ 1.74*	*$ 264,879*	
	5.003	*Load and haul to disposal area, 0.5 mile haul*	*27,867*	*LCY*	*$ 5.54*	*$ 9.53*	*$ -*	*$ -*	*$ 15.07*	*$ 419,828*	*Assume removal of top layer, 0.5' thick*
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	500	LF	$ 47.70	$ 29.60	$ 35.56	$ -	$ 112.86	$ 56,428	
	6.002	Furnish and Install Foundation Drain Manholes	3	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 17,275	
	6.003	Seepage Partition Walls	700	CY	$ 523.27	$ 116.49	$ 465.37	$ -	$ 1,105.13	$ 773,589	3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	1,150,000	BCY					$ 7.48	$ 8,605,073	Assumed common earth, 3000' haul w/ scraper
	7.003	*Embankment excavations*	*1,265,000*	*LCY*	*$ 0.98*	*$ 2.68*	*$ -*	*$ -*	*$ 3.65*	*$ 4,623,091*	*Include 10% swell factor*
	7.004	*Load and haul to site stockpile, 0.25 mile haul*	*1,265,000*	*LCY*	*$ 0.84*	*$ 2.30*	*$ -*	*$ -*	*$ 3.15*	*$ 3,981,982*	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	499,000	BCY					$ 9.03	$ 4,504,845	
	7.006	*Embankment excavations*	*548,900*	*LCY*	*$ 1.43*	*$ 3.03*	*$ -*	*$ -*	*$ 4.46*	*$ 2,449,040*	*Include 10% swell factor*
	7.007	*Load and haul to site stockpile, 0.25 mile haul*	*548,900*	*LCY*	*$ 1.04*	*$ 2.70*	*$ -*	*$ -*	*$ 3.75*	*$ 2,055,805*	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	3,849,000	BCY					$ 9.01	$ 34,675,752	
	7.009	*Embankment excavations*	*4,233,900*	*LCY*	*$ 1.43*	*$ 3.02*	*$ -*	*$ -*	*$ 4.45*	*$ 18,851,325*	*Include 10% swell factor*
	7.010	*Load and haul to site stockpile, 0.25 mile haul*	*4,233,900*	*LCY*	*$ 1.04*	*$ 2.70*	*$ -*	*$ -*	*$ 3.74*	*$ 15,824,428*	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	
	7.012	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.013	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	1,374,500	ECY					$ 6.73	$ 9,251,897	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	*Load and haul to site stockpile, 0.25 mile haul*	*1,511,950*	*LCY*	*$ 1.10*	*$ 2.96*	*$ -*	*$ -*	*$ 4.06*	*$ 6,135,514*	
	7.016	*Spread and compact*	*1,511,950*	*LCY*	*$ 1.14*	*$ 0.92*	*$ -*	*$ -*	*$ 2.06*	*$ 3,116,384*	
	7.017	Topsoil Replacement	125,000	ECY					$ 9.82	$ 1,227,668	Backfill burrow area using material from stockpile
	7.018	*Excavate, Load and haul excavated backfill material to fill location, 1 mile haul*	*137,500*	*LCY*	*$ 1.76*	*$ 5.05*	*$ -*	*$ -*	*$ 6.81*	*$ 935,851*	
	7.019	*Spread and compact*	*137,500*	*LCY*	*$ 1.17*	*$ 0.95*	*$ -*	*$ -*	*$ 2.12*	*$ 291,817*	
	7.020	Furnish and Install Zone 1 - Core	2,400,000	ECY					$ 13.56	$ 32,549,513	
	7.021	*Excavate from burrow area*	*2,640,000*	*LCY*	*$ 1.43*	*$ 3.02*	*$ -*	*$ -*	*$ 4.45*	*$ 11,755,390*	*Include 10% swell factor*
	7.022	*Load and haul to zone-1 fill location, 0.5 mile haul*	*2,640,000*	*LCY*	*$ 1.28*	*$ 2.88*	*$ -*	*$ -*	*$ 4.16*	*$ 10,975,156*	*No stockpiling required*
	7.023	*Spread and compact*	*2,640,000*	*LCY*	*$ 1.50*	*$ 2.22*	*$ -*	*$ -*	*$ 3.72*	*$ 9,818,968*	
	7.024	Load, Haul and Place - Zone 2A - Filter	726,000	Tons					$ 3.19	$ 2,316,629	
	7.025	*Load at stockpile and haul to fill location, 0.5 mile haul*	*147,335*	*LCY*	*$ 0.92*	*$ 2.52*	*$ -*	*$ -*	*$ 3.44*	*$ 507,319*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0251	*Direct hauling from quarry*	*343,782*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.026	*Spread and compact*	*491,118*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.68*	*$ 1,809,310*	*Include 15% swell factor*
	7.027	Load, Haul and Place - Zone 2A - Drain	803,000	Tons					$ 3.20	$ 2,570,498	
	7.028	*Load at stockpile and haul to fill location, 0.5 mile haul*	*162,962*	*LCY*	*$ 0.94*	*$ 2.56*	*$ -*	*$ -*	*$ 3.50*	*$ 570,734*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0281	*Direct hauling from quarry*	*380,244*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.029	*Spread and compact*	*543,206*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.68*	*$ 1,999,764*	*Include 15% swell factor*
	7.030	Load, Haul and Place - Zone 2A - Transition	451,000	Tons					$ 3.21	$ 1,446,193	
	7.031	*Load at stockpile and haul to fill location, 0.5 mile haul*	*91,526*	*LCY*	*$ 0.93*	*$ 2.53*	*$ -*	*$ -*	*$ 3.46*	*$ 317,075*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0311	*Direct hauling from quarry*	*213,562*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.032	*Spread and compact*	*305,088*	*LCY*	*$ 1.46*	*$ 2.24*	*$ -*	*$ -*	*$ 3.70*	*$ 1,129,118*	*Include 15% swell factor*
	7.033	Load, Haul and Place - Zone 2B - Filter	107,800	Tons					$ 3.23	$ 348,175	
	7.034	*Load at stockpile and haul to fill location, 0.5 mile haul*	*21,877*	*LCY*	*$ 0.93*	*$ 2.55*	*$ -*	*$ -*	*$ 3.48*	*$ 76,098*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0341	*Direct hauling from quarry*	*51,046*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.035	*Spread and compact*	*72,924*	*LCY*	*$ 1.47*	*$ 2.26*	*$ -*	*$ -*	*$ 3.73*	*$ 272,077*	*Include 15% swell factor*
	7.036	Load, Haul and Place - Zone 2B - Transition	473,000	Tons					$ 3.20	$ 1,513,291	
	7.037	*Load at stockpile and haul to fill location, 0.5 mile haul*	*95,991*	*LCY*	*$ 0.92*	*$ 2.51*	*$ -*	*$ -*	*$ 3.44*	*$ 329,758*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0371	*Direct hauling from quarry*	*223,979*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.038	*Spread and compact*	*319,971*	*LCY*	*$ 1.46*	*$ 2.24*	*$ -*	*$ -*	*$ 3.70*	*$ 1,183,534*	*Include 15% swell factor*
	7.039	Furnish and Install Zone 3 - Rockfill	2,600,000	ECY					$ 27.53	$ 71,579,898	
	7.040	*Blasting operations*	*3,120,000*	*LCY*	*$ 4.26*	*$ 5.69*	*$ 4.85*	*$ -*	*$ 14.80*	*$ 46,178,091*	*Include 20% swell factor*
	7.041	*Load and haul to processing area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling required, material to be hauled to fill location directly*
	7.042	*Crush and screen material*	*3,120,000*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
	7.043	*Load and haul to zone-3, 1.25 mile haul*	*3,120,000*	*LCY*	*$ 1.11*	*$ 3.35*	*$ -*	*$ -*	*$ 4.46*	*$ 13,920,171*	*No stockpiling required, direct haul*
	7.044	*Spread and compact*	*3,120,000*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.68*	*$ 11,481,636*	
	7.045	Furnish and Install Zone 4 - Random	2,200,000	ECY					$ 10.64	$ 23,399,243	

21. Cost Work Sheet Summary: Golden Gate Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.046	Excavations in common soil	945,300	LCY	$ 1.55	$ 2.20	$ -	$ -	$ 3.75	$ 3,549,537	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	945,300	LCY	$ 1.25	$ 3.48	$ -	$ -	$ 4.73	$ 4,468,704	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	1,584,700	LCY	$ 1.06	$ 2.78	$ -	$ -	$ 3.83	$ 6,075,979	Include 15% swell factor
	7.050	Spread and compact	2,530,000	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 9,305,023	
	7.051	Furnish and Install Riprap	98,000	ECY					$ 40.14	$ 3,933,501	
	7.052	Blasting operations	117,600	LCY	$ 4.30	$ 5.75	$ 4.85	$ -	$ 14.90	$ 1,752,047	Include 20% swell factor
	7.053	Load and haul to processing area, 1 mile haul		LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	117,600	LCY	$ 0.93	$ 2.53	$ -	$ -	$ 3.45	$ 405,856	
	7.056	Riprap placement	117,600	LCY	$ 6.00	$ 9.10	$ -	$ -	$ 15.10	$ 1,775,598	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 2,300,000.00	$ 2,300,000.00	$ 2,300,000	Allowance
	8.003	Seeding and Mulching	261,360	SF	$ -	$ -	$ -	$ 0.69	$ 0.69	$ 180,338	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	2,500	CY					$ 85.72	$ 214,291	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	2,875	LCY	$ 10.26	$ 11.11	$ 37.73	$ -	$ 59.11	$ 169,929	Include 15% swell factor
	8.007	Place and compact	2,875	LCY	$ 5.03	$ 10.40	$ -	$ -	$ 15.43	$ 44,362	
	8.008	Developing haul routes - Haul routes inside reservoir	12	ACRES					$ 27,947.01	$ 335,364	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	522,720	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 104,650	
	8.0091	Load and haul earth fill	9,680	CY	$ 1.74	$ 4.75	$ -	$ -	$ 6.49	$ 62,793	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	522,720	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.32	$ 167,922	
	8.011	Developing haul routes - Haul routes outside reservoir	25	ACRES					$ 27,008.54	$ 675,213	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	1,089,000	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 209,299	
	8.0121	Load and haul earth fill	20,167	CY	$ 1.73	$ 4.72	$ -	$ -	$ 6.45	$ 130,071	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	1,089,000	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 335,844	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	8,700	CY	$ 94.61	$ 50.34	$ 233.06	$ -	$ 378.01	$ 3,288,706	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.020	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 1,150,000.00	$ 1,150,000.00	$ 1,150,000	Allowance
9		**Golden Gate Dam Bypass Pipeline Facilities**									
	9.001	Upstream Cofferdam	-	CY						Included above	Earth fill coffer dam; included within zone 4 fill work
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required; Earth fill coffer dam
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	2,100	LF					$ 1,893.98	$ 3,977,357	
	9.010	Excavate trench in bedrock	4,107	LCY	$ 71.51	$ 51.86	$ -	$ -	$ 123.38	$ 506,670	
	9.011	Load and haul material to disposal site, 0.5 mile haul	4,107	LCY	$ 3.11	$ 7.79	$ -	$ -	$ 10.89	$ 44,740	
	9.012	48" steel pipe placement	2,100	LF	$ 60.87	$ 27.46	$ 845.32	$ -	$ 933.66	$ 1,960,680	
	9.013	Concrete backfill for pipe trench (dam footprint)	2,200	CY	$ 83.28	$ 21.01	$ 194.22	$ -	$ 298.51	$ 656,609	
	9.014	Reinforcement for concrete backfill	132	TON	$ 135.25	$ 9.35	$ 2,663.58	$ -	$ 2,808.18	$ 370,616	Allow 60lbs/CY for reinforcement
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	1	LS	$ 21,679.93	$ 6,197.40	$ 161,625.00	$ -	$ 189,502.33	$ 189,502	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	10	LF	$ -	$ -	$ -	$ 3,450.00	$ 3,450.00	$ 34,500	
	9.017	Install 48'x48" debris rack on conc. Manhole	1	LS	$ -	$ -	$ -	$ 5,865.00	$ 5,865.00	$ 5,865	
	9.018	Grout pipe	1,050	CY	$ 26.27	$ 5.26	$ 151.73	$ -	$ 183.26	$ 192,420	Allow 0.5CY of grout/lf of pipe
	9.019	Field Survey	1	LS	$ -	$ -	$ -	$ 15,755.00	$ 15,755.00	$ 15,755	
	9.020	Riprap Discharge Channel	75	CY					$ 460.11	$ 34,508	
	9.021	Blasting operations	90	LCY	$ 85.14	$ 113.82	$ 4.85	$ -	$ 203.81	$ 18,343	Include 20% swell factor
	9.022	Excavate	90	LCY	$ 22.12	$ 42.13	$ -	$ -	$ 64.25	$ 5,782	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	90	LCY	$ 18.89	$ 32.86	$ -	$ -	$ 51.75	$ 4,657	
	9.025	Place at the channel	90	LCY	$ 37.90	$ 25.72	$ -	$ -	$ 63.62	$ 5,725	
10		Misc allowance for small items, allow 1%	1.0%	%				349,102,936	$ 349,102,936	$ 3,491,029	
		Total Direct Cost	53	Acre	$ 1,903,730.47	$ 2,989,719.19	$ 1,607,431.23	$ 151,835.43	$ 6,652,716.33	$ 352,593,965	

Sites Reservoir (Alt 1): Sites Dam | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

22. Construction Cost Summary: Sites Dam

				Total Cost
Total Direct Cost				176,240,299
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				176,240,299
General Conditions				
Mobilization			5.0%	8,812,015
Site General Conditions & Requirements			10.0%	18,505,231
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	2,239,133
Bonds			0.6%	1,234,780
GC Home Office Overhead			6.0%	12,421,887
GC Profit			8.0%	17,556,268
Total Contractor Indirect Markups				60,769,314
TOTAL DIRECT COST BEFORE CONTINGENCIES				**237,009,613**
Contingencies				
Design Contingencies			10.0%	23,700,961
Construction Contingencies			15.0%	39,106,586
Total Contingency Allowance				62,807,547
TOTAL DIRECT COST BEFORE ESCALATION				**299,817,160**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2,927,815
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**302,744,975**

22. Cost Work Sheet Summary: Sites Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	27	ACRE	$ 3,076.78	$ 5,369.90	$ -	$ -	$ 8,446.68	$ 228,060	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	27	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 101,534	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	242,000	Tons					$ 37.01	$ 8,957,510	
	2.002	*Purchase processed material from quarry*	*242,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 5,371,553*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*163,706*	*LCY*	*$ 10.47*	*$ 11.44*	*$ -*	*$ -*	*$ 21.90*	*$ 3,585,957*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	297,000	Tons					$ 36.99	$ 10,987,457	
	2.005	*Purchase processed material from quarry*	*297,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 6,592,361*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*200,912*	*LCY*	*$ 10.45*	*$ 11.42*	*$ -*	*$ -*	*$ 21.88*	*$ 4,395,096*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	42,900	Tons					$ 37.20	$ 1,595,863	
	2.008	*Purchase processed material from quarry*	*42,900*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 952,230*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*29,021*	*LCY*	*$ 10.60*	*$ 11.58*	*$ -*	*$ -*	*$ 22.18*	*$ 643,633*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	148,500	Tons					$ 37.06	$ 5,502,923	
	2.011	*Purchase processed material from quarry*	*148,500*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 3,296,180*	*Include 10% waste factor / additional material supply*
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*100,456*	*LCY*	*$ 10.50*	*$ 11.47*	*$ -*	*$ -*	*$ 21.97*	*$ 2,206,743*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.013	Process and Stockpile on Project - Zone 2B - Transition	159,500	Tons					$ 37.07	$ 5,912,590	
	2.014	*Purchase processed material from quarry*	*159,500*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 3,540,342*	*Include 10% waste factor / additional material supply*
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*107,897*	*LCY*	*$ 10.50*	*$ 11.48*	*$ -*	*$ -*	*$ 21.99*	*$ 2,372,249*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	58,000	BCY					$ 8.65	$ 501,933	
	3.002	*Excavations - remove top soil layer*	*63,800*	*LCY*	*$ 1.46*	*$ 2.27*	*$ -*	*$ -*	*$ 3.74*	*$ 238,368*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*63,800*	*LCY*	*$ 1.15*	*$ 2.98*	*$ -*	*$ -*	*$ 4.13*	*$ 263,565*	
	3.004	Dam Foundation Excavation - Common	121,000	BCY					$ 8.61	$ 1,041,924	
	3.005	*Excavations - remove top soil layer*	*133,100*	*LCY*	*$ 1.56*	*$ 2.22*	*$ -*	*$ -*	*$ 3.79*	*$ 504,252*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*133,100*	*LCY*	*$ 1.13*	*$ 2.91*	*$ -*	*$ -*	*$ 4.04*	*$ 537,672*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	344,000	BCY					$ 11.76	$ 4,046,237	
	3.008	*Rock excavations, no blasting*	*395,600*	*LCY*	*$ 2.52*	*$ 3.69*	*$ -*	*$ -*	*$ 6.20*	*$ 2,454,306*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*395,600*	*LCY*	*$ 1.12*	*$ 2.90*	*$ -*	*$ -*	*$ 4.02*	*$ 1,591,931*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	47,000	BCY					$ 24.52	$ 1,152,215	
	3.011	*Blasting operations*	*56,400*	*LCY*	*$ 4.35*	*$ 5.81*	*$ 4.85*	*$ -*	*$ 15.01*	*$ 846,480*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 0.5 mile haul*	*56,400*	*LCY*	*$ 1.51*	*$ 3.91*	*$ -*	*$ -*	*$ 5.42*	*$ 305,735*	
	3.013	*Crush and screen material*	*56,400*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	20,000	SY					$ 20.29	$ 405,775	
	4.002	*Initial foundation core cleanup*	*20,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 343,578*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*5,500*	*CY*	*$ 3.79*	*$ 7.52*	*$ -*	*$ -*	*$ 11.31*	*$ 62,197*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	20,000	SY					$ 17.18	$ 343,578	
	4.005	*Final foundation core cleanup*	*20,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 343,578*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	800	CY					$ 122.13	$ 97,700	
	4.008	*Dental excavations*	*880*	*LCY*	*$ 69.06*	*$ 31.24*	*$ -*	*$ -*	*$ 100.30*	*$ 88,266*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*880*	*LCY*	*$ 3.94*	*$ 6.78*	*$ -*	*$ -*	*$ 10.72*	*$ 9,434*	
	4.010	Dental Concrete	800	CY	$ 44.52	$ 20.23	$ 183.12	$ -	$ 247.87	$ 198,296	
	4.011	Grout Cap with Anchors	3,500	CY	$ 80.66	$ 23.34	$ 519.68	$ 11.50	$ 635.18	$ 2,223,144	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	31,800	LF					$ 78.89	$ 2,508,759	
	4.013	*Drill setup for all holes*	*424*	*ea.*	*$ 192.51*	*$ 322.15*	*$ -*	*$ -*	*$ 514.65*	*$ 218,214*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*31,800*	*lft*	*$ 10.37*	*$ 11.18*	*$ -*	*$ -*	*$ 21.55*	*$ 685,234*	
	4.015	*Redrill grout holes*	*3,180*	*lft*	*$ 10.50*	*$ 11.32*	*$ -*	*$ -*	*$ 21.82*	*$ 69,391*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*1,590*	*ea.*	*$ 91.73*	*$ -*	*$ -*	*$ -*	*$ 91.73*	*$ 145,854*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*2,120*	*hr*	*$ 486.04*	*$ 100.19*	*$ -*	*$ -*	*$ 586.23*	*$ 1,242,811*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*424*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 147,255*	
	4.019	Consolidation Grouting	13,900	LF					$ 79.83	$ 1,109,693	
	4.020	*Drill setup for all holes*	*185*	*ea.*	*$ 201.86*	*$ 337.79*	*$ -*	*$ -*	*$ 539.65*	*$ 100,015*	*Assume 75' drilling lengths*
	4.021	*Drill curtain grout holes*	*13,900*	*lft*	*$ 10.51*	*$ 11.33*	*$ -*	*$ -*	*$ 21.84*	*$ 303,585*	
	4.022	*Redrill grout holes*	*1,390*	*lft*	*$ 12.01*	*$ 12.95*	*$ -*	*$ -*	*$ 24.96*	*$ 34,695*	*Assume 10% to be redrilled*
	4.023	*Hookup to grout holes and grout nipples*	*695*	*ea.*	*$ 92.98*	*$ -*	*$ -*	*$ -*	*$ 92.98*	*$ 64,619*	*1 x hookup every 20'*
	4.024	*Inject portland cement grout*	*927*	*hr*	*$ 485.30*	*$ 100.04*	*$ -*	*$ -*	*$ 585.34*	*$ 542,413*	*Allow 5 hours per hole*
	4.025	*Perform hydraulic conductivity tests*	*185*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 64,366*	

22. Cost Work Sheet Summary: Sites Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.026	Type III Cement	1,600	Tons	$ 177.36	$ 73.26	$ 113.14	$ -	$ 363.75	$ 582,007	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	69,100	SY					$ 3.69	$ 255,280	
	5.002	*Initial dam shell cleanup*	*69,100*	*SY*	*$ 1.37*	*$ 0.42*	*$ -*	*$ -*	*$ 1.78*	*$ 123,200*	
	5.003	*Load and haul to disposal area, 0.5 mile haul*	*12,668*	*LCY*	*$ 3.83*	*$ 6.59*	*$ -*	*$ -*	*$ 10.43*	*$ 132,081*	*Assume removal of top layer, 0.5' thick*
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	500	LF	$ 43.36	$ 26.91	$ 35.56	$ -	$ 105.83	$ 52,914	
	6.002	Furnish and Install Foundation Drain Manholes	1	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 5,758	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	339,000	BCY					$ 7.50	$ 2,544,108	Assumed common earth, 3000' haul w/ scraper
	7.003	*Embankment excavations*	*372,900*	*LCY*	*$ 0.98*	*$ 2.69*	*$ -*	*$ -*	*$ 3.67*	*$ 1,366,827*	*Include 10% swell factor*
	7.004	*Load and haul to site stockpile, 0.25 mile haul*	*372,900*	*LCY*	*$ 0.85*	*$ 2.31*	*$ -*	*$ -*	*$ 3.16*	*$ 1,177,282*	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	1,768,000	BCY					$ 9.02	$ 15,940,219	
	7.006	*Embankment excavations*	*1,944,800*	*LCY*	*$ 1.43*	*$ 3.02*	*$ -*	*$ -*	*$ 4.46*	*$ 8,665,832*	*Include 10% swell factor*
	7.007	*Load and haul to site stockpile, 0.25 mile haul*	*1,944,800*	*LCY*	*$ 1.04*	*$ 2.70*	*$ -*	*$ -*	*$ 3.74*	*$ 7,274,387*	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	
	7.009	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% swell factor*
	7.010	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	
	7.012	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.013	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	526,750	ECY					$ 6.73	$ 3,547,105	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	*Load and haul to site stockpile, 0.25 mile haul*	*579,425*	*LCY*	*$ 1.10*	*$ 2.96*	*$ -*	*$ -*	*$ 4.06*	*$ 2,352,308*	
	7.016	*Spread and compact*	*579,425*	*LCY*	*$ 1.14*	*$ 0.92*	*$ -*	*$ -*	*$ 2.06*	*$ 1,194,797*	
	7.017	Topsoil Replacement	58,000	ECY					$ 9.82	$ 569,581	Backfill burrow area using material from stockpile
	7.018	*Excavate, Load and haul excavated backfill material to fill location, 1 mile*	*63,800*	*LCY*	*$ 1.75*	*$ 5.02*	*$ -*	*$ -*	*$ 6.77*	*$ 431,931*	
	7.019	*Spread and compact*	*63,800*	*LCY*	*$ 1.19*	*$ 0.97*	*$ -*	*$ -*	*$ 2.16*	*$ 137,649*	
	7.020	Furnish and Install Zone 1 - Core	710,000	ECY					$ 13.11	$ 9,305,924	
	7.021	*Excavate from burrow area*	*781,000*	*LCY*	*$ 1.43*	*$ 3.02*	*$ -*	*$ -*	*$ 4.45*	*$ 3,478,892*	*Include 10% swell factor*
	7.022	*Load and haul to zone-1 fill location, 1 mile haul*	*781,000*	*LCY*	*$ 1.04*	*$ 2.70*	*$ -*	*$ -*	*$ 3.74*	*$ 2,920,297*	*No stockpiling required*
	7.023	*Spread and compact*	*781,000*	*LCY*	*$ 1.50*	*$ 2.22*	*$ -*	*$ -*	*$ 3.72*	*$ 2,906,734*	
	7.024	Load, Haul and Place - Zone 2A - Filter	242,000	Tons					$ 3.23	$ 782,749	
	7.025	*Load at stockpile and haul to fill location, 0.5 mile haul*	*49,112*	*LCY*	*$ 0.83*	*$ 2.65*	*$ -*	*$ -*	*$ 3.47*	*$ 170,576*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0251	*Direct hauling from quarry*	*114,594*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.026	*Spread and compact*	*163,706*	*LCY*	*$ 1.48*	*$ 2.26*	*$ -*	*$ -*	*$ 3.74*	*$ 612,173*	*Include 15% swell factor*
	7.027	Load, Haul and Place - Zone 2A - Drain	297,000	Tons					$ 3.22	$ 955,339	
	7.028	*Load at stockpile and haul to fill location, 0.5 mile haul*	*60,274*	*LCY*	*$ 0.82*	*$ 2.62*	*$ -*	*$ -*	*$ 3.44*	*$ 207,128*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0281	*Direct hauling from quarry*	*140,638*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.029	*Spread and compact*	*200,912*	*LCY*	*$ 1.47*	*$ 2.26*	*$ -*	*$ -*	*$ 3.72*	*$ 748,211*	*Include 15% swell factor*
	7.030	Load, Haul and Place - Zone 2A - Transition	42,900	Tons					$ 3.39	$ 145,383	
	7.031	*Load at stockpile and haul to fill location, 0.5 mile haul*	*8,706*	*LCY*	*$ 1.00*	*$ 3.20*	*$ -*	*$ -*	*$ 4.20*	*$ 36,552*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0311	*Direct hauling from quarry*	*20,314*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.032	*Spread and compact*	*29,021*	*LCY*	*$ 1.48*	*$ 2.27*	*$ -*	*$ -*	*$ 3.75*	*$ 108,831*	*Include 15% swell factor*
	7.033	Load, Haul and Place - Zone 2B - Filter	148,500	Tons					$ 3.45	$ 512,200	
	7.034	*Load at stockpile and haul to fill location, 0.5 mile haul*	*30,137*	*LCY*	*$ 1.12*	*$ 3.24*	*$ -*	*$ -*	*$ 4.36*	*$ 131,292*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0341	*Direct hauling from quarry*	*70,319*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.035	*Spread and compact*	*100,456*	*LCY*	*$ 1.50*	*$ 2.30*	*$ -*	*$ -*	*$ 3.79*	*$ 380,907*	*Include 15% swell factor*
	7.036	Load, Haul and Place - Zone 2B - Transition	159,500	Tons					$ 3.25	$ 517,771	
	7.037	*Load at stockpile and haul to fill location, 0.5 mile haul*	*32,369*	*LCY*	*$ 0.81*	*$ 2.58*	*$ -*	*$ -*	*$ 3.39*	*$ 109,656*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0371	*Direct hauling from quarry*	*75,528*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.038	*Spread and compact*	*107,897*	*LCY*	*$ 1.49*	*$ 2.29*	*$ -*	*$ -*	*$ 3.78*	*$ 408,115*	*Include 15% swell factor*
	7.039	Furnish and Install Zone 3 - Rockfill	1,050,000	ECY					$ 26.75	$ 28,087,300	
	7.040	*Blasting operations*	*1,260,000*	*LCY*	*$ 4.26*	*$ 5.69*	*$ 4.85*	*$ -*	*$ 14.80*	*$ 18,644,023*	*Include 20% swell factor*
	7.041	*Load and haul to processing area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling required, material to be hauled to fill location directly*
	7.042	*Crush and screen material*	*1,260,000*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
	7.043	*Load and haul to zone-3, 1 mile haul*	*1,260,000*	*LCY*	*$ 0.88*	*$ 2.93*	*$ -*	*$ -*	*$ 3.81*	*$ 4,804,369*	*No stockpiling required, direct haul*
	7.044	*Spread and compact*	*1,260,000*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.68*	*$ 4,638,908*	
	7.045	Furnish and Install Zone 4 - Random	660,000	ECY					$ 10.82	$ 7,142,033	
	7.046	*Excavations in common soil*	*358,800*	*LCY*	*$ 1.42*	*$ 2.22*	*$ -*	*$ -*	*$ 3.64*	*$ 1,306,259*	*No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor*
	7.047	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*

22. Cost Work Sheet Summary: Sites Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.048	Direct hauling from quarry excavation, 1 mile haul	358,800	LCY	$ 1.26	$ 3.50	$ -	$ -	$ 4.75	$ 1,705,327	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	400,200	LCY	$ 0.79	$ 2.53	$ -	$ -	$ 3.32	$ 1,328,057	Include 15% swell factor
	7.050	Spread and compact	759,000	LCY	$ 1.46	$ 2.24	$ -	$ -	$ 3.69	$ 2,802,390	
	7.051	Furnish and Install Riprap	40,000	ECY					$ 40.13	$ 1,605,141	
	7.052	Blasting operations	48,000	LCY	$ 4.31	$ 5.76	$ 4.85	$ -	$ 14.92	$ 716,217	Include 20% swell factor
	7.053	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	48,000	LCY	$ 0.79	$ 2.51	$ -	$ -	$ 3.30	$ 158,392	
	7.056	Riprap placement	48,000	LCY	$ 6.05	$ 9.17	$ -	$ -	$ 15.22	$ 730,532	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 2,300,000.00	$ 2,300,000.00	$ 2,300,000	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	870	CY					$ 100.72	$ 87,627	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	1,001	LCY	$ 13.33	$ 14.34	$ 37.73	$ -	$ 65.41	$ 65,446	Include 15% swell factor
	8.007	Place and compact	1,001	LCY	$ 7.23	$ 14.94	$ -	$ -	$ 22.17	$ 22,181	
	8.008	Developing haul routes - Haul routes inside reservoir	22	ACRES					$ 26,990.65	$ 593,794	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	958,320	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 183,137	
	8.0091	Load and haul earth fill	17,747	CY	$ 1.69	$ 4.62	$ -	$ -	$ 6.32	$ 112,130	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	958,320	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 298,528	
	8.011	Developing haul routes - Haul routes outside reservoir	15	ACRES					$ 27,785.55	$ 416,783	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	653,400	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 130,812	
	8.0121	Load and haul earth fill	12,100	CY	$ 1.79	$ 4.88	$ -	$ -	$ 6.67	$ 80,733	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	653,400	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.31	$ 205,238	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	2,700	CY	$ 94.53	$ 50.30	$ 233.06	$ -	$ 377.89	$ 1,020,296	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.02	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 575,000.00	$ 575,000.00	$ 575,000	Allowance
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included within Golden Gate Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	Excavate trench in bedrock	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.011	Load and haul material to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.012	48" steel pipe placement	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.013	Concrete backfill for pipe trench (dam footprint)	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.014	Reinforcement for concrete backfill	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.017	Install 48"x48" debris rack on conc. Manhole	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.018	Grout pipe	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.019	Field Survey	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.022	Excavate	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.025	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
10		**Sites Dam Diversion Facilities**									
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	Earth fill coffer dam; included within zone 4 fill work
	10.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required; Earth fill coffer dam
	10.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.004	Load and haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	10.006	Import material to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.007	Load at stockpile and haul to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.009	Upstream Portal Excavation and Rock Bolts	15,800	CY					$ 44.61	$ 704,890	

22. Cost Work Sheet Summary: Sites Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	10.010	Excavate and load material	17,380	LCY	$ 1.39	$ 2.42	$ -	$ -	$ 3.81	$ 66,147	Assumed excavating material is either common earth, loam, sand, clay or loose material.
	10.011	Haul to disposal site, 0.5 mile haul	17,380	LCY	$ 1.82	$ 4.37	$ -	$ -	$ 6.19	$ 107,615	
	10.012	Shotcrete portal face	948	CY	$ 86.92	$ 41.04	$ 221.97	$ -	$ 349.92	$ 331,727	
	10.013	Steel fiber for shotcrete	17	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 41,114	Allow 35lbs/CY of concrete
	10.014	20 ft rock bolts, 5 ft on center - Drilling	790	EA	$ 50.73	$ 20.73	$ -	$ -	$ 71.46	$ 56,451	
	10.015	3.5" diam grouted hole with #10 bar	36	CY	$ 263.49	$ 78.40	$ 2,522.70	$ -	$ 2,864.58	$ 101,836	
	10.016	Upstream Portal Backfill	24,500	CY					$ 10.54	$ 258,283	
	10.017	Load at stockpile and haul to fill location, 0.5 mile haul	26,950	LCY	$ 0.99	$ 4.34	$ -	$ -	$ 5.33	$ 143,587	
	10.018	Spread and compact	26,950	LCY	$ 2.11	$ 2.15	$ -	$ -	$ 4.26	$ 114,697	
	10.019	Inlet and Valve Structures	2,200	CY					$ 1,092.50	$ 2,403,500	
	10.020	Pour inlet and valve structures	2,200	CY	$ -	$ -	$ -	$ 1,092.50	$ 1,092.50	$ 2,403,500	
	10.021	Downstream Portal Excavation and Rock Bolts	12,500	CY					$ 45.40	$ 567,445	
	10.022	Excavate and load material	13,750	LCY	$ 1.48	$ 2.59	$ -	$ -	$ 4.07	$ 55,971	
	10.023	Haul to disposal site, 0.5 mile haul	13,750	LCY	$ 1.95	$ 4.56	$ -	$ -	$ 6.51	$ 89,497	
	10.024	Shotcrete portal face	750	CY	$ 87.89	$ 41.50	$ 221.97	$ -	$ 351.36	$ 263,517	
	10.025	Steel fiber for shotcrete	13	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 32,527	Allow 35lbs/CY of concrete
	10.026	20 ft rock bolts, 5 ft on center - Drilling	625	EA	$ 52.10	$ 21.29	$ -	$ -	$ 73.39	$ 45,867	
	10.027	3.5" diam grouted hole with #10 bar	28	CY	$ 249.79	$ 74.32	$ 2,522.70	$ -	$ 2,846.81	$ 80,066	
	10.028	Downstream Portal Backfill	34,400	CY					$ 10.22	$ 351,620	
	10.029	Load at stockpile and haul to fill location, 0.5 mile haul	37,840	BCY	$ 0.92	$ 4.04	$ -	$ -	$ 4.96	$ 187,767	
	10.030	Spread and compact	37,840	LCY	$ 2.14	$ 2.19	$ -	$ -	$ 4.33	$ 163,852	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	1,590	LF	$ -	$ -	$ -	$ 7,304.42	$ 7,304.42	$ 11,614,023	Second shift work will apply
	10.032	Tunnel Concrete Lining	1,590	LF	$ -	$ -	$ -	$ 7,205.71	$ 7,205.71	$ 11,457,076	Second shift work will apply
	10.033	10-Ft Steel Pipe Liner	1,590	LF	$ -	$ -	$ -	$ 8,094.08	$ 8,094.08	$ 12,869,593	Second shift work will apply
	10.034	Mechanical, Valves, Trash rack, and Metals	1	LS	$ -	$ -	$ -	$ 9,775,000	$ 9,775,000	$ 9,775,000	Allowance
	10.035	Riprap Discharge Channel	75	CY					$ 458.82	$ 34,412	
	10.036	Blasting operations	90	LCY	$ 59.57	$ 64.41	$ 4.85	$ -	$ 128.83	$ 11,594	
	10.037	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	90	LCY	$ 22.81	$ 68.17	$ -	$ -	$ 90.98	$ 8,188	
	10.038	Crush and screen material			$ -	$ -	$ -	$ -			
	10.039	Load and haul to stockpile, 1 mile haul	90	LCY	$ 13.36	$ 58.58	$ -	$ -	$ 71.95	$ 6,475	
	10.040	Place at the channel	90	LCY	$ 35.55	$ 55.05	$ -	$ -	$ 90.60	$ 8,154	
11		**ERS Facility**									Included within Saddle Dam 3 estimate
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.003	Haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.006	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.007	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	Haul excavated material and stockpile, 1 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 1 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		Misc allowance for small items, allow 1%	1.0%	%				174,495,345	$ 174,495,345	$ 1,744,953	
		Total Direct Cost	27	Acre	$ 1,329,916.30	$ 2,126,882.90	$ 1,104,228.55	$ 1,966,390.73	$ 6,527,418.48	$ 176,240,299	

Sites Reservoir (Alt 1): Saddle Dam 3 | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

23. Construction Cost Summary: Saddle Dam 3

				Total Cost
Total Direct Cost				149,262,469
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				149,262,469
General Conditions				
Mobilization			5.0%	7,463,123
Site General Conditions & Requirements			10.0%	15,672,559
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	1,896,380
Bonds			0.6%	1,045,767
GC Home Office Overhead			6.0%	10,520,418
GC Profit			8.0%	14,868,857
Total Contractor Indirect Markups				51,467,104
TOTAL DIRECT COST BEFORE CONTINGENCIES				**200,729,573**
Contingencies				
Design Contingencies			10.0%	20,072,957
Construction Contingencies			15.0%	33,120,380
Total Contingency Allowance				53,193,337
TOTAL DIRECT COST BEFORE ESCALATION				**253,922,910**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2,479,642
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**256,402,552**

23. Cost Work Sheet Summary: Saddle Dam 3

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	63	ACRE	$ 3,076.78	$ 5,369.90	$ -	$ -	$ 8,446.68	$ 532,141	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	63	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 236,912	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	319,000	Tons					$ 37.01	$ 11,806,791	
	2.002	*Purchase processed material from quarry*	*319,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 7,080,684*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*215,794*	*LCY*	*$ 10.46*	*$ 11.44*	*$ -*	*$ -*	*$ 21.90*	*$ 4,726,108*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	319,000	Tons					$ 37.01	$ 11,806,791	
	2.005	*Purchase processed material from quarry*	*319,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 7,080,684*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*215,794*	*LCY*	*$ 10.46*	*$ 11.44*	*$ -*	*$ -*	*$ 21.90*	*$ 4,726,108*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	92,400	Tons					$ 37.12	$ 3,430,171	
	2.008	*Purchase processed material from quarry*	*92,400*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,050,957*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*62,506*	*LCY*	*$ 10.54*	*$ 11.52*	*$ -*	*$ -*	*$ 22.07*	*$ 1,379,214*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Haul material from quarry to site stockpile/fill location, 40 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.015	*Haul material from quarry to site stockpile/fill location, 40 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	106,000	BCY					$ 8.13	$ 861,309	
	3.002	*Excavations - remove top soil layer*	*116,600*	*LCY*	*$ 1.44*	*$ 2.24*	*$ -*	*$ -*	*$ 3.68*	*$ 429,063*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*116,600*	*LCY*	*$ 1.03*	*$ 2.67*	*$ -*	*$ -*	*$ 3.71*	*$ 432,246*	
	3.004	Dam Foundation Excavation - Common	81,000	BCY					$ 8.19	$ 662,988	
	3.005	*Excavations - remove top soil layer*	*89,100*	*LCY*	*$ 1.56*	*$ 2.21*	*$ -*	*$ -*	*$ 3.77*	*$ 336,168*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*89,100*	*LCY*	*$ 1.02*	*$ 2.65*	*$ -*	*$ -*	*$ 3.67*	*$ 326,820*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	565,000	BCY					$ 11.33	$ 6,400,291	
	3.008	*Rock excavations, no blasting*	*649,750*	*LCY*	*$ 2.51*	*$ 3.68*	*$ -*	*$ -*	*$ 6.18*	*$ 4,017,666*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*649,750*	*LCY*	*$ 1.02*	*$ 2.65*	*$ -*	*$ -*	*$ 3.67*	*$ 2,382,625*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	-	BCY					$ -	$ -	
	3.011	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 20% swell factor*
	3.012	*Excavate, load and haul to stockpile, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	48,000	SY					$ 19.26	$ 924,595	
	4.002	*Initial foundation core cleanup*	*48,000*	*SY*	*$ 11.52*	*$ 5.54*	*$ -*	*$ -*	*$ 17.06*	*$ 818,861*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*13,200*	*CY*	*$ 2.69*	*$ 5.32*	*$ -*	*$ -*	*$ 8.01*	*$ 105,735*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	48,000	SY					$ 17.06	$ 818,861	
	4.005	*Final foundation core cleanup*	*48,000*	*SY*	*$ 11.52*	*$ 5.54*	*$ -*	*$ -*	*$ 17.06*	*$ 818,861*	
	4.006	*Load and haul to disposal area, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	2,300	CY					$ 121.68	$ 279,860	
	4.008	*Dental excavations*	*2,530*	*LCY*	*$ 68.46*	*$ 30.97*	*$ -*	*$ -*	*$ 99.43*	*$ 251,557*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*2,530*	*LCY*	*$ 4.11*	*$ 7.08*	*$ -*	*$ -*	*$ 11.19*	*$ 28,303*	
	4.010	Dental Concrete	2,300	CY	$ 44.74	$ 20.32	$ 183.12	$ -	$ 248.18	$ 570,819	
	4.011	Grout Cap with Anchors	7,600	CY	$ 78.94	$ 22.84	$ 519.68	$ 5.30	$ 626.76	$ 4,763,347	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	36,700	LF					$ 91.78	$ 3,368,338	
	4.013	*Drill setup for all holes*	*489*	*ea.*	*$ 194.61*	*$ 325.66*	*$ -*	*$ -*	*$ 520.26*	*$ 254,582*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*36,700*	*lft*	*$ 10.35*	*$ 11.16*	*$ -*	*$ -*	*$ 21.51*	*$ 789,320*	
	4.015	*Redrill grout holes*	*3,670*	*lft*	*$ 11.37*	*$ 12.26*	*$ -*	*$ -*	*$ 23.63*	*$ 86,739*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*1,835*	*ea.*	*$ 91.56*	*$ -*	*$ -*	*$ -*	*$ 91.56*	*$ 168,009*	
	4.017	*Inject portland cement grout*	*2,447*	*hr*	*$ 485.39*	*$ 100.05*	*$ -*	*$ -*	*$ 585.45*	*$ 1,432,392*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*1,835*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 637,296*	
	4.019	Consolidation Grouting	-	LF					$ -	$ -	Not required
	4.020	*Drill setup for all holes*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.021	*Drill curtain grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Redrill grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Hookup to grout holes and grout nipples*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	*Inject portland cement grout*	*-*	*hr*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.025	*Perform hydraulic conductivity tests*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	Type III Cement	1,300	Tons	$ 177.65	$ 73.38	$ 113.14	$ -	$ 364.16	$ 473,414	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	172,000	SY					$ 4.79	$ 824,002	
	5.002	*Initial dam shell cleanup*	*172,000*	*SY*	*$ 1.32*	*$ 0.40*	*$ -*	*$ -*	*$ 1.72*	*$ 295,679*	

23. Cost Work Sheet Summary: Saddle Dam 3

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	5.003	Load and haul to disposal area, 0.5 mile haul	47,300	LCY	$ 4.11	$ 7.06	$ -	$ -	$ 11.17	$ 528,322	Assume removal of top layer, 0.75' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	1,000	LF	$ 45.53	$ 28.26	$ 35.56	$ -	$ 109.34	$ 109,342	
	6.002	Furnish and Install Foundation Drain Manholes	3	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 17,275	
	6.003	Seepage Partition Walls	600	CY	$ 524.39	$ 116.74	$ 465.37	$ -	$ 1,106.49	$ 663,897	3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	431,000	BCY					$ 7.55	$ 3,254,962	Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	474,100	LCY	$ 0.98	$ 2.70	$ -	$ -	$ 3.69	$ 1,748,734	Include 10% swell factor
	7.004	Load and haul to site stockpile, 0.25 mile haul	474,100	LCY	$ 0.85	$ 2.33	$ -	$ -	$ 3.18	$ 1,506,228	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	304,000	BCY					$ 9.04	$ 2,749,110	
	7.006	Embankment excavations	334,400	LCY	$ 1.44	$ 3.03	$ -	$ -	$ 4.47	$ 1,494,542	Include 10% swell factor
	7.007	Load and haul to site stockpile, 0.25 mile haul	334,400	LCY	$ 1.04	$ 2.71	$ -	$ -	$ 3.75	$ 1,254,568	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	195,000	BCY					$ 9.12	$ 1,778,836	
	7.009	Embankment excavations	214,500	LCY	$ 1.45	$ 3.06	$ -	$ -	$ 4.51	$ 967,057	Include 10% swell factor
	7.010	Load and haul to site stockpile, 0.25 mile haul	214,500	LCY	$ 1.05	$ 2.73	$ -	$ -	$ 3.78	$ 811,779	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	Not required
	7.012	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	232,500	ECY					$ 6.22	$ 1,446,089	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	Load and haul to site stockpile, 0.25 mile haul	255,750	LCY	$ 1.16	$ 2.43	$ -	$ -	$ 3.59	$ 917,515	
	7.016	Spread and compact	255,750	LCY	$ 1.14	$ 0.93	$ -	$ -	$ 2.07	$ 528,574	
	7.017	Topsoil Replacement	106,000	ECY					$ 9.81	$ 1,039,643	Backfill burrow area using material from stockpile
	7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	116,600	LCY	$ 1.75	$ 5.04	$ -	$ -	$ 6.79	$ 791,874	
	7.019	Spread and compact	116,600	LCY	$ 1.17	$ 0.95	$ -	$ -	$ 2.12	$ 247,769	
	7.020	Furnish and Install Zone 1 - Core	900,000	ECY					$ 14.88	$ 13,390,275	
	7.021	Excavate from burrow area	990,000	LCY	$ 1.43	$ 3.02	$ -	$ -	$ 4.45	$ 4,408,271	Include 10% swell factor
	7.022	Load and haul to zone-1 fill location, 1.25 mile haul	990,000	LCY	$ 1.36	$ 3.99	$ -	$ -	$ 5.35	$ 5,296,145	No stockpiling required
	7.023	Spread and compact	990,000	LCY	$ 1.50	$ 2.22	$ -	$ -	$ 3.72	$ 3,685,859	
	7.024	Load, Haul and Place - Zone 2A - Filter	319,000	Tons					$ 3.20	$ 1,019,717	
	7.025	Load at stockpile and haul to fill location, 0.5 mile haul	64,738	LCY	$ 0.81	$ 2.55	$ -	$ -	$ 3.35	$ 217,091	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	Direct hauling from quarry	151,056	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	Spread and compact	215,794	LCY	$ 1.47	$ 2.25	$ -	$ -	$ 3.72	$ 802,626	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	319,000	Tons					$ 3.20	$ 1,019,717	
	7.028	Load at stockpile and haul to fill location, 0.5 mile haul	64,738	LCY	$ 0.81	$ 2.55	$ -	$ -	$ 3.35	$ 217,091	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	Direct hauling from quarry	151,056	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	Spread and compact	215,794	LCY	$ 1.47	$ 2.25	$ -	$ -	$ 3.72	$ 802,626	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	92,400	Tons					$ 3.29	$ 303,629	
	7.031	Load at stockpile and haul to fill location, 0.5 mile haul	18,752	LCY	$ 0.93	$ 2.93	$ -	$ -	$ 3.86	$ 72,364	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	Direct hauling from quarry	43,754	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	Spread and compact	62,506	LCY	$ 1.46	$ 2.24	$ -	$ -	$ 3.70	$ 231,265	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	7.034	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0341	Direct hauling from quarry	-	LCY						Elsewhere	
	7.035	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	7.037	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0371	Direct hauling from quarry	-	LCY						Elsewhere	
	7.038	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.039	Furnish and Install Zone 3 - Rockfill	610,000	ECY					$ 27.50	$ 16,774,034	
	7.040	Blasting operations	732,000	LCY	$ 4.26	$ 5.70	$ 4.85	$ -	$ 14.80	$ 10,837,259	Include 20% swell factor
	7.041	Excavate, load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	Crush and screen material	732,000	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	Load and haul to zone-3, 1.5 mile haul	732,000	LCY	$ 1.08	$ 3.35	$ -	$ -	$ 4.43	$ 3,243,216	No stockpiling required, direct haul
	7.044	Spread and compact	732,000	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 2,693,559	
	7.045	Furnish and Install Zone 4 - Random	1,663,000	ECY					$ 12.97	$ 21,576,334	
	7.046	Excavations in common soil	1,475,450	LCY	$ 1.42	$ 2.20	$ -	$ -	$ 3.62	$ 5,339,453	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	1,475,450	LCY	$ 1.39	$ 3.87	$ -	$ -	$ 5.26	$ 7,754,882	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	437,000	LCY	$ 0.79	$ 2.49	$ -	$ -	$ 3.28	$ 1,435,213	Include 15% swell factor
	7.050	Spread and compact	1,912,450	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 7,046,786	
	7.051	Furnish and Install Riprap	130,000	ECY					$ 39.90	$ 5,186,819	
	7.052	Blasting operations	156,000	LCY	$ 4.27	$ 5.71	$ 4.85	$ -	$ 14.84	$ 2,314,277	Include 20% swell factor

23. Cost Work Sheet Summary: Saddle Dam 3

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.053	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	156,000	LCY	$ 0.80	$ 2.52	$ -	$ -	$ 3.32	$ 518,607	
	7.056	Riprap placement	156,000	LCY	$ 6.00	$ 9.09	$ -	$ -	$ 15.09	$ 2,353,936	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 402,500.00	$ 402,500.00	$ 402,500	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	3,800	CY					$ 86.41	$ 328,368	
	8.006	Purchase and import gravel to fill location and stockpile, 35 mi haul	4,370	LCY	$ 10.69	$ 11.49	$ 37.73	$ -	$ 59.91	$ 261,824	Include 15% swell factor
	8.007	Place and compact	4,370	LCY	$ 4.96	$ 10.26	$ -	$ -	$ 15.23	$ 66,543	
	8.008	Developing haul routes - Haul routes inside reservoir	51	ACRES					$ 26,932.75	$ 1,373,570	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	2,221,560	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 418,599	
	8.0091	Load and haul earth fill, 0.5 mile haul	41,140	CY	$ 1.72	$ 4.71	$ -	$ -	$ 6.43	$ 264,626	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	2,221,560	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 690,345	
	8.011	Developing haul routes - Haul routes outside reservoir	12	ACRES					$ 27,947.01	$ 335,364	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	522,720	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 104,650	
	8.0121	Load and haul earth fill, 0.5 mile haul	9,680	CY	$ 1.74	$ 4.75	$ -	$ -	$ 6.49	$ 62,793	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	522,720	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.32	$ 167,922	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	6,400	CY	$ 94.71	$ 50.40	$ 233.06	$ -	$ 378.17	$ 2,420,290	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.02	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 287,500.00	$ 287,500.00	$ 287,500	
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included within the Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	Excavate trench in bedrock	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.011	Load and haul material to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.012	48" steel pipe placement	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.013	Concrete backfill for pipe trench (dam footprint)	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.014	Reinforcement for concrete backfill	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.017	Install 48"x48" debris rack on conc. Manhole	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.018	Grout pipe	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.019	Field Survey	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.022	Excavate	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.025	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
10		**Sites Dam Diversion Facilities**									Included within the Sites Dam Estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	10.006	Import material to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.011	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.012	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.013	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	

23. Cost Work Sheet Summary: Saddle Dam 3

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	10.014	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	10.015	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.018	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.023	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.024	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.025	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	10.026	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	10.027	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	Load at stockpile and haul to fill location, 0.5 mile haul	-	BCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.030	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.037	Excavate, load and haul to stockpile/processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.038	Crush and screen material			$ -	$ -	$ -	$ -			
	10.039	Load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.040	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
11		**ERS Facility**									
	11.001	Upstream Portal Excavation and Rock Bolts	27,500	CY					$ 17.50	$ 481,348	
	11.002	Excavate and load material	30,250	LCY	$ 1.41	$ 2.46	$ -	$ -	$ 3.87	$ 117,029	Assumed excavating material is either common earth, loam, sand, clay or loose material.
	11.003	Haul to disposal site, 0.5 mile haul	30,250	LCY	$ 1.48	$ 3.60	$ -	$ -	$ 5.08	$ 153,543	
	11.004	Shotcrete portal face	369	CY	$ 89.22	$ 42.12	$ 221.97	$ -	$ 353.30	$ 130,525	
	11.005	Steel fiber for shotcrete	6	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 13,734	
	11.006	20 ft rock bolts, 8 ft on center - Drilling	312	EA	$ 56.25	$ 22.98	$ -	$ -	$ 79.23	$ 24,698	
	11.007	3.5" diam grouted hole with #8 bar	14	CY	$ 330.57	$ 98.36	$ 2,522.70	$ -	$ 2,951.62	$ 41,819	
	11.008	Upstream Portal Backfill	24,800	CY					$ 9.74	$ 241,655	
	11.009	Load and haul material from stockpile, 0.5 mi assumed	27,280	LCY	$ 0.83	$ 3.63	$ -	$ -	$ 4.45	$ 121,496	
	11.010	Backfill: Compact and grade	27,280	LCY	$ 2.18	$ 2.23	$ -	$ -	$ 4.40	$ 120,158	
	11.011	Inlet and Valve Structures	2,250	CY					$ 1,092.50	$ 2,458,125	
	11.012	Pour inlet and valve structures	2,250	CY	$ -	$ -	$ -	$ 1,092.50	$ 1,092.50	$ 2,458,125	
	11.013	Downstream Portal Excavation and Rock Bolts	35,100	CY					$ 19.13	$ 671,638	
	11.014	Excavate and load material	38,610	LCY	$ 1.39	$ 2.43	$ -	$ -	$ 3.82	$ 147,559	
	11.015	Haul to disposal site, 1 mile haul	38,610	LCY	$ 1.46	$ 3.56	$ -	$ -	$ 5.01	$ 193,598	
	11.016	Shotcrete portal face	589	CY	$ 83.88	$ 39.60	$ 221.97	$ -	$ 345.44	$ 203,619	
	11.017	Steel fiber for shotcrete	9	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 21,912	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	497	EA	$ 55.40	$ 22.63	$ -	$ -	$ 78.04	$ 38,810	
	11.019	3.5" diam grouted hole with #8 bar	23	CY	$ 310.78	$ 92.47	$ 2,522.70	$ -	$ 2,925.95	$ 66,141	
	11.020	Downstream Portal Backfill	37,900	CY					$ 9.71	$ 368,005	
	11.021	Haul excavated material and stockpile, 1 mi assumed	41,690	LCY	$ 0.84	$ 3.67	$ -	$ -	$ 4.50	$ 187,767	
	11.022	Backfill: Compact and grade	41,690	LCY	$ 2.14	$ 2.18	$ -	$ -	$ 4.32	$ 180,238	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	828	LF	$ -	$ -	$ -	$ 7,304.42	$ 7,304.42	$ 6,048,057	Second shift work will apply
	11.024	Tunnel Concrete Lining	828	LF	$ -	$ -	$ -	$ 7,205.71	$ 7,205.71	$ 5,966,327	Second shift work will apply
	11.025	10-Ft Steel Pipe Cut and Cover Section	388	LF	$ -	$ -	$ -	$ 8,094.08	$ 8,094.08	$ 3,140,504	Second shift work will apply
	11.026	Mechanical, Valves, Trash rack, and Metals	1	LS	$ -	$ -	$ -	$ 4,887,500	$ 4,887,500	$ 4,887,500	Allowance
	11.027	Riprap Discharge Channel	5,000	CY					$ 56.71	$ 283,563	
	11.028	Blasting operations	6,000	LCY	$ 5.11	$ 6.83	$ 4.85	$ -	$ 16.79	$ 100,719	
	11.029	Excavate, load and haul to stockpile/processing area, 1 mile haul	6,000	LCY	$ 2.49	$ 7.24	$ -	$ -	$ 9.73	$ 58,392	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 0.5 mile haul	6,000	LCY	$ 1.03	$ 4.50	$ -	$ -	$ 5.52	$ 33,135	
	11.032	Place at the channel	6,000	LCY	$ 6.05	$ 9.17	$ -	$ -	$ 15.22	$ 91,316	
12		Misc allowance for small items, allow 1%	1.0%	%				147,784,623	$ 147,784,623	$ 1,477,846	
		Total Direct Cost	63	Acre	$ 591,864.11	$ 936,596.00	$ 434,708.99	$ 406,076.45	$ 2,369,245.54	$ 149,262,469	

Sites Reservoir (Alt 1): Saddle Dam 5 | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

24. Construction Cost Summary: Saddle Dam 5

				Total Cost
Total Direct Cost				71,826,106
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				71,826,106
General Conditions				
Mobilization			5.0%	3,591,305
Site General Conditions & Requirements			10.0%	7,541,741
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	912,551
Bonds			0.6%	503,230
GC Home Office Overhead			6.0%	5,062,496
GC Profit			8.0%	7,154,994
Total Contractor Indirect Markups				24,766,317
TOTAL DIRECT COST BEFORE CONTINGENCIES				**96,592,423**
Contingencies				
Design Contingencies			10.0%	9,659,242
Construction Contingencies			15.0%	15,937,750
Total Contingency Allowance				25,596,992
TOTAL DIRECT COST BEFORE ESCALATION				**122,189,415**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	1,193,221
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**123,382,636**

24. Cost Work Sheet Summary: Saddle Dam 5

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	42	ACRE	$ 3,164.68	$ 5,523.33	$ -	$ -	$ 8,688.01	$ 364,896	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	42	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 157,941	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	121,000	Tons					$ 37.09	$ 4,487,950	
	2.002	*Purchase processed material from quarry*	*121,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,685,777*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*81,853*	*LCY*	*$ 10.52*	*$ 11.50*	*$ -*	*$ -*	*$ 22.02*	*$ 1,802,173*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	126,500	Tons					$ 37.02	$ 4,683,589	
	2.005	*Purchase processed material from quarry*	*126,500*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,807,857*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*85,574*	*LCY*	*$ 10.47*	*$ 11.45*	*$ -*	*$ -*	*$ 21.92*	*$ 1,875,731*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	36,300	Tons					$ 37.39	$ 1,357,419	
	2.008	*Purchase processed material from quarry*	*36,300*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 805,733*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*24,556*	*LCY*	*$ 10.73*	*$ 11.73*	*$ -*	*$ -*	*$ 22.47*	*$ 551,686*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Haul material from quarry to site stockpile/fill location, 40 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.015	*Haul material from quarry to site stockpile/fill location, 40 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	58,000	BCY					$ 8.65	$ 501,933	
	3.002	*Excavations - remove top soil layer*	*63,800*	*LCY*	*$ 1.46*	*$ 2.27*	*$ -*	*$ -*	*$ 3.74*	*$ 238,368*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*63,800*	*LCY*	*$ 1.15*	*$ 2.98*	*$ -*	*$ -*	*$ 4.13*	*$ 263,565*	
	3.004	Dam Foundation Excavation - Common	24,000	BCY					$ 9.36	$ 224,729	
	3.005	*Excavations - remove top soil layer*	*26,400*	*LCY*	*$ 1.70*	*$ 2.42*	*$ -*	*$ -*	*$ 4.12*	*$ 108,760*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*26,400*	*LCY*	*$ 1.22*	*$ 3.17*	*$ -*	*$ -*	*$ 4.39*	*$ 115,968*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	256,000	BCY					$ 11.77	$ 3,013,095	
	3.008	*Rock excavations, no blasting*	*294,400*	*LCY*	*$ 2.52*	*$ 3.70*	*$ -*	*$ -*	*$ 6.22*	*$ 1,832,324*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*294,400*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 1,180,770*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	-	BCY					$ -	$ -	
	3.011	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	23,000	SY					$ 19.61	$ 451,092	
	4.002	*Initial foundation core cleanup*	*23,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 395,115*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*6,325*	*CY*	*$ 2.97*	*$ 5.88*	*$ -*	*$ -*	*$ 8.85*	*$ 55,977*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	23,000	SY					$ 17.18	$ 395,115	
	4.005	*Final foundation core cleanup*	*23,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 395,115*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	1,300	CY					$ 123.15	$ 160,094	
	4.008	*Dental excavations*	*1,430*	*LCY*	*$ 68.00*	*$ 30.76*	*$ -*	*$ -*	*$ 98.76*	*$ 141,225*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*1,430*	*LCY*	*$ 4.85*	*$ 8.35*	*$ -*	*$ -*	*$ 13.19*	*$ 18,869*	
	4.010	Dental Concrete	1,300	CY	$ 44.14	$ 20.05	$ 183.12	$ -	$ 247.32	$ 321,511	
	4.011	Grout Cap with Anchors	4,200	CY	$ 78.98	$ 22.86	$ 519.68	$ 9.58	$ 631.10	$ 2,650,622	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	14,600	LF					$ 79.65	$ 1,162,939	
	4.013	*Drill setup for all holes*	*195*	*ea.*	*$ 192.18*	*$ 321.59*	*$ -*	*$ -*	*$ 513.77*	*$ 100,015*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*14,600*	*lft*	*$ 10.58*	*$ 11.40*	*$ -*	*$ -*	*$ 21.98*	*$ 320,932*	
	4.015	*Redrill grout holes*	*1,460*	*lft*	*$ 11.44*	*$ 12.33*	*$ -*	*$ -*	*$ 23.76*	*$ 34,695*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*730*	*ea.*	*$ 93.58*	*$ -*	*$ -*	*$ -*	*$ 93.58*	*$ 68,311*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*973*	*hr*	*$ 486.71*	*$ 100.33*	*$ -*	*$ -*	*$ 587.03*	*$ 571,377*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*195*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 67,608*	
	4.019	Consolidation Grouting	-	LF					$ -	$ -	Not required
	4.020	*Drill setup for all holes*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.021	*Drill curtain grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Redrill grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Hookup to grout holes and grout nipples*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	*Inject portland cement grout*	*-*	*hr*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.025	*Perform hydraulic conductivity tests*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	Type III Cement	520	Tons	$ 177.07	$ 73.14	$ 113.14	$ -	$ 363.34	$ 188,939	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	73,000	SY					$ 4.87	$ 355,784	
	5.002	*Initial dam shell cleanup*	*73,000*	*SY*	*$ 1.36*	*$ 0.41*	*$ -*	*$ -*	*$ 1.77*	*$ 129,360*	
	5.003	*Load and haul to disposal area, 0.5 mile haul*	*20,075*	*LCY*	*$ 4.15*	*$ 7.13*	*$ -*	*$ -*	*$ 11.28*	*$ 226,424*	*Assume removal of top layer, 0.75' thick*

24. Cost Work Sheet Summary: Saddle Dam 5

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	300	LF	$ 50.59	$ 31.40	$ 35.56	$ -	$ 117.54	$ 35,262	
	6.002	Furnish and Install Foundation Drain Manholes	2	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 11,516	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	180,000	BCY					$ 7.48	$ 1,346,881	Assumed common earth, 3000' haul w/ scraper
	7.003	*Embankment excavations*	*198,000*	*LCY*	*$ 0.98*	*$ 2.68*	*$ -*	*$ -*	*$ 3.65*	*$ 723,614*	*Include 10% swell factor*
	7.004	*Load and haul to site stockpile, 0.25 mile haul*	*198,000*	*LCY*	*$ 0.84*	*$ 2.30*	*$ -*	*$ -*	*$ 3.15*	*$ 623,267*	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	130,000	BCY					$ 9.06	$ 1,178,190	
	7.006	*Embankment excavations*	*143,000*	*LCY*	*$ 1.44*	*$ 3.04*	*$ -*	*$ -*	*$ 4.48*	*$ 640,518*	*Include 10% swell factor*
	7.007	*Load and haul to site stockpile, 0.25 mile haul*	*143,000*	*LCY*	*$ 1.05*	*$ 2.71*	*$ -*	*$ -*	*$ 3.76*	*$ 537,672*	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	Not required
	7.009	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.010	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	Not required
	7.012	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.013	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	77,500	ECY					$ 5.96	$ 462,114	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	*Load and haul to site stockpile, 0.25 mile haul*	*85,250*	*LCY*	*$ 0.97*	*$ 2.38*	*$ -*	*$ -*	*$ 3.35*	*$ 285,922*	
	7.016	*Spread and compact*	*85,250*	*LCY*	*$ 1.14*	*$ 0.93*	*$ -*	*$ -*	*$ 2.07*	*$ 176,191*	
	7.017	Topsoil Replacement	58,000	ECY					$ 9.82	$ 569,581	Backfill burrow area using material from stockpile
	7.018	*Excavate, Load and haul excavated backfill material to fill location, 1 mile haul*	*63,800*	*LCY*	*$ 1.75*	*$ 5.02*	*$ -*	*$ -*	*$ 6.77*	*$ 431,931*	
	7.019	*Spread and compact*	*63,800*	*LCY*	*$ 1.19*	*$ 0.97*	*$ -*	*$ -*	*$ 2.16*	*$ 137,649*	
	7.020	Furnish and Install Zone 1 - Core	369,000	ECY					$ 14.93	$ 5,508,425	
	7.021	*Excavate from burrow area*	*405,900*	*LCY*	*$ 1.43*	*$ 3.02*	*$ -*	*$ -*	*$ 4.46*	*$ 1,808,521*	*Include 10% swell factor*
	7.022	*Load and haul to zone-1 fill location, 1.5 mile haul*	*405,900*	*LCY*	*$ 1.36*	*$ 4.01*	*$ -*	*$ -*	*$ 5.37*	*$ 2,181,610*	*No stockpiling required*
	7.023	*Spread and compact*	*405,900*	*LCY*	*$ 1.51*	*$ 2.23*	*$ -*	*$ -*	*$ 3.74*	*$ 1,518,294*	
	7.024	Load, Haul and Place - Zone 2A - Filter	121,000	Tons					$ 3.29	$ 398,176	
	7.025	*Load at stockpile and haul to fill location, 0.5 mile haul*	*24,556*	*LCY*	*$ 0.83*	*$ 2.65*	*$ -*	*$ -*	*$ 3.47*	*$ 85,288*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0251	*Direct hauling from quarry*	*57,297*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.026	*Spread and compact*	*81,853*	*LCY*	*$ 1.51*	*$ 2.31*	*$ -*	*$ -*	*$ 3.82*	*$ 312,888*	*Include 15% swell factor*
	7.027	Load, Haul and Place - Zone 2A - Drain	126,500	Tons					$ 3.26	$ 411,780	
	7.028	*Load at stockpile and haul to fill location, 0.5 mile haul*	*25,672*	*LCY*	*$ 0.79*	*$ 2.53*	*$ -*	*$ -*	*$ 3.32*	*$ 85,288*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0281	*Direct hauling from quarry*	*59,901*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.029	*Spread and compact*	*85,574*	*LCY*	*$ 1.51*	*$ 2.31*	*$ -*	*$ -*	*$ 3.82*	*$ 326,492*	*Include 15% swell factor*
	7.030	Load, Haul and Place - Zone 2A - Transition	36,300	Tons					$ 3.32	$ 120,593	
	7.031	*Load at stockpile and haul to fill location, 0.5 mile haul*	*7,367*	*LCY*	*$ 0.92*	*$ 2.52*	*$ -*	*$ -*	*$ 3.44*	*$ 25,366*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0311	*Direct hauling from quarry*	*17,189*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.032	*Spread and compact*	*24,556*	*LCY*	*$ 1.53*	*$ 2.35*	*$ -*	*$ -*	*$ 3.88*	*$ 95,227*	*Include 15% swell factor*
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	7.034	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.0341	*Direct hauling from quarry*	*-*	*LCY*						*Elsewhere*	
	7.035	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	7.037	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.0371	*Direct hauling from quarry*	*-*	*LCY*						*Elsewhere*	
	7.038	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.039	Furnish and Install Zone 3 - Rockfill	190,000	ECY					$ 27.41	$ 5,207,072	
	7.040	*Blasting operations*	*228,000*	*LCY*	*$ 4.27*	*$ 5.71*	*$ 4.85*	*$ -*	*$ 14.82*	*$ 3,379,649*	*Include 20% swell factor*
	7.041	*Excavate, load and haul to stockpile, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling required, material to be hauled to fill location directly*
	7.042	*Crush and screen material*	*228,000*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
	7.043	*Load and haul to zone-3, 1 mile haul*	*228,000*	*LCY*	*$ 0.98*	*$ 3.33*	*$ -*	*$ -*	*$ 4.32*	*$ 983,985*	*No stockpiling required, direct haul*
	7.044	*Spread and compact*	*228,000*	*LCY*	*$ 1.46*	*$ 2.24*	*$ -*	*$ -*	*$ 3.70*	*$ 843,438*	
	7.045	Furnish and Install Zone 4 - Random	470,000	ECY					$ 11.37	$ 5,343,582	
	7.046	*Excavations in common soil*	*305,900*	*LCY*	*$ 1.43*	*$ 2.22*	*$ -*	*$ -*	*$ 3.65*	*$ 1,115,564*	*No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor*
	7.047	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	7.048	*Direct hauling from quarry excavation, 1 mile haul*	*305,900*	*LCY*	*$ 1.26*	*$ 3.50*	*$ -*	*$ -*	*$ 4.76*	*$ 1,456,374*	*Include 15% swell factor, no stockpiling required, direct haul*
	7.049	*Load at stockpile and haul to fill location, 0.5 mile haul*	*234,600*	*LCY*	*$ 0.79*	*$ 2.50*	*$ -*	*$ -*	*$ 3.29*	*$ 771,879*	*Include 15% swell factor*
	7.050	*Spread and compact*	*540,500*	*LCY*	*$ 1.46*	*$ 2.24*	*$ -*	*$ -*	*$ 3.70*	*$ 1,999,764*	
	7.051	Furnish and Install Riprap	47,000	ECY					$ 40.25	$ 1,891,737	
	7.052	*Blasting operations*	*56,400*	*LCY*	*$ 4.35*	*$ 5.81*	*$ 4.85*	*$ -*	*$ 15.01*	*$ 846,480*	*Include 20% swell factor*
	7.053	*Load and haul to processing area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.054	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
	7.055	*Load and haul to fill location, 0.5 mile haul*	*56,400*	*LCY*	*$ 0.82*	*$ 2.60*	*$ -*	*$ -*	*$ 3.42*	*$ 192,970*	
	7.056	*Riprap placement*	*56,400*	*LCY*	*$ 6.01*	*$ 9.10*	*$ -*	*$ -*	*$ 15.11*	*$ 852,287*	
8		**Other Work**									

24. Cost Work Sheet Summary: Saddle Dam 5

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 402,500.00	$ 402,500.00	$ 402,500	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	2,100	CY					$ 90.89	$ 190,877	
	8.006	*Purchase and Import gravel to fill location and stockpile, 35 mi haul*	*2,415*	*LCY*	*$ 11.05*	*$ 11.89*	*$ 37.73*	*$ -*	*$ 60.67*	*$ 146,514*	*Include 15% swell factor*
	8.007	*Place and compact*	*2,415*	*LCY*	*$ 5.99*	*$ 12.38*	*$ -*	*$ -*	*$ 18.37*	*$ 44,362*	
	8.008	Developing haul routes - Haul routes inside reservoir	32	ACRES					$ 28,033.64	$ 897,076	Clear, grade, provide gravel fill layer and compact
	8.009	*Clear and grub*	*1,393,920*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 261,624*	
	8.0091	*Load and haul earth fill, 0.5 mile haul*	*25,813*	*CY*	*$ 2.14*	*$ 5.85*	*$ -*	*$ -*	*$ 7.99*	*$ 206,319*	*Use existing earth fill material from stockpile*
	8.010	*Grade and Compact surface for earthen road*	*1,393,920*	*SF*	*$ 0.13*	*$ 0.17*	*$ -*	*$ -*	*$ 0.31*	*$ 429,133*	
	8.011	Developing haul routes - Haul routes outside reservoir	21	ACRES					$ 28,490.25	$ 598,295	Clear, grade, provide gravel fill layer and compact
	8.012	*Clear and grub*	*914,760*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 170,056*	
	8.0121	*Load and haul earth fill, 0.5 mile haul*	*16,940*	*CY*	*$ 2.20*	*$ 6.01*	*$ -*	*$ -*	*$ 8.21*	*$ 139,041*	*Use existing earth fill material from stockpile*
	8.013	*Grade and Compact surface for earthen road*	*914,760*	*SF*	*$ 0.14*	*$ 0.18*	*$ -*	*$ -*	*$ 0.32*	*$ 289,199*	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	3,000	CY	$ 95.71	$ 50.93	$ 233.06	$ -	$ 379.70	$ 1,139,093	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	*Clay excavations from burrow area*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.02	*Load and haul from stockpile to fill location, 0.5 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	*Place clay backfill material*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.024	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.025	*Crush and screen material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.026	*Load and haul from stockpile to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.027	*Spread riprap*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 287,500.00	$ 287,500.00	$ 287,500	
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included within Golden Gate Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**									Included within Sites Dam Estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	

24. Cost Work Sheet Summary: Saddle Dam 5

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	10.023	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.024	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.025	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	10.026	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	10.027	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	Load at stockpile and haul to fill location, 0.5 mile haul	-	BCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.030	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.037	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.038	Crush and screen material			$ -	$ -	$ -	$ -			
	10.039	Load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.040	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
11		**ERS Facility**									
	11.001	Upstream Portal Excavation and Rock Bolts	27,215	CY					$ 17.68	$ 481,220	
	11.002	Excavate and load material	29,937	LCY	$ 1.42	$ 2.49	$ -	$ -	$ 3.91	$ 117,029	
	11.003	Haul to disposal site, 0.5 mile haul	29,937	LCY	$ 1.49	$ 3.73	$ -	$ -	$ 5.22	$ 156,381	
	11.004	Shotcrete portal face	361	CY	$ 91.27	$ 43.09	$ 221.97	$ -	$ 356.33	$ 128,676	
	11.005	Steel fiber for shotcrete	5	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 13,424	
	11.006	20 ft rock bolts, 8 ft on center - Drilling	305	EA	$ 57.55	$ 23.51	$ -	$ -	$ 81.06	$ 24,698	
	11.007	3.5" diam grouted hole with #8 bar	14	CY	$ 338.20	$ 100.63	$ 2,522.70	$ -	$ 2,961.52	$ 41,012	
	11.008	Upstream Portal Backfill	24,500	CY					$ 9.87	$ 241,794	
	11.009	Haul excavated material and stockpile, 0.5 mi assumed	26,950	LCY	$ 1.00	$ 3.72	$ -	$ -	$ 4.72	$ 127,097	
	11.010	Backfill: Compact and grade	26,950	LCY	$ 2.11	$ 2.15	$ -	$ -	$ 4.26	$ 114,697	
	11.011	Inlet and Valve Structures	2,200	CY					$ 1,092.50	$ 2,403,500	
	11.012	Pour inlet and valve structures	2,200	CY	$ -	$ -	$ -	$ 1,092.50	$ 1,092.50	$ 2,403,500	
	11.013	Downstream Portal Excavation and Rock Bolts	31,867	CY					$ 22.30	$ 710,742	
	11.014	Excavate and load material	35,054	LCY	$ 1.37	$ 2.40	$ -	$ -	$ 3.77	$ 132,294	
	11.015	Haul to disposal site, 0.5 mile haul	35,054	LCY	$ 1.44	$ 3.60	$ -	$ -	$ 5.04	$ 176,779	
	11.016	Shotcrete portal face	719	CY	$ 86.01	$ 40.61	$ 221.97	$ -	$ 348.58	$ 250,464	
	11.017	Steel fiber for shotcrete	11	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 26,710	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	606	EA	$ 53.71	$ 21.94	$ -	$ -	$ 75.66	$ 45,867	
	11.019	3.5" diam grouted hole with #8 bar	28	CY	$ 254.95	$ 75.86	$ 2,522.70	$ -	$ 2,853.51	$ 78,628	
	11.020	Downstream Portal Backfill	34,400	CY					$ 10.47	$ 360,275	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	37,840	LCY	$ 1.10	$ 4.10	$ -	$ -	$ 5.19	$ 196,423	
	11.022	Backfill: Compact and grade	37,840	LCY	$ 2.14	$ 2.19	$ -	$ -	$ 4.33	$ 163,852	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	832	LF	$ -	$ -	$ -	$ 7,304.42	$ 7,304.42	$ 6,077,275	
	11.024	Tunnel Concrete Lining	832	LF	$ -	$ -	$ -	$ 7,205.71	$ 7,205.71	$ 5,995,149	
	11.025	10-Ft Steel Pipe Cut and Cover Section	400	LF	$ -	$ -	$ -	$ 8,094.08	$ 8,094.08	$ 3,237,633	
	11.026	Mechanical, Valves, Trash rack, and Metals	1	LS	$ -	$ -	$ -	$ 4,887,500	$ 4,887,500	$ 4,887,500	
	11.027	Riprap Discharge Channel	4,200	CY					$ 57.61	$ 241,972	
	11.028	Blasting operations	5,040	LCY	$ 4.56	$ 6.10	$ 4.85	$ -	$ 15.51	$ 78,157	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	5,040	LCY	$ 2.22	$ 6.46	$ -	$ -	$ 8.69	$ 43,794	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	5,040	LCY	$ 1.43	$ 6.28	$ -	$ -	$ 7.71	$ 38,851	
	11.032	Place at the channel	5,040	LCY	$ 6.40	$ 9.70	$ -	$ -	$ 16.11	$ 81,170	
12		Misc allowance for small items, allow 1%	1.0%	%				71,114,956	$ 71,114,956	$ 711,150	
		Total Direct Cost	42	Acre	$ 338,190.21	$ 523,343.73	$ 270,801.78	$ 577,809.66	$ 1,710,145.38	$ 71,826,106	

Sites Reservoir (Alt 1): Other Saddle Dams | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

25. Construction Cost Summary: Other Saddle Dams/Dikes

				Total Cost
Total Direct Cost				71,429,050
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				71,429,050
General Conditions				
Mobilization			5.0%	3,571,453
Site General Conditions & Requirements			10.0%	7,500,050
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	907,506
Bonds			0.6%	500,448
GC Home Office Overhead			6.0%	5,034,510
GC Profit			8.0%	7,115,441
Total Contractor Indirect Markups				24,629,408
TOTAL DIRECT COST BEFORE CONTINGENCIES				**96,058,458**
Contingencies				
Design Contingencies			10.0%	9,605,846
Construction Contingencies			15.0%	15,849,646
Total Contingency Allowance				25,455,492
TOTAL DIRECT COST BEFORE ESCALATION				**121,513,950**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	1,186,624
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**122,700,574**

25. Cost Work Sheet Summary: Other Saddle Dams/Dikes

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	49	ACRE	$ 3,164.68	$ 5,523.33	$ -	$ -	$ 8,688.01	$ 425,712	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	49	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 184,265	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	173,800	Tons					$ 37.22	$ 6,469,064	
	2.002	*Purchase processed material from quarry*	*173,800*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 3,857,752*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*117,571*	*LCY*	*$ 10.61*	*$ 11.60*	*$ -*	*$ -*	*$ 22.21*	*$ 2,611,312*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	177,606	Tons					$ 37.00	$ 6,571,933	
	2.005	*Purchase processed material from quarry*	*177,606*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 3,942,232*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*120,145*	*LCY*	*$ 10.46*	*$ 11.43*	*$ -*	*$ -*	*$ 21.89*	*$ 2,629,702*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	48,400	Tons					$ 37.01	$ 1,791,502	
	2.008	*Purchase processed material from quarry*	*48,400*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 1,074,311*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*32,741*	*LCY*	*$ 10.47*	*$ 11.44*	*$ -*	*$ -*	*$ 21.90*	*$ 717,191*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	74,000	BCY					$ 8.41	$ 622,397	
	3.002	*Excavations - remove top soil layer*	*81,400*	*LCY*	*$ 1.42*	*$ 2.21*	*$ -*	*$ -*	*$ 3.63*	*$ 295,577*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*81,400*	*LCY*	*$ 1.12*	*$ 2.90*	*$ -*	*$ -*	*$ 4.01*	*$ 326,820*	
	3.004	Dam Foundation Excavation - Common	33,500	BCY					$ 8.54	$ 286,018	
	3.005	*Excavations - remove top soil layer*	*36,850*	*LCY*	*$ 1.55*	*$ 2.21*	*$ -*	*$ -*	*$ 3.76*	*$ 138,422*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*36,850*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 147,596*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	302,500	BCY					$ 11.71	$ 3,543,342	
	3.008	*Rock excavations, no blasting*	*347,875*	*LCY*	*$ 2.51*	*$ 3.68*	*$ -*	*$ -*	*$ 6.19*	*$ 2,151,720*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*347,875*	*LCY*	*$ 1.11*	*$ 2.89*	*$ -*	*$ -*	*$ 4.00*	*$ 1,391,622*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	-	BCY					$ -	$ -	Not required
	3.011	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.012	*Excavate, load and haul to stockpile, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	16,400	SY					$ 12.13	$ 198,945	
	4.002	*Initial foundation core cleanup*	*16,400*	*SY*	*$ 7.60*	*$ 2.25*	*$ -*	*$ -*	*$ 9.86*	*$ 161,627*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*4,510*	*CY*	*$ 2.78*	*$ 5.50*	*$ -*	*$ -*	*$ 8.27*	*$ 37,318*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	16,400	SY					$ 9.86	$ 161,627	
	4.005	*Final foundation core cleanup*	*16,400*	*SY*	*$ 7.60*	*$ 2.25*	*$ -*	*$ -*	*$ 9.86*	*$ 161,627*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	1,500	CY					$ 121.44	$ 182,160	
	4.008	*Dental excavations*	*1,650*	*LCY*	*$ 68.14*	*$ 30.82*	*$ -*	*$ -*	*$ 98.96*	*$ 163,292*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*1,650*	*LCY*	*$ 4.20*	*$ 7.23*	*$ -*	*$ -*	*$ 11.44*	*$ 18,869*	
	4.010	Dental Concrete	1,500	CY	$ 44.85	$ 20.38	$ 183.12	$ -	$ 248.35	$ 372,524	
	4.011	Grout Cap with Anchors	4,900	CY	$ 79.22	$ 22.92	$ 519.68	$ 8.21	$ 630.04	$ 3,087,200	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	16,200	LF					$ 78.49	$ 1,271,561	
	4.013	*Drill setup for all holes*	*216*	*ea.*	*$ 188.94*	*$ 316.18*	*$ -*	*$ -*	*$ 505.12*	*$ 109,107*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*16,200*	*lft*	*$ 10.31*	*$ 11.11*	*$ -*	*$ -*	*$ 21.42*	*$ 346,954*	
	4.015	*Redrill grout holes*	*1,620*	*lft*	*$ 10.31*	*$ 11.11*	*$ -*	*$ -*	*$ 21.42*	*$ 34,695*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*810*	*ea.*	*$ 91.17*	*$ -*	*$ -*	*$ -*	*$ 91.17*	*$ 73,850*	
	4.017	*Inject portland cement grout*	*1,080*	*hr*	*$ 485.13*	*$ 100.00*	*$ -*	*$ -*	*$ 585.13*	*$ 631,938*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*216*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 75,017*	
	4.019	Consolidation Grouting	-	LF					$ -	$ -	Not required
	4.020	*Drill setup for all holes*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.021	*Drill curtain grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Redrill grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Hookup to grout holes and grout nipples*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	*Inject portland cement grout*	*-*	*hr*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.025	*Perform hydraulic conductivity tests*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	Type III Cement	571	Tons	$ 177.11	$ 73.16	$ 113.14	$ -	$ 363.41	$ 207,507	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	38,400	SY					$ 3.85	$ 147,952	
	5.002	*Initial dam shell cleanup*	*38,400*	*SY*	*$ 1.35*	*$ 0.41*	*$ -*	*$ -*	*$ 1.76*	*$ 67,760*	

25. Cost Work Sheet Summary: Other Saddle Dams/Dikes

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	5.003	Load and haul to disposal area, 0.5 mile haul	7,040	LCY	$ 4.19	$ 7.20	$ -	$ -	$ 11.39	$ 80,192	Assume removal of top layer, 0.5' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	1,200	LF	$ 45.17	$ 28.03	$ 35.56	$ -	$ 108.76	$ 130,508	
	6.002	Furnish and Install Foundation Drain Manholes	4	EA	$ 1,252.73	$ 762.78	$ 3,070.88	$ -	$ 5,086.39	$ 20,346	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	212,000	BCY					$ 7.59	$ 1,608,774	Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	233,200	LCY	$ 0.99	$ 2.72	$ -	$ -	$ 3.71	$ 864,317	Include 10% swell factor
	7.004	Load and haul to site stockpile, 0.25 mile haul	233,200	LCY	$ 0.86	$ 2.34	$ -	$ -	$ 3.19	$ 744,458	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	174,000	BCY					$ 9.03	$ 1,570,920	
	7.006	Embankment excavations	191,400	LCY	$ 1.43	$ 3.03	$ -	$ -	$ 4.46	$ 854,024	Include 10% swell factor
	7.007	Load and haul to site stockpile, 0.25 mile haul	191,400	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.75	$ 716,896	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	Not required
	7.009	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.010	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	Not required
	7.012	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	96,500	ECY					$ 7.03	$ 678,739	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	Load and haul to site stockpile, 0.25 mile haul	106,150	LCY	$ 1.29	$ 3.02	$ -	$ -	$ 4.32	$ 458,500	
	7.016	Spread and compact	106,150	LCY	$ 1.15	$ 0.93	$ -	$ -	$ 2.07	$ 220,239	
	7.017	Topsoil Replacement	58,000	ECY					$ 9.82	$ 569,581	Backfill burrow area using material from stockpile
	7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	63,800	LCY	$ 1.75	$ 5.02	$ -	$ -	$ 6.77	$ 431,931	
	7.019	Spread and compact	63,800	LCY	$ 1.19	$ 0.97	$ -	$ -	$ 2.16	$ 137,649	
	7.020	Furnish and Install Zone 1 - Core	450,000	ECY					$ 13.09	$ 5,889,392	
	7.021	Excavate from burrow area	495,000	LCY	$ 1.43	$ 3.03	$ -	$ -	$ 4.47	$ 2,210,415	Include 10% swell factor
	7.022	Load and haul to zone-1 fill location, 0.25 mile haul	495,000	LCY	$ 1.14	$ 2.56	$ -	$ -	$ 3.70	$ 1,831,053	No stockpiling required
	7.023	Spread and compact	495,000	LCY	$ 1.51	$ 2.23	$ -	$ -	$ 3.73	$ 1,847,924	
	7.024	Load, Haul and Place - Zone 2A - Filter	173,800	Tons					$ 3.23	$ 562,153	
	7.025	Load at stockpile and haul to fill location, 0.5 mile haul	35,271	LCY	$ 0.96	$ 2.63	$ -	$ -	$ 3.60	$ 126,830	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	Direct hauling from quarry	82,299	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	Spread and compact	117,571	LCY	$ 1.46	$ 2.24	$ -	$ -	$ 3.70	$ 435,323	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	177,606	Tons					$ 3.24	$ 575,756	
	7.028	Load at stockpile and haul to fill location, 0.5 mile haul	36,044	LCY	$ 0.94	$ 2.57	$ -	$ -	$ 3.52	$ 126,830	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	Direct hauling from quarry	84,102	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	Spread and compact	120,145	LCY	$ 1.47	$ 2.26	$ -	$ -	$ 3.74	$ 448,927	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	48,400	Tons					$ 3.32	$ 160,483	
	7.031	Load at stockpile and haul to fill location, 0.5 mile haul	9,822	LCY	$ 1.04	$ 2.83	$ -	$ -	$ 3.87	$ 38,049	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	Direct hauling from quarry	22,919	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	Spread and compact	32,741	LCY	$ 1.48	$ 2.26	$ -	$ -	$ 3.74	$ 122,435	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	7.034	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0341	Direct hauling from quarry	-	LCY						Elsewhere	
	7.035	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	7.037	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0371	Direct hauling from quarry	-	LCY						Elsewhere	
	7.038	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.039	Furnish and Install Zone 3 - Rockfill	224,000	ECY					$ 28.70	$ 6,428,117	
	7.040	Blasting operations	268,800	LCY	$ 4.28	$ 5.72	$ 4.85	$ -	$ 14.84	$ 3,989,329	Include 20% swell factor
	7.041	Excavate, load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	Crush and screen material	268,800	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	Load and haul to zone-3, 2 mile haul	268,800	LCY	$ 1.17	$ 4.21	$ -	$ -	$ 5.38	$ 1,445,708	No stockpiling required, direct haul
	7.044	Spread and compact	268,800	LCY	$ 1.46	$ 2.24	$ -	$ -	$ 3.69	$ 993,080	
	7.045	Furnish and Install Zone 4 - Random	606,000	ECY					$ 11.20	$ 6,789,664	
	7.046	Excavations in common soil	430,100	LCY	$ 1.42	$ 2.21	$ -	$ -	$ 3.64	$ 1,563,697	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	430,100	LCY	$ 1.12	$ 2.90	$ -	$ -	$ 4.02	$ 1,728,985	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	266,800	LCY	$ 0.93	$ 2.54	$ -	$ -	$ 3.47	$ 925,858	Include 15% swell factor
	7.050	Spread and compact	696,900	LCY	$ 1.46	$ 2.23	$ -	$ -	$ 3.69	$ 2,571,125	
	7.051	Furnish and Install Riprap	55,000	ECY					$ 40.09	$ 2,205,189	
	7.052	Blasting operations	66,000	LCY	$ 4.30	$ 5.74	$ 4.85	$ -	$ 14.89	$ 982,561	Include 20% swell factor
	7.053	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	66,000	LCY	$ 0.93	$ 2.53	$ -	$ -	$ 3.46	$ 228,294	
	7.056	Riprap placement	66,000	LCY	$ 5.99	$ 9.08	$ -	$ -	$ 15.07	$ 994,335	
8		**Other Work**									

25. Cost Work Sheet Summary: Other Saddle Dams/Dikes

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 517,500.00	$ 517,500.00	$ 517,500	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	3,300	CY					$ 85.37	$ 281,733	
	8.006	*Purchase and Import gravel to fill location and stockpile, 35 mi haul*	*3,795*	*LCY*	*$ 10.55*	*$ 11.35*	*$ 37.73*	*$ -*	*$ 59.63*	*$ 226,281*	*Include 15% swell factor*
	8.007	*Place and compact*	*3,795*	*LCY*	*$ 4.76*	*$ 9.85*	*$ -*	*$ -*	*$ 14.61*	*$ 55,453*	
	8.008	Developing haul routes - Haul routes inside reservoir	48	ACRES					$ 28,033.64	$ 1,345,615	Clear, grade, provide gravel fill layer and compact
	8.009	*Clear and grub*	*2,090,880*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 392,436*	
	8.0091	*Load and haul earth fill*	*38,720*	*CY*	*$ 2.14*	*$ 5.85*	*$ -*	*$ -*	*$ 7.99*	*$ 309,478*	*Use existing earth fill material from stockpile*
	8.010	*Grade and Compact surface for earthen road*	*2,090,880*	*SF*	*$ 0.13*	*$ 0.17*	*$ -*	*$ -*	*$ 0.31*	*$ 643,700*	
	8.011	Developing haul routes - Haul routes outside reservoir	32	ACRES					$ 30,193.52	$ 966,193	Clear, grade, provide gravel fill layer and compact
	8.012	*Clear and grub*	*1,393,920*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 261,624*	
	8.0121	*Load and haul earth fill*	*25,813*	*CY*	*$ 2.77*	*$ 7.90*	*$ -*	*$ -*	*$ 10.67*	*$ 275,435*	*Use existing earth fill material from stockpile*
	8.013	*Grade and Compact surface for earthen road*	*1,393,920*	*SF*	*$ 0.13*	*$ 0.17*	*$ -*	*$ -*	*$ 0.31*	*$ 429,133*	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	2,200	CY	$ 89.91	$ 47.84	$ 174.80	$ -	$ 312.54	$ 687,599	
	8.016	Concrete for spillway	19,500	CY							
	8.017	Spillway walls, reinforced concrete	273	CY					$ 1,256.19	$ 342,940	
	8.018	*Formwork*	*2,600*	*SF*	*$ 19.82*	*$ 0.38*	*$ 5.24*	*$ -*	*$ 25.44*	*$ 66,152*	
	8.019	*Concrete*	*420*	*CY*	*$ 43.86*	*$ 10.55*	*$ 233.06*	*$ -*	*$ 287.47*	*$ 120,739*	
	8.02	*Reinforcement*	*52.50*	*TON*	*$ 59.07*	*$ -*	*$ 2,913.29*	*$ -*	*$ 2,972.36*	*$ 156,049*	*Allow reinforcement of 250 lbs/cy*
	8.021	Spillway slab concrete, reinforced concrete	500	CY					$ 642.34	$ 321,170	
	8.022	*Formwork*	*2,500*	*SF*	*$ 20.61*	*$ 0.39*	*$ 5.24*	*$ -*	*$ 26.25*	*$ 65,628*	*Allow formwork of 5SF/CY*
	8.023	*Concrete*	*500*	*CY*	*$ 42.99*	*$ 10.34*	*$ 233.06*	*$ -*	*$ 286.39*	*$ 143,193*	
	8.024	*Reinforcement*	*37.50*	*TON*	*$ 82.70*	*$ -*	*$ 2,913.29*	*$ -*	*$ 2,995.99*	*$ 112,350*	*Allow reinforcement of 150 lbs/cy*
	8.025	Spillway mass concrete	18,727	CY					$ 311.04	$ 5,824,871	
	8.026	*Formwork*	*-*	*SF*						*Not required*	
	8.027	*Concrete*	*18,727*	*CY*	*$ 88.93*	*$ 47.32*	*$ 174.80*	*$ -*	*$ 311.04*	*$ 5,824,871*	
	8.028	*Reinforcement*	*-*	*TON*						*Not required*	
	8.029	Bridge	1,700	SF	$ -	$ -	$ -	$ 492.86	*$ 492.86*	*$ 837,857*	
	8.030	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.031	Clay Backfill	20,000	CY					$ 20.05	$ 401,046	
	8.032	*Clay excavations from burrow area*	*24,000*	*LCY*	*$ 1.70*	*$ 2.42*	*$ -*	*$ -*	*$ 4.12*	*$ 98,873*	
	8.033	*Load and haul from stockpile to fill location, 1 mile haul*	*24,000*	*LCY*	*$ 1.22*	*$ 3.17*	*$ -*	*$ -*	*$ 4.39*	*$ 105,426*	
	8.034	*Place clay backfill material*	*24,000*	*LCY*	*$ 3.28*	*$ 4.91*	*$ -*	*$ -*	*$ 8.20*	*$ 196,747*	
	8.035	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.036	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.037	*Load and haul to processing area, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.038	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.039	*Load and haul from stockpile to fill location, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.040	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.041	Rim Grouting	51,300	LF	$ -	$ -	$ -	$ 120.75	*$ 120.75*	*$ 6,194,475*	Includes clearing & grubbing, furnishing cement material, drill setup for holes, soil drilling to rock, drill curtain holes in rock, grout backfill, hydroseed area.
	8.042	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 287,500.00	$ 287,500.00	$ 287,500	Allowance
9		Misc allowance for small items, allow 1%	1.0%	%				70,721,832	$ 70,721,832	$ 707,218	
		Total Direct Cost	49	Acre	$ 374,631.97	$ 540,513.11	$ 362,099.17	$ 180,491.46	$ 1,457,735.72	$ 71,429,050	

Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

26. Construction Cost Summary: Inlet/Outlet & Diversion Works

				Total Cost
Total Direct Cost				170,115,943
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				170,115,943
General Conditions				
Mobilization			5.0%	8,505,797
Site General Conditions & Requirements			10.0%	17,862,174
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	2,161,323
Bonds			0.6%	1,191,871
GC Home Office Overhead			6.0%	11,990,226
GC Profit			8.0%	16,946,187
Total Contractor Indirect Markups				58,657,578
TOTAL DIRECT COST BEFORE CONTINGENCIES				**228,773,521**
Contingencies				
Design Contingencies			10.0%	22,877,352
Construction Contingencies			15.0%	37,747,631
Total Contingency Allowance				60,624,983
TOTAL DIRECT COST BEFORE ESCALATION				**289,398,504**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2,826,073
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**292,224,577**

26. Cost Work Sheet Summary: Inlet/Outlet & Diversion Works

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ -**	Included within Sites Dam estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.023	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.024	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.025	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.027	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*BCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.030	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.040	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
11		**ERS Facility 1**								**$ -**	Included within Saddle Dam 3 Estimate
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.003	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.004	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.005	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.007	*3.5" diam grouted hole with #8 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 0.5 mi assumed*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.010	*Backfill: Compact and grade*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	

26. Cost Work Sheet Summary: Inlet/Outlet & Diversion Works

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		**ERS Facility 2**								**$ -**	Included within Saddle Dam 5 Estimate
	12.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.003	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.007	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	12.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	12.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	12.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
13		**IO Facility**								**$ 168,431,626**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	9	ACRE	$ 1,230.71	$ 2,147.96	$ -	$ -	$ 3,379	$ 30,408	Light vegetation removal
	13.003	Erosion and Sediment Control	9	ACRE	$ -	$ -	$ -	$ 3,761	$ 3,761	$ 33,845	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	540.00	LF					$ 450.72	$ 243,388	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	2.00	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ 50,000	
	13.007	Foundation piles - drilled piers	540.00	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ 89,100	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	41	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ 104,288	Allow 150lbs/cy
	13.010	Pile testing allowance	15.0%	%	$ -	$ -	$ -	$ 243,387.50	$ 243,387.50	$ 36,508	
	13.011	Pile cap / base slab	489	CY					$ 652.70	$ 319,186	5' thick base slab
	13.012	Cast in place concrete	489	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 159,828	36" thick slab
	13.013	Formwork	911	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 23,106	Formwork to sides
	13.014	Concrete reinforcement	37	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 136,251	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	8,369	CY							
	13.016	Walls	7,535	CY					$ 1,133.76	$ 8,542,844	
	13.017	Cast in place concrete	7,535	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 2,462,664	Average 4' thick
	13.018	Formwork	101,723	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 2,581,208	
	13.019	Concrete reinforcement	942	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 3,498,971	Allow 250lbs/cy

26. Cost Work Sheet Summary: Inlet/Outlet & Diversion Works

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.020	Slabs - elevated decks	722	CY					$ 833.82	$ 602,020	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	*Cast in place concrete*	*722*	*CY*	*$ 65.37*	*$ 32.68*	*$ 228.78*	*$ -*	*$ 326.83*	*$ 235,971*	*36" thick slab*
	13.022	*Formwork*	*6,498*	*SF*	*$ 15.23*	*$ 2.54*	*$ 7.61*	*$ -*	*$ 25.38*	*$ 164,887*	
	13.023	*Concrete reinforcement*	*54*	*TON*	*$ 742.98*	*$ 371.49*	*$ 2,600.43*	*$ -*	*$ 3,714.90*	*$ 201,162*	*Allow 150lbs/cy*
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	*Cast in place concrete*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	13.026	*Formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Allow 30sf/cy*
	13.027	*Concrete reinforcement*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Allow 200lbs/cy*
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	*Cast in place concrete*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	13.030	*Formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	13.031	*Concrete reinforcement*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	13.032	Bridge Piers	112	CY					$ 1,459.57	$ 163,472	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	*Cast in place concrete*	*112*	*CY*	*$ 65.37*	*$ 32.68*	*$ 228.78*	*$ -*	*$ 326.83*	*$ 36,605*	
	13.034	*Formwork*	*3,360*	*SF*	*$ 15.23*	*$ 2.54*	*$ 7.61*	*$ -*	*$ 25.38*	*$ 85,260*	*Allow 30sf/cy*
	13.035	*Concrete reinforcement*	*11*	*TON*	*$ 742.98*	*$ 371.49*	*$ 2,600.43*	*$ -*	*$ 3,714.90*	*$ 41,607*	*Allow 200lbs/cy*
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	1	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	1	LS						Included below	
	13.038	Metal ladders	270	LF	$ -	$ -	$ -	$ 3,552.50	$ 3,552.50	$ 959,175	As per May 2020 NODOS Estimate
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 507.50	$ 507.50	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	24	EA	$ -	$ -	$ -	$ 384,583.50	$ 384,583.50	$ 9,230,004	As per May 2020 NODOS Estimate
	13.041	Moveable screens and hoists	6	EA	$ -	$ -	$ -	$ 76,125.00	$ 76,125.00	$ 456,750	As per May 2020 NODOS Estimate
	13.042	Sliding steel plates and hoists	6	EA	$ -	$ -	$ -	$ 101,500.00	$ 101,500.00	$ 609,000	As per May 2020 NODOS Estimate
	13.043	8 ton jib crane	1	EA	$ -	$ -	$ -	$ 121,800.00	$ 121,800.00	$ 121,800	As per May 2020 NODOS Estimate
	13.044	12 ft x 30 ft inlet tunnel roller gate	2	EA	$ -	$ -	$ -	$ 1,888,915.00	$ 1,888,915.00	$ 3,777,830	As per May 2020 NODOS Estimate
	13.045	12 ft x 25 ft outlet tunnel roller gates	4	EA	$ -	$ -	$ -	$ 1,609,790.00	$ 1,609,790.00	$ 6,439,160	As per May 2020 NODOS Estimate
	13.046	Other Metals Intake Tower	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
	13.047	Painting	1	LS	$ -	$ -	$ -	$ 50,750.00	$ 50,750.00	$ 50,750	As per May 2020 NODOS Estimate
		Access bridge									
	13.048	Access bridge	10,000	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ 5,000,000	Assume 500' x 20' wide bridge
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	6,222	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ 52,834,051	As per May 2020 NODOS Estimate
	13.051	Concrete Liner	5,712	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ 51,883,438	As per May 2020 NODOS Estimate
	13.052	Steel Liner	510	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ 5,267,089	As per May 2020 NODOS Estimate
	13.053	**Lower Intake Channel**	475,000	CY					$ 38.28	$ 18,180,797	
	13.054	*Excavations in common material*	*432,250*	*LCY*	*$ 6.00*	*$ 9.00*	*$ -*	*$ -*	*$ 15.00*	*$ 6,483,750*	*Assume 70% in common earth and 30% rock; include a 30% swell factor*
	13.055	*Excavations in rock*	*185,250*	*LCY*	*$ 10.50*	*$ 24.50*	*$ -*	*$ -*	*$ 35.00*	*$ 6,483,750*	
	13.056	*Haul to disposal site, 0.5 mile haul*	*617,500*	*LCY*	*$ 1.75*	*$ 5.25*	*$ -*	*$ -*	*$ 7.00*	*$ 4,322,500*	
	13.057	*Shotcrete portal face*	*1,387*	*CY*	*$ 64.00*	*$ 32.00*	*$ 224.00*	*$ -*	*$ 320.00*	*$ 443,769*	
	13.058	*Steel fiber for shotcrete*	*21*	*TON*	*$ 260.00*	*$ -*	*$ 1,040.00*	*$ -*	*$ 1,300.00*	*$ 27,042*	
	13.059	*20 ft rock bolts, 8 ft on center - Drilling*	*880*	*EA*	*$ 187.50*	*$ 62.50*	*$ -*	*$ -*	*$ 250.00*	*$ 220,000*	
	13.060	*3.5" diam grouted hole with #8 bar*	*40*	*CY*	*$ 1,000.00*	*$ 500.00*	*$ 3,500.00*	*$ -*	*$ 5,000.00*	*$ 199,986*	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	63,000	CY					$ 49.88	$ 3,142,613	
	13.062	*Excavate and load material*	*81,900*	*LCY*	*$ 10.00*	*$ 15.00*	*$ -*	*$ -*	*$ 25.00*	*$ 2,047,500*	
	13.063	*Haul to disposal site, 0.5 mile haul*	*81,900*	*LCY*	*$ 1.75*	*$ 5.25*	*$ -*	*$ -*	*$ 7.00*	*$ 573,300*	
	13.064	*Shotcrete portal face*	*813*	*CY*	*$ 64.00*	*$ 32.00*	*$ 224.00*	*$ -*	*$ 320.00*	*$ 260,172*	
	13.065	*Steel fiber for shotcrete*	*12*	*TON*	*$ 260.00*	*$ -*	*$ 1,040.00*	*$ -*	*$ 1,300.00*	*$ 15,854*	
	13.066	*20 ft rock bolts, 8 ft on center - Drilling*	*515*	*EA*	*$ 187.50*	*$ 62.50*	*$ -*	*$ -*	*$ 250.00*	*$ 128,750*	
	13.067	*3.5" diam grouted hole with #8 bar*	*23*	*CY*	*$ 1,000.00*	*$ 500.00*	*$ 3,500.00*	*$ -*	*$ 5,000.00*	*$ 117,037*	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
14		Misc allowance for small items, allow 1%	1.0%	%				168,431,626	$ 168,431,626	$ 1,684,316	
		Total Direct Cost	42	Acre	$ 243,387.88	$ 346,507.06	$ 153,550.94	$ 3,306,933.71	$ 4,050,379.59	$ 170,115,943	

Sites Reservoir (Alt 1): Sites Lodoga Road Realignment | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.01. Construction Cost Summary: Sites Lodoga Road Realignment

				Unit Cost Rate ($/LF)	Total Cost
			LF:	28,972	
Total Direct Cost				4,071.10	117,947,799
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				4,071.10	117,947,799
General Conditions					
Mobilization			3.0%	122.13	3,538,434
Site General Conditions & Requirements			10.0%	419.32	12,148,623
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	50.74	1,469,983
Bonds			0.6%	27.98	810,629
GC Field and Home Office Overhead			5.0%	234.56	6,795,773
GC Profit			5.0%	246.29	7,135,562
Total Contractor Indirect Markups				1,101.03	31,899,004
TOTAL DIRECT COST BEFORE CONTINGENCIES				**5,172.12**	**149,846,803**
Contingencies					
Design Contingencies			10.0%	517.21	14,984,680
Construction Contingencies			15.0%	853.40	24,724,722
Total Contingency Allowance				1,370.61	39,709,402
TOTAL DIRECT COST BEFORE ESCALATION				**6,542.74**	**189,556,205**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	63.89	1,851,080
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**6,606.63**	**191,407,285**

27.01. Cost Work Sheet Summary: Sites Lodoga Road Realignment

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Sites Lodoga Road Realignment									
		Road length (LF)	28,972	LF							
		Road length (Miles)	6	MILES							
		Road Area (SF)	985,048	SF							
		Road Area (SY)	109,450	SY							
		Road Area (Acre)	23	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Elsewhere	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	*Included elsewhere*
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	70	ACRE	$ 1,115.34	$ 1,835.55	$ -	$ -	$ 2,950.89	$ 206,562	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	21,600	LF					$ 4.10	$ 88,479	
	2.002	*Setup temporary silt fence*	*21,600*	*LF*	*$ 1.77*	*$ 0.72*	*$ 0.44*	*$ -*	*$ 2.94*	*$ 63,509*	
	2.003	*Silt fence removal*	*21,600*	*LF*	*$ 0.62*	*$ 0.27*	*$ -*	*$ 0.27*	*$ 1.16*	*$ 24,970*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	-	CY					$ -	$ -	Not required
	2.011	*Roadway excavations, common earth*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	165,900	CY					$ 10.72	$ 1,778,290	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, averaae 0.5 mile haul
	2.014	*Roadway excavations*	*190,785*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.26*	*$ 812,958*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*190,785*	*LCY*	*$ 1.48*	*$ 3.58*	*$ -*	*$ -*	*$ 5.06*	*$ 965,332*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	75,400	CY					$ 20.37	$ 1,535,582	Excavated material to be stockpiled for re-use, averaae 2 mile haul
	2.017	*Blasting operations*	*27,144*	*LCY*	*$ 4.52*	*$ 4.32*	*$ 4.85*	*$ -*	*$ 13.68*	*$ 371,419*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*63,336*	*LCY*	*$ 2.97*	*$ 3.83*	*$ -*	*$ -*	*$ 6.79*	*$ 430,156*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 2 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 2 mile haul*	*90,480*	*LCY*	*$ 2.23*	*$ 5.88*	*$ -*	*$ -*	*$ 8.11*	*$ 734,007*	*Haul to stockpile location, 2 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	1,492,700	CY					$ 9.72	$ 14,511,292	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*1,641,970*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.27*	*$ 7,006,920*	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*1,641,970*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.57*	*$ 7,504,372*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	1,492,700	CY					$ 6.44	$ 9,617,106	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*1,492,700*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*1,492,700*	*LCY*	*$ 3.32*	*$ 3.13*	*$ -*	*$ -*	*$ 6.44*	*$ 9,617,106*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	4,696,700	CY					$ 7.17	$ 33,683,040	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	*5,166,370*	*LCY*						*Elsewhere*	*Handling cost included within related excavation project*
	3.007	*Spread and compact*	*5,166,370*	*LCY*	*$ 3.38*	*$ 3.14*	*$ -*	*$ -*	*$ 6.52*	*$ 33,683,040*	
	3.008	Class 4 Aggregate subbase	17,200	CY					$ 61.75	$ 1,062,173	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*29,240*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 442,960*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*19,780*	*LCY*	*$ 10.63*	*$ 12.45*	*$ -*	*$ -*	*$ 23.08*	*$ 456,533*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*19,780*	*LCY*	*$ 4.23*	*$ 3.99*	*$ -*	*$ -*	*$ 8.22*	*$ 162,680*	
	3.013	Class 2 Aggregate base	17,200	CY					$ 61.75	$ 1,062,173	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*29,240*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 442,960*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*19,780*	*LCY*	*$ 10.63*	*$ 12.45*	*$ -*	*$ -*	*$ 23.08*	*$ 456,533*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*19,780*	*LCY*	*$ 4.23*	*$ 3.99*	*$ -*	*$ -*	*$ 8.22*	*$ 162,680*	
	3.018	Asphalt concrete	22,950	TON	$ 8.79	$ 4.85	$ 102.88	$ -	$ 116.53	$ 2,674,253	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	17	TON	$ 995.95	$ 499.58	$ 2,664.86	$ -	$ 4,160.38	$ 71,143	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	2,897	LF	$ 5.82	$ 2.58	$ 43.54	$ -	$ 51.95	$ 150,502	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required

27.01. Cost Work Sheet Summary: Sites Lodoga Road Realignment

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	2,860	LF					$ 98.81	$ 282,596	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*2,132*	*LCY*	*$ 4.74*	*$ 4.61*	*$ -*	*$ -*	*$ 9.35*	*$ 19,938*	
	4.007	*Load and haul material to disposal site, 0.5 mile haul*	*2,132*	*LCY*	*$ 4.07*	*$ 7.35*	*$ -*	*$ -*	*$ 11.42*	*$ 24,340*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*2,860*	*LF*	*$ 36.06*	*$ 6.95*	*$ 32.11*	*$ -*	*$ 75.12*	*$ 214,847*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*2,132*	*LCY*	*$ 1.69*	*$ 5.02*	*$ -*	*$ -*	*$ 6.71*	*$ 14,304*	
	4.010	*Sand Bedding*	*185*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 9,167*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	57,944	LF	$ 0.26	$ 0.15	$ 0.70	$ -	$ 1.11	$ 64,401	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	57,944	LF	$ 0.26	$ 0.15	$ 0.70	$ -	$ 1.11	$ 64,401	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	29	EA	$ 295.38	$ 126.14	$ 562.46	$ -	$ 983.97	$ 28,535	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	565,000	SF	$ 0.05	$ 0.02	$ 0.07	$ -	$ 0.15	$ 81,936	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	33.33	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 7,027	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	100	EA	$ 45.28	$ 17.61	$ 71.96	$ -	$ 134.85	$ 13,485	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	66,400	SF					$ 72.78	$ 4,832,395	
	4.021	*Setting and removing formwork*	*132,800*	*SF*	*$ 9.56*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.02*	*$ 1,596,872*	
	4.022	*Concrete fill work*	*4,919*	*CY*	*$ 30.59*	*$ 7.35*	*$ 224.18*	*$ -*	*$ 262.13*	*$ 1,289,283*	*Assume wall 24" thick, 5000psi concrete*
	4.023	*Provide/Install Reinforcing*	*492*	*TON*	*$ 1,093.70*	*$ 60.96*	*$ 2,802.31*	*$ -*	*$ 3,956.96*	*$ 1,946,240*	*Allow 200lbs/cy*
	4.024	Rock Slope Protection using rip rap	905,000	CY					$ 37.71	$ 34,128,056	
	4.025	*Blasting operations*	*1,086,000*	*LCY*	*$ 4.12*	*$ 4.01*	*$ -*	*$ 5.18*	*$ 13.30*	*$ 14,447,435*	
	4.026	*Load and haul to processing area, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	Not required
	4.028	*Load and haul to stockpile location, 2 mile haul*	*434,400*	*LCY*	*$ 2.15*	*$ 5.70*	*$ -*	*$ -*	*$ 7.86*	*$ 3,413,173*	Assume 40% of material to be stockpiled (double handling allowance)
	4.029	*Load and haul from stockpile to fill location, 0.5 mile haul*	*434,400*	*LCY*	*$ 1.08*	*$ 2.87*	*$ -*	*$ -*	*$ 3.95*	*$ 1,716,451*	40% of material to be double handled
	4.030	*Load and direct haul from excavations to fill location, 2 mile haul*	*651,600*	*LCY*	*$ 2.15*	*$ 5.69*	*$ -*	*$ -*	*$ 7.84*	*$ 5,109,895*	Direct haul to fill location, 60% of material to be hauled directly
	4.031	*Rip rap placement*	*651,600*	*LCY*	*$ 5.61*	*$ 8.88*	*$ -*	*$ -*	*$ 14.49*	*$ 9,441,101*	
	4.032	RSP backing	493,600	CY					$ 13.16	$ 6,493,715	
	4.033	*Load and haul material from stockpile to fill location, 2 mile haul*	*542,960*	*LCY*	*$ 2.15*	*$ 5.70*	*$ -*	*$ -*	*$ 7.85*	*$ 4,261,534*	
	4.034	*Spread and compact*	*542,960*	*LCY*	*$ 1.63*	*$ 2.48*	*$ -*	*$ -*	*$ 4.11*	*$ 2,232,181*	
	4.035	RSP Fabric backing material	839,200	SY	$ -	$ -	$ -	$ 5.18	$ 5.18	$ 4,342,860	
	4.036	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	-	MILE	$ -	$ -	$ -	$ -	$ -	$ -	Not required
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1%	1.0%	%				$ 116,779,999	$ 116,779,999	$ 1,167,800	
		Total Direct Cost	28,972	LF	$ 1,566.27	$ 1,892.74	$ 227.38	$ 384.70	$ 4,071.10	$ 117,947,799.24	

Sites Reservoir (Alt 1): Huffmaster Road Realignment | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.02. Construction Cost Summary: Huffmaster Road Realignment

				Unit Cost Rate ($/LF)	Total Cost
			LF:	39,909	
Total Direct Cost				679.77	27,129,105
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				679.77	27,129,105
General Conditions					
Mobilization			3.0%	20.39	813,873
Site General Conditions & Requirements			10.0%	70.02	2,794,298
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	8.47	338,110
Bonds			0.6%	4.67	186,452
GC Field and Home Office Overhead			5.0%	39.17	1,563,092
GC Profit			5.0%	41.12	1,641,246
Total Contractor Indirect Markups				183.85	7,337,071
TOTAL DIRECT COST BEFORE CONTINGENCIES				**863.62**	**34,466,176**
Contingencies					
Design Contingencies			10.0%	86.36	3,446,618
Construction Contingencies			15.0%	142.50	5,686,919
Total Contingency Allowance				228.86	9,133,537
TOTAL DIRECT COST BEFORE ESCALATION				**1,092.48**	**43,599,713**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	10.67	425,766
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**1,103.15**	**44,025,479**

27.02. Cost Work Sheet Summary: Huffmaster Road Realignment

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Huffmaster Road Realignment									
		Road length (LF)	39,909	LF							
		Road length (Miles)	8	MILES							
		Road Area (SF)	598,635	SF							
		Road Area (SY)	66,515	SY							
		Road Area (Acre)	14	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Elsewhere	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	*Included elsewhere*
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	40	ACRE	$ 1,097.92	$ 1,806.87	$ -	$ -	$ 2,904.78	$ 116,191	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	33,600	LF					$ 4.07	$ 136,792	
	2.002	*Setup temporary silt fence*	*33,600*	*LF*	*$ 1.81*	*$ 0.73*	*$ 0.44*	*$ -*	*$ 2.98*	*$ 100,289*	
	2.003	*Silt fence removal*	*33,600*	*LF*	*$ 0.64*	*$ 0.27*	*$ -*	*$ 0.17*	*$ 1.09*	*$ 36,503*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.007	*Crushing Operations*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	886,500	CY					$ 10.16	$ 9,006,087	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*1,019,475*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.27*	*$ 4,348,678*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*1,019,475*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.57*	*$ 4,657,409*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	151,600	CY					$ 10.80	$ 1,637,156	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*174,340*	*LCY*	*$ 2.11*	*$ 2.19*	*$ -*	*$ -*	*$ 4.29*	*$ 748,437*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*174,340*	*LCY*	*$ 1.49*	*$ 3.60*	*$ -*	*$ -*	*$ 5.10*	*$ 888,719*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	46,900	CY					$ 35.66	$ 1,672,487	Excavated material to be stockpiled for re-use, average 8 mile haul
	2.017	*Blasting operations*	*16,884*	*LCY*	*$ 4.54*	*$ 4.34*	*$ 4.85*	*$ -*	*$ 13.73*	*$ 231,744*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*39,396*	*LCY*	*$ 2.98*	*$ 3.84*	*$ -*	*$ -*	*$ 6.82*	*$ 268,847*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 2 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No screening required*
	2.022	*Load and haul to stockpile location, 8 mile haul*	*56,280*	*LCY*	*$ 5.28*	*$ 15.54*	*$ -*	*$ -*	*$ 20.82*	*$ 1,171,896*	*Haul to stockpile location, 8 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	478,000	CY					$ 9.73	$ 4,650,027	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*525,800*	*LCY*	*$ 2.10*	*$ 2.17*	*$ -*	*$ -*	*$ 4.27*	*$ 2,245,311*	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*525,800*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.57*	*$ 2,404,716*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	478,000	CY					$ 6.53	$ 3,121,182	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*478,000*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*478,000*	*LCY*	*$ 3.34*	*$ 3.19*	*$ -*	*$ -*	*$ 6.53*	*$ 3,121,182*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	-	CY					$ -	$ -	Not required
	3.009	*Purchase processed material from quarry*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.012	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	Class 2 Aggregate base	22,200	CY					$ 61.08	$ 1,356,064	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*37,740*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 571,727*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*25,530*	*LCY*	*$ 10.43*	*$ 12.22*	*$ -*	*$ -*	*$ 22.65*	*$ 578,275*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*25,530*	*LCY*	*$ 4.15*	*$ 3.92*	*$ -*	*$ -*	*$ 8.07*	*$ 206,062*	
	3.018	Asphalt concrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not Required
	3.019	Tack Coat	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not Required
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	3,991	LF	$ 5.49	$ 2.44	$ 43.53	$ -	$ 51.46	$ 205,389	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required

27.02. Cost Work Sheet Summary: Huffmaster Road Realignment

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	4,700	LF					$ 97.87	$ 459,966	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*3,503*	*LCY*	*$ 4.62*	*$ 4.49*	*$ -*	*$ -*	*$ 9.11*	*$ 31,901*	
	4.007	*Load and haul material to disposal site, 0.5 mile haul*	*3,503*	*LCY*	*$ 3.96*	*$ 7.16*	*$ -*	*$ -*	*$ 11.12*	*$ 38,943*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*4,700*	*LF*	*$ 36.41*	*$ 7.02*	*$ 32.10*	*$ -*	*$ 75.53*	*$ 354,986*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*3,503*	*LCY*	*$ 1.37*	*$ 4.07*	*$ -*	*$ -*	*$ 5.44*	*$ 19,073*	
	4.010	*Sand Bedding*	*305*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 15,064*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.013	Paint Traffic Stripe - 6" White	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.014	Roadside Signs	40	EA	$ 321.23	$ 137.17	$ 562.46	$ -	$ 1,020.86	$ 40,834	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	440,600	SF	$ 0.05	$ 0.02	$ 0.07	$ -	$ 0.14	$ 61,669	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	56.00	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 11,805	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	168	EA	$ 44.92	$ 17.47	$ 71.96	$ -	$ 134.35	$ 22,570	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	59,900	SF					$ 72.83	$ 4,362,279	
	4.021	*Setting and removing formwork*	*119,800*	*SF*	*$ 9.57*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.04*	*$ 1,442,421*	
	4.022	*Concrete fill work*	*4,437*	*CY*	*$ 30.45*	*$ 7.32*	*$ 224.18*	*$ -*	*$ 261.95*	*$ 1,162,298*	*Assume wall 24" thick, 5000psi concrete*
	4.023	*Provide/Install Reinforcing*	*444*	*TON*	*$ 1,097.63*	*$ 61.18*	*$ 2,802.31*	*$ -*	*$ 3,961.11*	*$ 1,757,561*	*Allow 200lbs/cy*
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to stockpile location, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Load and haul from stockpile to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	*Load and direct haul from excavations to fill location, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.031	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	RSP backing	-	CY					$ -	$ -	Not required
	4.033	*Load and haul material from stockpile to fill location, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.034	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.035	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.036	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	-	MILE	$ -	$ -	$ -	$ -	$ -	$ -	Not required
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1%	1.0%	%				$ 26,860,500	$ 26,860,500	$ 268,605	
		Total Direct Cost	39,909	LF	$ 265.74	$ 317.02	$ 89.76	$ 7.25	$ 679.77	$ 27,129,105	

Sites Reservoir (Alt 1): North Access Road 69 and Saddle Dam Roads | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.03. Construction Cost Summary: North Access Road 69 and Saddle Dam Roads

				Unit Cost Rate ($/LF)	Total Cost
			LF:	56,623	
Total Direct Cost				271.43	15,369,166
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				271.43	15,369,166
General Conditions					
Mobilization			5.0%	13.57	768,458
Site General Conditions & Requirements			10.0%	28.50	1,613,762
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	3.45	195,265
Bonds			0.6%	1.90	107,680
GC Field and Home Office Overhead			5.0%	15.94	902,717
GC Profit			5.0%	16.74	947,852
Total Contractor Indirect Markups				80.10	4,535,734
TOTAL DIRECT COST BEFORE CONTINGENCIES				**351.53**	**19,904,900**
Contingencies					
Design Contingencies			10.0%	35.15	1,990,490
Construction Contingencies			15.0%	58.00	3,284,309
Bidding Contingencies / Alternative Procurement Strategy (APS)			0.0%	-	-
Total Contingency Allowance				93.16	5,274,799
TOTAL DIRECT COST BEFORE ESCALATION				**444.69**	**25,179,699**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	4.34	245,888
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**449.03**	**25,425,587**

27.03. Cost Work Sheet Summary: North Access Road 69 and Saddle Dam Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		North Access Road 69 and Saddle Dam Roads									
		Road length (LF)	56,623	LF							
		Road length (Miles)	11	MILES							
		Road Area (SF)	1,019,214	SF							
		Road Area (SY)	113,246	SY							
		Road Area (Acre)	24	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	76	ACRE	$ 1,091.50	$ 1,796.30	$ -	$ -	$ 2,887.80	$ 219,472	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	14,000	LF					$ 4.52	$ 63,288	
	2.002	*Setup temporary silt fence*	*14,000*	*LF*	*$ 1.83*	*$ 0.74*	*$ 0.44*	*$ -*	*$ 3.01*	*$ 42,161*	
	2.003	*Silt fence removal*	*14,000*	*LF*	*$ 0.77*	*$ 0.33*	*$ -*	*$ 0.41*	*$ 1.51*	*$ 21,126*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.007	*Crushing Operations*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	383,400	CY					$ 10.18	$ 3,901,747	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*440,910*	*LCY*	*$ 2.10*	*$ 2.18*	*$ -*	*$ -*	*$ 4.27*	*$ 1,883,997*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*440,910*	*LCY*	*$ 1.37*	*$ 3.21*	*$ -*	*$ -*	*$ 4.58*	*$ 2,017,750*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	72,200	CY					$ 10.95	$ 790,351	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*83,030*	*LCY*	*$ 2.14*	*$ 2.22*	*$ -*	*$ -*	*$ 4.35*	*$ 361,314*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*83,030*	*LCY*	*$ 1.51*	*$ 3.65*	*$ -*	*$ -*	*$ 5.17*	*$ 429,037*	*Haul to disposal area; no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	35,400	CY					$ 21.59	$ 764,203	Excavated material to be stockpiled for re-use, average 2 mile haul
	2.017	*Blasting operations*	*12,744*	*LCY*	*$ 4.81*	*$ 4.60*	*$ 4.85*	*$ -*	*$ 14.26*	*$ 181,695*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*29,736*	*LCY*	*$ 2.90*	*$ 3.73*	*$ -*	*$ -*	*$ 6.63*	*$ 197,155*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No screening required*
	2.022	*Load and haul to stockpile location, 2 mile haul*	*42,480*	*LCY*	*$ 2.50*	*$ 6.57*	*$ -*	*$ -*	*$ 9.07*	*$ 385,354*	*Haul to stockpile location, 2 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	266,000	CY					$ 9.75	$ 2,592,257	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*292,600*	*LCY*	*$ 2.10*	*$ 2.18*	*$ -*	*$ -*	*$ 4.28*	*$ 1,251,697*	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*292,600*	*LCY*	*$ 1.37*	*$ 3.21*	*$ -*	*$ -*	*$ 4.58*	*$ 1,340,560*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	266,000	CY					$ 6.91	$ 1,837,417	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*266,000*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*266,000*	*LCY*	*$ 3.66*	*$ 3.25*	*$ -*	*$ -*	*$ 6.91*	*$ 1,837,417*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	3.007	*Spread and compact*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	3.008	Class 4 Aggregate subbase	12,100	CY					$ 63.28	$ 765,707	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*20,570*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 311,617*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*13,915*	*LCY*	*$ 11.08*	*$ 12.98*	*$ -*	*$ -*	*$ 24.06*	*$ 334,791*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*13,915*	*LCY*	*$ 4.41*	*$ 4.16*	*$ -*	*$ -*	*$ 8.57*	*$ 119,299*	
	3.013	Class 2 Aggregate base	48,700	CY					$ 60.73	$ 2,957,555	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*82,790*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 1,254,195*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*56,005*	*LCY*	*$ 10.26*	*$ 12.02*	*$ -*	*$ -*	*$ 22.28*	*$ 1,247,856*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*56,005*	*LCY*	*$ 4.18*	*$ 3.95*	*$ -*	*$ -*	*$ 8.13*	*$ 455,505*	
	3.018	Asphalt concrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	3.019	Tack Coat	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	5,662	LF	$ 5.36	$ 2.38	$ 43.53	$ -	$ 51.27	$ 290,316	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'

27.03. Cost Work Sheet Summary: North Access Road 69 and Saddle Dam Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.003	Transition Railing (Type WB-31)	8	EA	$ 1,260.28	$ 1,121.83	$ 2,693.75	$ -	$ 5,075.86	$ 40,607	Assume 4 at each culvert crossing, assume wood posts
	4.004	End Anchor Assembly (Type SFT)	8	EA	$ 1,260.28	$ 1,121.83	$ 592.63	$ -	$ 2,974.73	$ 23,798	Assume 4 at each culvert crossing, assume wood posts
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	2,080	LF					$ 104.52	$ 217,411	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*1,550*	*LCY*	*$ 5.22*	*$ 5.07*	*$ -*	*$ -*	*$ 10.29*	*$ 15,950*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*1,550*	*LCY*	*$ 5.38*	*$ 11.42*	*$ -*	*$ -*	*$ 16.80*	*$ 26,048*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*2,080*	*LF*	*$ 36.06*	*$ 6.95*	*$ 32.11*	*$ -*	*$ 75.12*	*$ 156,250*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*1,550*	*LCY*	*$ 2.19*	*$ 5.87*	*$ -*	*$ -*	*$ 8.06*	*$ 12,497*	
	4.010	*Sand Bedding*	*135*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 6,667*	
	4.011	Box culvert single cell	2	EA	$ 1,241.68	$ 489.20	$ 10,020.75	$ -	$ 11,751.62	$ 23,503	Assume 8' long, 12' x 8'
	4.012	Paint Traffic Stripe - 6" Yellow	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.013	Paint Traffic Stripe - 6" White	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.014	Roadside Signs	57	EA	$ 300.56	$ 128.35	$ 562.46	$ -	$ 991.37	$ 56,508	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	172,800	SF	$ 0.06	$ 0.03	$ 0.07	$ -	$ 0.16	$ 27,508	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	29.33	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 6,184	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	110	EA	$ 41.17	$ 16.01	$ 71.96	$ -	$ 129.13	$ 14,204	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.020	Retaining walls (Allowance)	-	SF					$ -	$ -	Not required
	4.021	*Setting and removing formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Concrete fill work*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Provide/Install Reinforcing*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	11	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 550,000	Not required
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 15,142,036	$ 15,142,036	$ 227,131	
		Total Direct Cost	56,623	LF	$ 95.35	$ 125.90	$ 36.23	$ 13.94	$ 271.43	$ 15,369,166	

Sites Reservoir (Alt 1): County, Delevan & Maxwell Roads | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.04. Construction Cost Summary: County, Delevan & Maxwell Roads

				Unit Cost Rate ($/LF)	Total Cost
			LF:	112,356	
Total Direct Cost				155.28	17,447,045
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				155.28	17,447,045
General Conditions					
Mobilization			5.0%	7.76	872,352
Site General Conditions & Requirements			10.0%	16.30	1,831,940
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	1.97	221,665
Bonds			0.6%	1.09	122,238
GC Field and Home Office Overhead			5.0%	9.12	1,024,762
GC Profit			5.0%	9.58	1,076,000
Total Contractor Indirect Markups				45.83	5,148,957
TOTAL DIRECT COST BEFORE CONTINGENCIES				**201.11**	**22,596,002**
Contingencies					
Design Contingencies			10.0%	20.11	2,259,600
Construction Contingencies			15.0%	33.18	3,728,340
Total Contingency Allowance				53.29	5,987,940
TOTAL DIRECT COST BEFORE ESCALATION				**254.41**	**28,583,942**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2.48	279,132
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**256.89**	**28,863,074**

27.04. Cost Work Sheet Summary: County, Delevan & Maxwell Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		County, Delevan & Maxwell Roads									
		Road length (LF)	112,356	LF							
		Road length (Miles)	22	MILES							
		Road Area (SF)	3,145,968	SF							
		Road Area (SY)	349,552	SY							
		Road Area (Acre)	73	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	38	ACRE	$ 1,155.70	$ 1,901.97	$ -	$ -	$ 3,057.67	$ 116,191	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	18,310	LF					$ 4.51	$ 82,525	
	2.002	*Setup temporary silt fence*	*18,310*	*LF*	*$ 1.92*	*$ 0.78*	*$ 0.44*	*$ -*	*$ 3.14*	*$ 57,555*	
	2.003	*Silt fence removal*	*18,310*	*LF*	*$ 0.74*	*$ 0.31*	*$ -*	*$ 0.31*	*$ 1.36*	*$ 24,970*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Includes AB & AC material which needs to be crushed and screened for potential re-use, includes hauling to stockpile/direct fill location within 0.5 miles, assume 90% of total roadway excavations include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Includes removal of asphalt top layer; include a 15% swell factor*
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Haul to stockpile location, 0.25 mile hauling distance assumed*
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	-	CY					$ -	$ -	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 10% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	1,720	CY					$ 25.15	$ 43,252	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 3 mile haul
	2.014	*Roadway excavations*	*1,978*	*LCY*	*$ 3.20*	*$ 3.32*	*$ -*	*$ -*	*$ 6.52*	*$ 12,904*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 3 mile haul*	*1,978*	*LCY*	*$ 4.05*	*$ 11.29*	*$ -*	*$ -*	*$ 15.34*	*$ 30,348*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 3 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	-	CY					$ -	$ -	Not required
	2.017	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.018	*Rock breaking operation*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.022	*Load and haul to stockpile location, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	15,690	CY					$ 10.22	$ 160,346	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*17,259*	*LCY*	*$ 2.20*	*$ 2.28*	*$ -*	*$ -*	*$ 4.49*	*$ 77,425*	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*17,259*	*LCY*	*$ 1.44*	*$ 3.37*	*$ -*	*$ -*	*$ 4.80*	*$ 82,921*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	15,690	CY					$ 7.10	$ 111,359	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*15,690*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*15,690*	*LCY*	*$ 3.76*	*$ 3.34*	*$ -*	*$ -*	*$ 7.10*	*$ 111,359*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	-	CY					$ -	$ -	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	Class 2 Aggregate base	-	CY					$ -	$ -	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.018	Asphalt concrete	39,330	TON	$ 8.55	$ 4.71	$ 102.88	$ -	$ 116.15	$ 4,568,126	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	58	TON	$ 921.76	$ 462.37	$ 2,500.59	$ -	$ 3,884.73	$ 226,091	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
	3.020	FDR-C	349,190	SQYD	$ 3.48	$ 2.60	$ -	$ -	$ 6.08	$ 2,123,975	Full Depth Reclamation
	3.021	Cement	17,470	TON	$ -	$ -	$ 169.71	$ -	$ 169.71	$ 2,964,849	
4		**Other Roadwork**									

27.04. Cost Work Sheet Summary: County, Delevan & Maxwell Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.001	Allowance for Temporary Bridges / Modification of Existing Bridges	10,705	SF	$ -	$ -	$ -	$ 368.00	$ 368.00	$ 3,939,440	Includes provision for temporary Bridges / Modification of Existing Bridges
	4.002	Midwest Guardrail System	11,236	LF	$ 5.40	$ 2.40	$ 43.53	$ -	$ 51.33	$ 576,753	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	28	EA	$ 1,170.26	$ 1,041.70	$ 2,693.75	$ -	$ 4,905.71	$ 137,360	Assume 4 at each culvert crossing, assume wood posts
	4.004	End Anchor Assembly (Type SFT)	28	EA	$ 1,170.26	$ 1,041.70	$ 592.63	$ -	$ 2,804.58	$ 78,528	Assume 4 at each culvert crossing, assume wood posts
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	1,384	LF					$ 109.29	$ 151,253	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*1,032*	*LCY*	*$ 5.88*	*$ 5.71*	*$ -*	*$ -*	*$ 11.60*	*$ 11,963*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*1,032*	*LCY*	*$ 6.07*	*$ 12.87*	*$ -*	*$ -*	*$ 18.94*	*$ 19,536*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*1,384*	*LF*	*$ 37.26*	*$ 7.18*	*$ 32.11*	*$ -*	*$ 76.55*	*$ 105,946*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*1,032*	*LCY*	*$ 2.47*	*$ 6.61*	*$ -*	*$ -*	*$ 9.09*	*$ 9,372*	
	4.010	*Sand Bedding*	*90*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 4,436*	
	4.011	Box culvert single cell	7	EA	$ 709.53	$ 279.54	$ 10,020.75	$ -	$ 11,009.82	$ 77,069	Assume 8' long, 12' x 8'
	4.012	Paint Traffic Stripe - 6" Yellow	224,712	LF	$ 0.24	$ 0.14	$ 0.70	$ -	$ 1.08	$ 243,723	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	224,712	LF	$ 0.24	$ 0.14	$ 0.70	$ -	$ 1.08	$ 243,723	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	113	EA	$ 265.32	$ 113.30	$ 562.46	$ -	$ 941.08	$ 106,342	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	52.00	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 10,962	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	156	EA	$ 38.70	$ 15.05	$ 71.96	$ -	$ 125.71	$ 19,610	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	374,710	SF	$ -	$ -	$ -	$ 0.29	$ 0.29	$ 107,729	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	-	SF					$ -	$ -	Not required
	4.021	*Setting and removing formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Concrete fill work*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Provide/Install Reinforcing*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	22	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 1,100,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow $50,000/mile for road patching and repair
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 17,189,207	$ 17,189,207	$ 257,838	
		Total Direct Cost	112,356	LF	$ 19.37	$ 14.19	$ 73.53	$ 48.20	$ 155.28	$ 17,447,045	

Sites Reservoir (Alt 1): Access Roads A, B, C & Comm Roads | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.05. Construction Cost Summary: Access Roads A, B, C & Comm Roads

				Unit Cost Rate ($/LF)	Total Cost
			LF:	26,766	
Total Direct Cost				558.94	14,960,614
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				558.94	14,960,614
General Conditions					
Mobilization			5.0%	27.95	748,031
Site General Conditions & Requirements			10.0%	58.69	1,570,865
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	7.10	190,075
Bonds			0.6%	3.92	104,818
GC Field and Home Office Overhead			5.0%	32.83	878,720
GC Profit			5.0%	34.47	922,656
Total Contractor Indirect Markups				164.95	4,415,165
TOTAL DIRECT COST BEFORE CONTINGENCIES				**723.90**	**19,375,779**
Contingencies					
Design Contingencies			10.0%	72.39	1,937,578
Construction Contingencies			15.0%	119.44	3,197,004
Total Contingency Allowance				191.83	5,134,582
TOTAL DIRECT COST BEFORE ESCALATION				**915.73**	**24,510,361**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	8.94	239,352
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**924.67**	**24,749,713**

27.05. Cost Work Sheet Summary: Access Roads A, B, C & Comm Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Access Roads A, B, C & Comm Roads									
		Road length (LF)	26,766	LF							
		Road length (Miles)	6	MILES							
		Road Area (SF)	401,490	SF							
		Road Area (SY)	44,610	SY							
		Road Area (Acre)	10	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	24	ACRE	$ 1,219.91	$ 2,007.63	$ -	$ -	$ 3,227.54	$ 77,461	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	4,800	LF					$ 6.05	$ 29,049	
	2.002	*Setup temporary silt fence*	*4,800*	*LF*	*$ 2.00*	*$ 0.81*	*$ 0.44*	*$ -*	*$ 3.25*	*$ 15,611*	
	2.003	*Silt fence removal*	*4,800*	*LF*	*$ 1.12*	*$ 0.48*	*$ -*	*$ 1.20*	*$ 2.80*	*$ 13,438*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	344,800	CY					$ 10.15	$ 3,500,883	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*396,520*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.26*	*$ 1,690,436*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*396,520*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.57*	*$ 1,810,447*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	63,500	CY					$ 11.11	$ 705,671	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*73,025*	*LCY*	*$ 2.17*	*$ 2.25*	*$ -*	*$ -*	*$ 4.42*	*$ 322,602*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*73,025*	*LCY*	*$ 1.54*	*$ 3.71*	*$ -*	*$ -*	*$ 5.25*	*$ 383,068*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	9,300	CY					$ 18.71	$ 174,019	Excavated material to be stockpiled for re-use, average 0.5 mile haul
	2.017	*Blasting operations*	*3,348*	*LCY*	*$ 4.58*	*$ 4.38*	*$ 4.85*	*$ -*	*$ 13.80*	*$ 46,209*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*7,812*	*LCY*	*$ 3.01*	*$ 3.88*	*$ -*	*$ -*	*$ 6.88*	*$ 53,769*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 0.5 mile haul*	*11,160*	*LCY*	*$ 1.96*	*$ 4.68*	*$ -*	*$ -*	*$ 6.63*	*$ 74,040*	*Haul to stockpile location, 0.5 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	226,300	CY					$ 9.80	$ 2,218,116	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*248,930*	*LCY*	*$ 2.11*	*$ 2.19*	*$ -*	*$ -*	*$ 4.30*	*$ 1,071,039*	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*248,930*	*LCY*	*$ 1.38*	*$ 3.23*	*$ -*	*$ -*	*$ 4.61*	*$ 1,147,077*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	226,300	CY					$ 6.89	$ 1,559,021	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*226,300*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*226,300*	*LCY*	*$ 3.65*	*$ 3.24*	*$ -*	*$ -*	*$ 6.89*	*$ 1,559,021*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	2,900	CY					$ 68.46	$ 198,528	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*4,930*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 74,685*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*3,335*	*LCY*	*$ 12.60*	*$ 14.77*	*$ -*	*$ -*	*$ 27.38*	*$ 91,307*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*3,335*	*LCY*	*$ 5.02*	*$ 4.74*	*$ -*	*$ -*	*$ 9.76*	*$ 32,536*	
	3.013	Class 2 Aggregate base	20,900	CY					$ 61.31	$ 1,281,303	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*35,530*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 538,248*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*24,035*	*LCY*	*$ 10.49*	*$ 12.30*	*$ -*	*$ -*	*$ 22.79*	*$ 547,839*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*24,035*	*LCY*	*$ 4.18*	*$ 3.94*	*$ -*	*$ -*	*$ 8.12*	*$ 195,216*	
	3.018	Asphalt concrete	3,900	TON	$ 9.86	$ 5.43	$ 102.88	$ -	$ 118.17	$ 460,871	Not required
	3.019	Tack Coat	3	TON	$ 2,270.76	$ 1,139.04	$ 6,191.07	$ -	$ 9,600.86	$ 28,803	Not required
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	2,677	LF	$ 5.67	$ 2.52	$ 43.54	$ -	$ 51.73	$ 138,456	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'

27.05. Cost Work Sheet Summary: Access Roads A, B, C & Comm Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	973	LF					$ 106.42	$ 103,549	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*725*	*LCY*	*$ 5.58*	*$ 5.42*	*$ -*	*$ -*	*$ 11.00*	*$ 7,975*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*725*	*LCY*	*$ 5.75*	*$ 12.20*	*$ -*	*$ -*	*$ 17.96*	*$ 13,024*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*973*	*LF*	*$ 36.13*	*$ 6.97*	*$ 32.11*	*$ -*	*$ 75.21*	*$ 73,183*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*725*	*LCY*	*$ 2.34*	*$ 6.27*	*$ -*	*$ -*	*$ 8.62*	*$ 6,248*	
	4.010	*Sand Bedding*	*63*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 3,119*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	10,382	LF	$ 0.36	$ 0.21	$ 0.70	$ -	$ 1.27	$ 13,226	Includes 2 yellow stripes for road for C1 only
	4.013	Paint Traffic Stripe - 6" White	692	LF	$ 2.69	$ 1.61	$ 0.70	$ -	$ 5.00	$ 3,462	Assume 2 edge of traveled way stripes for road for C1 only
	4.014	Roadside Signs	27	EA	$ 317.26	$ 135.48	$ 562.46	$ -	$ 1,015.20	$ 27,410	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	80,300	SF	$ 0.07	$ 0.03	$ 0.07	$ -	$ 0.17	$ 13,327	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	16.00	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 3,373	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	24	EA	$ 62.89	$ 24.45	$ 71.96	$ -	$ 159.30	$ 3,823	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.020	Retaining walls (Allowance)	53,532	SF					$ 72.84	$ 3,899,171	Allow 10' high on both sides for 10% of the road length. Includes excavation, backfill & reinforcement.
	4.021	*Setting and removing formwork*	*107,064*	*SF*	*$ 9.57*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.04*	*$ 1,288,572*	
	4.022	*Concrete fill work*	*3,965*	*CY*	*$ 30.97*	*$ 7.45*	*$ 224.18*	*$ -*	*$ 262.60*	*$ 1,041,315*	
	4.023	*Provide/Install Reinforcing*	*397*	*TON*	*$ 1,094.21*	*$ 60.99*	*$ 2,802.31*	*$ -*	*$ 3,957.51*	*$ 1,569,284*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	6	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 300,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow $50,000/mile for road patching and repair
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 14,739,521	$ 14,739,521	$ 221,093	
		Total Direct Cost	26,766	LF	$ 207.79	$ 201.43	$ 129.92	$ 19.80	$ 558.94	$ 14,960,614	

Sites Reservoir (Alt 1): Peninsula Hills Recreation Roads | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.06. Construction Cost Summary: Peninsula Hills Recreation Roads

				Unit Cost Rate ($/LF)	Total Cost
			LF:	10,841	
Total Direct Cost				447.65	4,852,962
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				447.65	4,852,962
General Conditions					
Mobilization			5.0%	22.38	242,648
Site General Conditions & Requirements			10.0%	47.00	509,561
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	5.69	61,657
Bonds			0.6%	3.14	34,001
GC Field and Home Office Overhead			5.0%	26.29	285,041
GC Profit			5.0%	27.61	299,294
Total Contractor Indirect Markups				132.11	1,432,202
TOTAL DIRECT COST BEFORE CONTINGENCIES				**579.76**	**6,285,164**
Contingencies					
Design Contingencies			10.0%	57.98	628,516
Construction Contingencies			15.0%	95.66	1,037,052
Total Contingency Allowance				153.64	1,665,568
TOTAL DIRECT COST BEFORE ESCALATION				**733.39**	**7,950,732**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	7.16	77,642
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**740.55**	**8,028,374**

27.06. Cost Work Sheet Summary: Peninsula Hills Recreation Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Peninsula Hills Recreation Roads									
		Road length (LF)	10,841	LF							
		Road length (Miles)	3	MILES							
		Road Area (SF)	325,232	SF							
		Road Area (SY)	36,137	SY							
		Road Area (Acre)	8	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	10	ACRE	$ 1,478.67	$ 2,433.49	$ -	$ -	$ 3,912.17	$ 38,730	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	1,760	LF					$ 8.45	$ 14,869	
	2.002	*Setup temporary silt fence*	*1,760*	*LF*	*$ 1.81*	*$ 0.74*	*$ 0.44*	*$ -*	*$ 3.00*	*$ 5,275*	
	2.003	*Silt fence removal*	*1,760*	*LF*	*$ 1.53*	*$ 0.65*	*$ -*	*$ 3.27*	*$ 5.45*	*$ 9,594*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	108,460	CY					$ 10.35	$ 1,122,420	Includes hauling to stockpile within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*124,729*	*LCY*	*$ 2.13*	*$ 2.21*	*$ -*	*$ -*	*$ 4.35*	*$ 541,972*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*124,729*	*LCY*	*$ 1.39*	*$ 3.26*	*$ -*	*$ -*	*$ 4.65*	*$ 580,449*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	19,965	CY					$ 11.31	$ 225,815	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*22,960*	*LCY*	*$ 2.21*	*$ 2.29*	*$ -*	*$ -*	*$ 4.50*	*$ 103,233*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*22,960*	*LCY*	*$ 1.57*	*$ 3.77*	*$ -*	*$ -*	*$ 5.34*	*$ 122,582*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	3,025	CY					$ 23.76	$ 71,887	Excavated material to be stockpiled for re-use, average 3 mile haul
	2.017	*Blasting operations*	*1,089*	*LCY*	*$ 7.04*	*$ 6.73*	*$ 4.85*	*$ -*	*$ 18.61*	*$ 20,268*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*2,541*	*LCY*	*$ 3.08*	*$ 3.97*	*$ -*	*$ -*	*$ 7.05*	*$ 17,923*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 1.5 mile haul*	*3,630*	*LCY*	*$ 2.59*	*$ 6.69*	*$ -*	*$ -*	*$ 9.28*	*$ 33,695*	*Haul to stockpile location, 1.5 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	71,225	CY					$ 9.76	$ 694,832	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*78,348*	*LCY*	*$ 2.10*	*$ 2.18*	*$ -*	*$ -*	*$ 4.28*	*$ 335,506*	*Include 10% swell factor*
	2.025	*Load and haul to fill location, 0.5 mile haul*	*78,348*	*LCY*	*$ 1.37*	*$ 3.21*	*$ -*	*$ -*	*$ 4.59*	*$ 359,325*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	71,225	CY					$ 7.04	$ 501,114	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*71,225*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*71,225*	*LCY*	*$ 3.73*	*$ 3.31*	*$ -*	*$ -*	*$ 7.04*	*$ 501,114*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	6,050	CY					$ 66.69	$ 403,494	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*10,285*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 155,809*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*6,958*	*LCY*	*$ 12.08*	*$ 14.16*	*$ -*	*$ -*	*$ 26.25*	*$ 182,613*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*6,958*	*LCY*	*$ 4.81*	*$ 4.54*	*$ -*	*$ -*	*$ 9.35*	*$ 65,072*	
	3.013	Class 2 Aggregate base	6,050	CY					$ 66.69	$ 403,494	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*10,285*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 155,809*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*6,958*	*LCY*	*$ 12.08*	*$ 14.16*	*$ -*	*$ -*	*$ 26.25*	*$ 182,613*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*6,958*	*LCY*	*$ 4.81*	*$ 4.54*	*$ -*	*$ -*	*$ 9.35*	*$ 65,072*	
	3.018	Asphalt concrete	8,129	TON	$ 9.46	$ 5.21	$ 102.88	$ -	$ 117.55	$ 955,603	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	6	TON	$ 985.25	$ 494.21	$ 2,486.86	$ -	$ 3,966.32	$ 23,996	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
4		**Other Roadwork**									
	4.00	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required

27.06. Cost Work Sheet Summary: Peninsula Hills Recreation Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.002	Midwest Guardrail System	1,084	LF	$ 6.22	$ 2.76	$ 43.53	$ -	$ 52.52	$ 56,934	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	402	LF					$ 118.02	$ 47,387	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*299*	*LCY*	*$ 6.76*	*$ 6.57*	*$ -*	*$ -*	*$ 13.32*	*$ 3,988*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*299*	*LCY*	*$ 6.97*	*$ 14.79*	*$ -*	*$ -*	*$ 21.76*	*$ 6,512*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*402*	*LF*	*$ 40.87*	*$ 7.88*	*$ 32.14*	*$ -*	*$ 80.89*	*$ 32,476*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*299*	*LCY*	*$ 2.84*	*$ 7.60*	*$ -*	*$ -*	*$ 10.44*	*$ 3,124*	
	4.010	*Sand Bedding*	*26*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 1,287*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	21,682	LF	$ 0.26	$ 0.15	$ 0.70	$ -	$ 1.11	$ 24,117	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	21,682	LF	$ 0.26	$ 0.15	$ 0.70	$ -	$ 1.11	$ 24,117	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	11	EA	$ 389.37	$ 166.27	$ 562.46	$ -	$ 1,118.09	$ 12,299	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	33,110	SF	$ 0.08	$ 0.03	$ 0.07	$ -	$ 0.19	$ 6,170	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	5.87	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 1,237	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	9	EA	$ 171.53	$ 66.69	$ 71.96	$ -	$ 310.17	$ 2,730	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	-	SF					$ -	$ -	Not required
	4.021	*Setting and removing formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Concrete fill work*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Provide/Install Reinforcing*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	3	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 150,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow $50,000/mile for road patching and repair
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 4,781,243	$ 4,781,243	$ 71,719	
		Total Direct Cost	10,841	LF	$ 136.10	$ 173.31	$ 117.14	$ 21.10	$ 447.65	$ 4,852,962	

Sites Reservoir (Alt 1): Sites Lodoga Road Realignment Bridges | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

27.07. Construction Cost Summary: Sites Lodoga Road Realignment Bridges

				Unit Cost Rate ($/SF)	Total Cost
			SF:	107,672	
Total Direct Cost				806.32	86,817,610
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				806.32	86,817,610
General Conditions					
Mobilization			5.0%	40.32	4,340,880
Site General Conditions & Requirements			10.0%	84.66	9,115,849
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	10.24	1,103,018
Bonds			0.6%	5.65	608,264
GC Field & Home Office Overhead			5.0%	47.36	5,099,281
GC Profit			5.0%	49.73	5,354,245
Total Contractor Indirect Markups				237.96	25,621,537
TOTAL DIRECT COST BEFORE CONTINGENCIES				**1,044.27**	**112,439,147**
Contingencies					
Design Contingencies			15.0%	156.64	16,865,872
Construction Contingencies			15.0%	180.14	19,395,753
Total Contingency Allowance				336.78	36,261,625
TOTAL DIRECT COST BEFORE ESCALATION				**1,381.05**	**148,700,772**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	13.49	1,452,113
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**1,394.54**	**150,152,885**

27.07. Cost Work Sheet Summary: Sites Lodoga Road Realignment Bridges

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Sites Lodoga Road Realignment Bridges									
		Bridge length (LF)	3,033.00	LF							Bridge 1: 1400', Bridge 2: 1633'
		Bridge width (LF)	35.50	LF							
		Bridge Area (SF)	107,671.50	SF							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY							Assume no demolition work required
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Not required, Included elsewhere
2		**Temporary Access Road Development**									
	2.001	Develop Access Road to Abutments	3,033.00	LF					$ 195.31	$ 592,389	Cut-fill balance on hillsides - Assumed 10 ft average cut/fill depth for earthwork; AB surfacing - Assumed 12" thick aggregate surfacing; Assume average road width of 25'; Assume 1 x the bridge total bridge length
	2.002	*Clear and grub*	*2.00*	*ACRE*	*$ 2,864.94*	*$ 4,832.91*	*$ -*	*$ -*	*$ 7,697.85*	*$ 15,396*	*Clear, grade, provide gravel fill layer and compact*
	2.003	*Road excavation work (earth cutting allowance)*	*30,891.67*	*LCY*	*$ 1.72*	*$ 2.91*	*$ -*	*$ -*	*$ 4.63*	*$ 142,945*	*Assume average cut of say 10', average width of 25', Include 10% swell factor; assume common earth*
	2.004	*Load and haul to fill location, 0.5 mile haul*	*30,891.67*	*LCY*	*$ 0.51*	*$ 1.88*	*$ -*	*$ -*	*$ 2.39*	*$ 73,980*	*Assume 0.5 mile haul, no stockpiling needed, direct filling*
	2.005	*Place and compact using excavated material (earth filling allowance)*	*30,891.67*	*LCY*	*$ 1.80*	*$ 2.60*	*$ -*	*$ -*	*$ 4.40*	*$ 135,853*	*Assume average fill of say 10', average width of 25', Include 10% swell factor*
	2.006	*Purchase processed material from quarry*	*5,252.00*	*TON*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 116,576*	*12' thick aggregate base layer, assume average width of 25' assume 1.7ton/CY, purchase material from commercial quarry*
	2.007	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*3,399.00*	*LCY*	*$ 12.19*	*$ 14.15*	*$ -*	*$ -*	*$ 26.34*	*$ 89,524*	*35 mile haul distance assumed*
	2.008	*Place and compact road base*	*3,399.00*	*LCY*	*$ 2.18*	*$ 3.15*	*$ -*	*$ -*	*$ 5.33*	*$ 18,114*	
	2.009	*Remove temp access road*	*1.00*	*LCY*					*$ -*	*$ -*	*Not required*
3		**Foundation Excavations**									
	3.001	Surveying allowance, survey access, pier, and abutment locations	150.00	DAYS	$ 3,054.53	$ 740.34	$ -	$ -	$ 3,794.87	$ 569,230	150 day surveying allowance
	3.002	Structure Excavation	24,360.00	CY					$ 10.39	$ 252,993	Excavations for pier caps
	3.003	*Bridge foundation excavations in soft rock / common soil*	*18,757.20*	*LCY*	*$ 1.51*	*$ 2.79*	*$ -*	*$ -*	*$ 4.30*	*$ 80,656*	*Assume 70% of excavations in common earth*
	3.004	*Bridge foundation excavations in hard rock*	*8,038.80*	*LCY*	*$ 2.41*	*$ 3.78*	*$ -*	*$ -*	*$ 6.20*	*$ 49,804*	*Assume 30% in weathered rock, provision for blasting and ripping*
	3.005	*Load and haul to disposal site, 1 mile haul*	*26,796.00*	*LCY*	*$ 1.11*	*$ 3.46*	*$ -*	*$ -*	*$ 4.57*	*$ 122,533*	*Assume 1 mile haul*
	3.006	Footing Foundation Cleanup	107,671.50	SF					$ 1.30	$ 140,100	Assume bridge footprint for cleaning work
	3.007	*Foundation cleaning*	*11,963.50*	*SY*	*$ 7.61*	*$ 3.10*	*$ -*	*$ -*	*$ 10.71*	*$ 128,090*	
	3.008	*Load and haul to disposal site, 1 mile haul*	*2,193.31*	*CY*	*$ 1.45*	*$ 4.03*	*$ -*	*$ -*	*$ 5.48*	*$ 12,010*	*Assume removal of top layer, 0.5' thick*
4		**Foundation Piling**									
	4.001	48" Cast-In-Drilled-Hole Concrete Piling	23,760.00	LF					$ 658.66	$ 15,649,880	CIDH piles, assume average 60' deep, 35' to rock, 5' rock socketing
	4.002	*Drilling rig and support crane mobilization/Demobilization allowance*	*2.00*	*EA*	*$ 27,062.54*	*$ 20,851.63*	*$ -*	*$ -*	*$ 47,914.17*	*$ 95,828*	*Mobilize piling rig, support crane, piling material and related equipment for operation.*
	4.003	*Drill, 48" Dia. Caltrans CIDH Piling*	*23,760.00*	*LF*	*$ 138.27*	*$ 60.15*	*$ -*	*$ -*	*$ 198.42*	*$ 4,714,351*	*Assume 60' deep piles, 396 piles; Assumed 40% soft to medium rock and 60% hard rock, include temporary steel casing to be used, permanent casing not required*
	4.004	*Remove/excavate soil*								*Included above*	
	4.005	*Load and haul to disposal site, 1 mile haul*	*12,164.25*	*LCY*	*$ 1.13*	*$ 3.52*	*$ -*	*$ -*	*$ 4.65*	*$ 56,554*	
	4.006	*Place Concrete Fill, 48" Dia. Caltrans CIDH Piling*	*11,881.76*	*CY*	*$ 54.79*	*$ 14.68*	*$ 328.22*	*$ -*	*$ 397.68*	*$ 4,725,121*	*Include rock socket, temporary steel casing to be used for 30% of the total pile length, permanent casing not required*
	4.007	*Provide/Install Reinforcing for CIDH Piles*	*1,485*	*TON*	*$ 590.88*	*$ 11.22*	*$ 3,237.62*	*$ -*	*$ 3,839.71*	*$ 5,702,814*	*Allow 250 lb/cy reinforcement, include epoxy coating*
	4.008	*CIDH Observation Tubes*	*2,376.00*	*EA*	*$ -*	*$ -*	*$ -*	*$ 149.50*	*$ 149.50*	*$ 355,212*	*Allow 6 per pile*
	4.009	24" Cast-In-Drilled-Hole Concrete Piling	2,880.00	LF					$ 245.33	$ 706,552	CIDH piles, assume average 60' deep, 35' to rock, 5' rock socketing
	4.010	*Drilling rig and support crane mobilization/Demobilization allowance*	*-*	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include above*
	4.011	*Drill, 24" Dia. Caltrans CIDH Piling*	*2,880.00*	*LF*	*$ 86.41*	*$ 36.88*	*$ -*	*$ -*	*$ 123.29*	*$ 355,078*	*Assume 60' deep piles, 48 piles; Assumed 40% common earth and 60% rock, include temporary steel casing to be used, permanent casing not required*
	4.012	*Remove/excavate soil*								*Included above*	
	4.013	*Load and haul to disposal site, 1 mile haul*	*368.61*	*LCY*	*$ 4.31*	*$ 11.98*	*$ -*	*$ -*	*$ 16.29*	*$ 6,005*	
	4.014	*Place Concrete Fill, 24" Dia. Caltrans CIDH Piling*	*360.05*	*CY*	*$ 46.90*	*$ 16.33*	*$ 379.32*	*$ -*	*$ 442.56*	*$ 159,346*	*Include rock socket, temporary steel casing to be used for 30% of the total pile length, permanent casing not required*
	4.015	*Provide/Install Reinforcing for CIDH Piles*	*36.01*	*TON*	*$ 722.18*	*$ 13.71*	*$ 3,237.62*	*$ -*	*$ 3,973.51*	*$ 143,067*	*Allow 200 lb/cy reinforcement, include epoxy coating*
	4.016	*CIDH Observation Tubes*	*288.00*	*EA*	*$ -*	*$ -*	*$ -*	*$ 149.50*	*$ 149.50*	*$ 43,056*	*Allow 6 per pile*
	4.017	Pile testing allowance	1.5%	%				$ 16,356,432	$ 16,356,432	$ 245,346	Pile testing allowance
	4.018	Inspection/observation tubes needed	1.00	LS						Included above	
	4.019	Pile caps	-	CY						Included below	
5		**Bridge Foundation Footings**									
	5.001	Structural Concrete, Bridge Footing	19,040.00	CY					$ 642.46	$ 12,232,352	Assume 1750CY per footing, Include setting/removing formwork, 2,800 sf per footing; 250 lb/cy reinforcement
	5.002	*Footing excavations*	*-*	*LCY*						*Included above*	*Included within foundation excavations*
	5.003	*Load and haul to disposal site, 5 mile haul*	*-*	*LCY*						*Included above*	*Included above*
	5.004	*Setting and removing formwork*	*31,132.00*	*SF*	*$ 12.47*	*$ 1.12*	*$ 5.14*	*$ -*	*$ 18.74*	*$ 583,295*	*Steel framed plywood*
	5.005	*Concrete fill work*	*19,040.00*	*CY*	*$ 32.58*	*$ 7.83*	*$ 228.62*	*$ -*	*$ 269.03*	*$ 5,122,357*	*Concrete to be poured by 28M concrete pump truck*
	5.006	*Provide/Install Reinforcing*	*2,380*	*TON*	*$ 932.60*	*$ 29.29*	*$ 1,780.42*	*$ -*	*$ 2,742.31*	*$ 6,526,699*	*Allow 250 lb/cy reinforcement, include epoxy coating*
6		**Bridge Structure**									
	6.001	Concrete pier / column	-	LF						Included below	Cast in place columns, included elsewhere
	6.002	*Placement of precast concrete rings*	*-*	*LF*							
	6.003	*Fill concrete shaft with concrete*	*-*	*CY*							
	6.004	*Provide/Install Reinforcing*	*-*	*LB*							
	6.005	Pier cap at top	-	CY						Included below	Included elsewhere

27.07. Cost Work Sheet Summary: Sites Lodoga Road Realignment Bridges

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	6.006	Bridge bearing / bearing pad	15.00	EA	$ -	$ -	$ -	$ 9,660.00	$ 9,660.00	$ 144,900	1 x bearing per bridge column
	6.007	Structural Concrete, Bridge Columns	20,650.00	CY					$ 1,469.00	$ 30,334,875	Include piers/columns and pier/column cap, bridge deck included elsewhere, cast in place
	6.008	*Setting and removing formwork*	*135,220.00*	*SF*	*$ 21.19*	*$ 19.35*	*$ 5.06*	*$ -*	*$ 45.60*	*$ 6,165,951*	*Allowance for climbing forms*
	6.009	*Concrete fill work*	*20,650.00*	*CY*	*$ 45.60*	*$ 13.77*	*$ 233.06*	*$ -*	*$ 292.44*	*$ 6,038,826*	*Concrete to be poured by crane and the same crane to be used to pull formwork upwards for piers. Allowance for (2) cranes for both bridges*
	6.0091	*Standing time*	*20,650.00*	*CY*	*$ -*	*$ 16.20*	*$ -*	*$ -*	*$ 16.20*	*$ 334,441*	*Standing time for concrete crew equipment in between concrete pours*
	6.010	*Provide/Install Reinforcing*	*4,646.25*	*TON*	*$ 497.06*	*$ 39.94*	*$ 3,293.11*	*$ -*	*$ 3,830.11*	*$ 17,795,657*	*Allow 450 lb/cy reinforcement, include epoxy coating*
	6.011	Bridge deck system		SF						Included below	Cast in place bridge deck structure, included elsewhere
	6.012	Structural Concrete, Bridge	10,920.00	CY					$ 1,936.67	$ 21,148,405	Deck concrete, cast in place
	6.013	*Allowance for Incremental bridge construction system*	*1.00*	*LS*	*$ -*	*$ -*	*$ -*	*$ 10,035,539*	*$ 10,035,539*	*$ 10,035,539*	*Two bridges to be poured separately using the same assembly*
	6.014	*Setting and removing formwork*	*44,460.00*	*SF*	*$ 14.84*	*$ 0.69*	*$ 6.94*	*$ -*	*$ 22.47*	*$ 999,078*	*Job-built plywood formwork, 4 use. Formwork to be built for two spans and used multiple times.*
	6.015	*Concrete fill work*	*10,920.00*	*CY*	*$ 23.99*	*$ 7.21*	*$ 248.80*	*$ -*	*$ 280.00*	*$ 3,057,572*	*Concrete to be poured by 28M concrete pump truck at casting base.*
	6.0151	*Standing time*	*10,920.00*	*CY*	*$ -*	*$ 63.18*	*$ -*	*$ -*	*$ 63.18*	*$ 689,918*	*Standing time for concrete crew equipment in between concrete pours*
	6.016	*Provide/Install Reinforcing*	*2,457*	*TON*	*$ 975.32*	*$ 91.90*	*$ 1,371.74*	*$ -*	*$ 2,438.97*	*$ 5,992,549*	*Allow 450 lb/cy reinforcement*
	6.0161	*Monitoring allowance for incremental launching*	*13*	*EA*	*$ -*	*$ -*	*$ -*	*$ 28,750.00*	*$ 28,750.00*	*$ 373,750*	*Allowance for monitoring work during deck launching*
	6.017	Prestressing Cast-In-Place Concrete	493,520.00	LB	*$ -*	*$ -*	*$ -*	*$ 2.49*	*$ 2.49*	*$ 1,227,606*	
	6.018	Bar Reinforcing Steel	8,449	TON						Included above	
7		**Approach work**									
	7.001	Structural Fill	5,030.00	CY					$ 74.74	$ 375,953	
	7.002	*Purchase processed material from quarry*	*9,406.10*	*TON*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 208,782*	*Allow 1.7ton/CY, include 10% waste factor*
	7.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*6,086.30*	*LCY*	*$ 10.62*	*$ 11.58*	*$ -*	*$ -*	*$ 22.20*	*$ 135,105*	*Include 10% swell factor*
	7.004	*Place and compact*	*6,086.30*	*LCY*	*$ 2.50*	*$ 2.77*	*$ -*	*$ -*	*$ 5.27*	*$ 32,065*	
	7.005	Structural Concrete, Approach Slab	60.00	CY					$ 577.86	$ 34,672	
	7.006	*Approach slab excavations*	*30.00*	*LCY*	*$ 56.04*	*$ 25.67*	*$ -*	*$ -*	*$ 81.70*	*$ 2,451*	*Assume 50% of approach slab quantity*
	7.007	*Load and haul to disposal site, 1 mile haul*	*30.00*	*LCY*	*$ 73.78*	*$ 64.35*	*$ -*	*$ -*	*$ 138.12*	*$ 4,144*	*Included above*
	7.008	*Place Structural Approach Slab*	*60.00*	*CY*	*$ 51.17*	*$ 12.30*	*$ 228.62*	*$ -*	*$ 292.10*	*$ 17,526*	
	7.009	*Provide/Install Reinforcing*	*3.60*	*TON*	*$ 1,229.85*	*$ 68.55*	*$ 1,632.41*	*$ -*	*$ 2,930.81*	*$ 10,551*	*Allow 120 lb/cy reinforcement*
8		**Bridge General Work**									
	8.001	Concrete Barrier (Type 842)	6,150.00	LF	$ -	$ -	$ -	$ 103.50	$ 103.50	$ 636,525	
	8.002	Abutment wall allowance	1,420.00	SF						Included above	
	8.003	Setting and removing formwork	2,840.00	SF							
	8.004	Concrete fill work	2,130.00	CY							
	8.005	Provide/Install Reinforcing	745,500.00	LB							
	8.006	Abutment seat allowance	142.00	CY						Included above	
	8.007	Setting and removing formwork	21,300.00	SF							
	8.008	Concrete fill work	142.00	CY							
	8.009	Provide/Install Reinforcing	42,600.00	LB							
	8.010	Abutment expansion joint	142.00	LF	$ 13.42	$ -	$ 7.33	$ -	$ 20.74	$ 2,946	
	8.011	Allowance for inspection vault	4.00	LS						Not required	
	8.012	Asphalt concrete, 4" thick	107,671.50	SF						Not required	Not required, Polymer Fiber deck
	8.013	Paint Traffic Stripe - 6" Yellow	6,066.00	LF	$ 0.31	$ 0.18	$ 0.70	$ -	$ 1.19	$ 7,226	
	8.014	Paint Traffic Stripe - 6" White	6,066.00	LF	$ 0.31	$ 0.18	$ 0.70	$ -	$ 1.19	$ 7,226	
	8.015	Roadside Signs	8.00	EA	$ 267.69	$ 114.31	$ 131.46	$ -	$ 513.46	$ 4,108	Includes steel posts, Includes furnish aluminum sign panels, allow 4 signs per bridge
	8.016	Joint Seal Assembly (Mr 4")	290.00	LF	$ -	$ -	$ -	$ 3,220.00	$ 3,220.00	$ 933,800	
	8.017	Lighting	1.00	LS	$ -	$ -	$ 7.33	$ 287,500.00	$ 287,507.33	$ 287,507	Allowance
9		**Misc Allowance**									
	9.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 85,534,591	$ 85,534,591	$ 1,283,019	
		- Bridge deck access hatches									
		- Access ladders and platforms									
		- Other misc. items									
		Total Direct Cost	107,672	SF	$ 174.10	$ 67.28	$ 420.36	$ 144.57	$ 806.32	$ 86,817,610	

Sites Reservoir (Alt 1): Sites Lodoga Road Temporary Detour | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.08. Construction Cost Summary: Sites Lodoga Road Temporary Detour

				Unit Cost Rate ($/LF)	Total Cost
			LF:	6,500	
Total Direct Cost				1,773.10	11,525,131
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				1,773.10	11,525,131
General Conditions					
Mobilization			5.0%	88.65	576,257
Site General Conditions & Requirements			10.0%	186.18	1,210,139
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	22.53	146,427
Bonds			0.6%	12.42	80,748
GC Field and Home Office Overhead			5.0%	104.14	676,935
GC Profit			5.0%	109.35	710,782
Total Contractor Indirect Markups				523.28	3,401,288
TOTAL DIRECT COST BEFORE CONTINGENCIES				**2,296.37**	**14,926,419**
Contingencies					
Design Contingencies			10.0%	229.64	1,492,642
Construction Contingencies			15.0%	378.90	2,462,859
Total Contingency Allowance				608.54	3,955,501
TOTAL DIRECT COST BEFORE ESCALATION				**2,904.91**	**18,881,920**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	28.37	184,388
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**2,933.28**	**19,066,308**

27.08. Cost Work Sheet Summary: Sites Lodoga Road Temporary Detour

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Sites Lodoga Road Temporary Detour									
		Road length (LF)	6,500	LF							
		Road length (Miles)	2	MILES							
		Road Area (SF)	156,000	SF							
		Road Area (SY)	17,333	SY							
		Road Area (Acre)	4	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	11	ACRE	$ 1,330.81	$ 2,190.14	$ -	$ -	$ 3,520.95	$ 38,730	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	800	LF					$ 18.05	$ 14,443	
	2.002	*Setup temporary silt fence*	*800*	*LF*	*$ 3.99*	*$ 1.62*	*$ 0.44*	*$ -*	*$ 6.06*	*$ 4,848*	
	2.003	*Silt fence removal*	*800*	*LF*	*$ 3.37*	*$ 1.43*	*$ -*	*$ 7.19*	*$ 11.99*	*$ 9,594*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	499,600	CY					$ 10.16	$ 5,077,616	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*574,540*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.27*	*$ 2,451,777*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*574,540*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.57*	*$ 2,625,839*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	69,000	CY					$ 11.05	$ 762,124	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*79,350*	*LCY*	*$ 2.16*	*$ 2.24*	*$ -*	*$ -*	*$ 4.39*	*$ 348,410*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*79,350*	*LCY*	*$ 1.53*	*$ 3.69*	*$ -*	*$ -*	*$ 5.21*	*$ 413,714*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	26,900	CY					$ 21.11	$ 567,753	Excavated material to be stockpiled for re-use, average 1.5 mile haul
	2.017	*Blasting operations*	*9,684*	*LCY*	*$ 4.75*	*$ 4.54*	*$ 4.85*	*$ -*	*$ 14.13*	*$ 136,882*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*22,596*	*LCY*	*$ 3.12*	*$ 4.02*	*$ -*	*$ -*	*$ 7.14*	*$ 161,308*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 1.5 mile haul*	*32,280*	*LCY*	*$ 2.33*	*$ 6.02*	*$ -*	*$ -*	*$ 8.35*	*$ 269,563*	*Haul to stockpile location, 1.5 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	121,200	CY					$ 9.92	$ 1,202,593	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*133,320*	*LCY*	*$ 2.14*	*$ 2.22*	*$ -*	*$ -*	*$ 4.36*	*$ 580,684*	*Include 10% swell factor*
	2.025	*Load and haul to fill location, 0.25 mile haul*	*133,320*	*LCY*	*$ 1.40*	*$ 3.27*	*$ -*	*$ -*	*$ 4.66*	*$ 621,909*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	121,200	CY					$ 6.89	$ 835,190	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*121,200*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*121,200*	*LCY*	*$ 3.65*	*$ 3.24*	*$ -*	*$ -*	*$ 6.89*	*$ 835,190*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	3,850	CY					$ 68.64	$ 264,274	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*6,545*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 99,151*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*4,428*	*LCY*	*$ 12.66*	*$ 14.84*	*$ -*	*$ -*	*$ 27.50*	*$ 121,742*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*4,428*	*LCY*	*$ 5.04*	*$ 4.76*	*$ -*	*$ -*	*$ 9.80*	*$ 43,381*	
	3.013	Class 2 Aggregate base	3,850	CY					$ 68.64	$ 264,274	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*6,545*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 99,151*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*4,428*	*LCY*	*$ 12.66*	*$ 14.84*	*$ -*	*$ -*	*$ 27.50*	*$ 121,742*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*4,428*	*LCY*	*$ 5.04*	*$ 4.76*	*$ -*	*$ -*	*$ 9.80*	*$ 43,381*	
	3.018	Asphalt concrete	5,200	TON	$ 9.24	$ 5.09	$ 102.88	$ -	$ 117.22	$ 609,525	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	4	TON	$ 873.37	$ 438.09	$ 1,850.44	$ -	$ 3,161.90	$ 12,331	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required

27.08. Cost Work Sheet Summary: Sites Lodoga Road Temporary Detour

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.002	Midwest Guardrail System	650	LF	$ 7.78	$ 3.46	$ 43.56	$ -	$ 54.80	$ 35,621	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	760	LF					$ 115.32	$ 87,645	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*566*	*LCY*	*$ 7.14*	*$ 6.94*	*$ -*	*$ -*	*$ 14.08*	*$ 7,975*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*566*	*LCY*	*$ 7.37*	*$ 15.63*	*$ -*	*$ -*	*$ 22.99*	*$ 13,024*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*760*	*LF*	*$ 37.01*	*$ 7.14*	*$ 32.12*	*$ -*	*$ 76.27*	*$ 57,962*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*566*	*LCY*	*$ 3.00*	*$ 8.03*	*$ -*	*$ -*	*$ 11.03*	*$ 6,248*	
	4.010	*Sand Bedding*	*49*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 2,436*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	13,000	LF	$ 0.29	$ 0.17	$ 0.70	$ -	$ 1.16	$ 15,059	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	13,000	LF	$ 0.29	$ 0.17	$ 0.70	$ -	$ 1.16	$ 15,059	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	7	EA	$ 611.86	$ 261.28	$ 562.46	$ -	$ 1,435.60	$ 10,049	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	71,800	SF	$ 0.08	$ 0.03	$ 0.07	$ -	$ 0.18	$ 12,731	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	8.67	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 1,827	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	27	EA	$ 55.91	$ 21.74	$ 71.96	$ -	$ 149.60	$ 4,039	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.020	Retaining walls (Allowance)	19,500	SF					$ 73.02	$ 1,423,923	
	4.021	*Setting and removing formwork*	*39,000*	*SF*	*$ 9.58*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.05*	*$ 469,920*	
	4.022	*Concrete fill work*	*1,444*	*CY*	*$ 31.89*	*$ 7.67*	*$ 224.18*	*$ -*	*$ 263.74*	*$ 380,953*	
	4.023	*Provide/Install Reinforcing*	*144*	*TON*	*$ 1,103.46*	*$ 61.51*	*$ 2,802.31*	*$ -*	*$ 3,967.27*	*$ 573,050*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	2	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 100,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow $50,000/mile for road patching and repair
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 11,354,809	$ 11,354,809	$ 170,322	
		Total Direct Cost	6,500	LF	$ 654.97	$ 815.40	$ 259.88	$ 42.85	$ 1,773.10	$ 11,525,131	

VE Alternative 1

Sites Reservoir (Alt 1): Dam VE Review | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

1. Construction Cost Summary: Produce embankment materials from on-site materials

				Total Cost
Total Direct Cost Effect				(9,661,076)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(9,661,076)
General Conditions				
Mobilization			5.0%	(483,054)
Site General Conditions & Requirements			10.0%	(1,014,413)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(122,744)
Bonds			0.6%	(67,688)
GC Home Office Overhead			6.0%	(680,938)
GC Profit			8.0%	(962,393)
Total Contractor Indirect Markups				(3,331,230)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(12,992,306)**
Contingencies				
Design Contingencies			10.0%	(1,299,231)
Construction Contingencies			15.0%	(2,143,731)
Total Contingency Allowance				(3,442,962)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION				**(16,435,268)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(160,496)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(16,595,764)**

1 Cost Work Sheet Summary: Produce embankment materials from on-site materials

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
2		**Process and Haul Filter Materials to Project**									
	2.016	Purchase and Stockpile Filter, Drain and Transition Material	(1,560,000)	Tons					$ 37.16	$ (57,976,958)	
	2.017	*Purchase processed material from quarry*	*(1,560,000)*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ (34,626,540)*	
	2.018	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*(1,055,294)*	*LCY*	*$ 10.57*	*$ 11.56*	*$ -*	*$ -*	*$ 22.13*	*$ (23,350,418)*	
	2.019	Produce aggregate base materials from on-site materials	1,560,000	Tons					$ 30.97	$ 48,315,882	
	2.020	*Excavate material*	*1,055,294*	*Tons*	*$ -*	*$ -*	*$ -*	*$ 15.00*	*$ 15.00*	*$ 15,829,412*	
	2.021	*Haul excavated material to processed yard, 1 mile haul*	*1,055,294*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 4.50*	*$ 4.50*	*$ 4,748,824*	
	2.022	*Crush material*	*1,055,294*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 5.50*	*$ 5.50*	*$ 5,804,118*	
	2.023	*Screen material*	*1,055,294*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 2.50*	*$ 2.50*	*$ 2,638,235*	
	2.024	*Washing allowance*	*1,055,294*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 13.50*	*$ 13.50*	*$ 14,246,471*	
	2.025	*Haul to stockpile/fill location, 1 mile haul*	*1,055,294*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 4.50*	*$ 4.50*	*$ 4,748,824*	
	2.026	*Provision for soil testing*	*1*	*LS*	*$ -*	*$ -*	*$ -*	*$ 300,000.00*	*$ 300,000.00*	*$ 300,000*	
		Total Direct Cost Effect	1,560,000	TON	$ (7)	$ (8)	$ (22)	$ 31	$ (6)	$ (9,661,076)	

Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

2. Construction Cost Summary: Use single tunnel

				Total Cost
Total Direct Cost Effect				(24,378,541)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(24,378,541)
General Conditions				
Mobilization			5.0%	(1,218,927)
Site General Conditions & Requirements			10.0%	(2,559,747)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(309,729)
Bonds			0.6%	(170,802)
GC Home Office Overhead			6.0%	(1,718,265)
GC Profit			8.0%	(2,428,481)
Total Contractor Indirect Markups				(8,405,951)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(32,784,492)**
Contingencies				
Design Contingencies			10.0%	(3,278,449)
Construction Contingencies			15.0%	(5,409,441)
Total Contingency Allowance				(8,687,890)
TOTAL DIRECT COST BEFORE ESCALATION				**(41,472,382)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(404,992)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(41,877,374)**

2. Cost Work Sheet Summary: Use single tunnel

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 170,115,943	$ 170,115,943	$ (170,115,943)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ -**	Included within Sites Dam estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.023	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.024	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.025	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.027	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*BCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.030	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.040	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
11		**ERS Facility 1**								**$ -**	Included within Saddle Dam 3 Estimate
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.003	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.004	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.005	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.007	*3.5" diam grouted hole with #8 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 0.5 mi assumed*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.010	*Backfill: Compact and grade*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	

2. Cost Work Sheet Summary: Use single tunnel

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		**ERS Facility 2**								**$ -**	Included within Saddle Dam 5 Estimate
	12.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.003	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.007	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	12.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	12.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	12.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
13		**IO Facility**								**$ 144,294,457**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	9	ACRE	$ 1,230.71	$ 2,147.96	$ -	$ -	$ 3,379	$ 30,408	Light vegetation removal
	13.003	Erosion and Sediment Control	9	ACRE	$ -	$ -	$ -	$ 3,761	$ 3,761	$ 33,845	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	540.00	LF					$ 450.72	$ 243,388	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	2.00	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ 50,000	
	13.007	Foundation piles - drilled piers	540.00	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ 89,100	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	41	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ 104,288	Allow 150lbs/cy
	13.010	Pile testing allowance	15.0%	%	$ -	$ -	$ -	$ 243,387.50	$ 243,387.50	$ 36,508	
	13.011	Pile cap / base slab	489	CY					$ 652.70	$ 319,186	5' thick base slab
	13.012	Cast in place concrete	489	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 159,828	36" thick slab
	13.013	Formwork	911	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 23,106	Formwork to sides
	13.014	Concrete reinforcement	37	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 136,251	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	8,369	CY							
	13.016	Walls	7,535	CY					$ 1,133.76	$ 8,542,844	
	13.017	Cast in place concrete	7,535	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 2,462,664	Average 4' thick
	13.018	Formwork	101,723	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 2,581,208	
	13.019	Concrete reinforcement	942	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 3,498,971	Allow 250lbs/cy
	13.020	Slabs - elevated decks	722	CY					$ 833.82	$ 602,020	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	Cast in place concrete	722	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 235,971	36" thick slab

2. Cost Work Sheet Summary: Use single tunnel

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.022	Formwork	6,498	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 164,887	
	13.023	Concrete reinforcement	54	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 201,162	Allow 150lbs/cy
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.026	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Allow 30sf/cy
	13.027	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Allow 200lbs/cy
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.030	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	13.031	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	13.032	Bridge Piers	112	CY					$ 1,459.57	$ 163,472	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	Cast in place concrete	112	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 36,605	
	13.034	Formwork	3,360	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 85,260	Allow 30sf/cy
	13.035	Concrete reinforcement	11	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 41,607	Allow 200lbs/cy
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	1	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	1	LS						Included below	
	13.038	Metal ladders	270	LF	$ -	$ -	$ -	$ 3,552.50	$ 3,552.50	$ 959,175	As per May 2020 NODOS Estimate
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 507.50	$ 507.50	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	24	EA	$ -	$ -	$ -	$ 384,583.50	$ 384,583.50	$ 9,230,004	As per May 2020 NODOS Estimate
	13.041	Moveable screens and hoists	6	EA	$ -	$ -	$ -	$ 76,125.00	$ 76,125.00	$ 456,750	As per May 2020 NODOS Estimate
	13.042	Sliding steel plates and hoists	6	EA	$ -	$ -	$ -	$ 101,500.00	$ 101,500.00	$ 609,000	As per May 2020 NODOS Estimate
	13.043	8 ton jib crane	1	EA	$ -	$ -	$ -	$ 121,800.00	$ 121,800.00	$ 121,800	As per May 2020 NODOS Estimate
	13.044	12 ft x 30 ft inlet tunnel roller gate	2	EA	$ -	$ -	$ -	$ 1,888,915.00	$ 1,888,915.00	$ 3,777,830	As per May 2020 NODOS Estimate
	13.045	12 ft x 25 ft outlet tunnel roller gates	4	EA	$ -	$ -	$ -	$ 1,609,790.00	$ 1,609,790.00	$ 6,439,160	As per May 2020 NODOS Estimate
	13.046	Other Metals Intake Tower	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
	13.047	Painting	1	LS	$ -	$ -	$ -	$ 50,750.00	$ 50,750.00	$ 50,750	As per May 2020 NODOS Estimate
		Access bridge									
	13.048	Access bridge	10,000	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ 5,000,000	Assume 500' x 20' wide bridge
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	-	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ -	23' diameter tunnel
	13.051	Concrete Liner	-	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ -	23' diameter tunnel
	13.052	Steel Liner	-	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ -	23' diameter tunnel
	13.052a	32' Diameter Tunnel excavation	3,110	LF	$ -	$ -	$ -	$ 12,832.92	$ 12,832.92	$ 39,910,393	32' diameter
	13.052b	32' Diameter Tunnel - Concrete Liner	2,856	LF	$ -	$ -	$ -	$ 14,884.96	$ 14,884.96	$ 42,511,456	32' diameter
	13.052c	32' Diameter Tunnel - Concrete Liner	255	LF	$ -	$ -	$ -	$ 17,130.76	$ 17,130.76	$ 4,368,344	32' diameter
	13.053	**Lower Intake Channel**	475,000	CY					$ 38.28	$ 18,180,797	
	13.054	Excavations in common material	432,250	LCY	$ 6.00	$ 9.00	$ -	$ -	$ 15.00	$ 6,483,750	Assume 70% in common earth and 30% rock; include a 30% swell factor
	13.055	Excavations in rock	185,250	LCY	$ 10.50	$ 24.50	$ -	$ -	$ 35.00	$ 6,483,750	
	13.056	Haul to disposal site, 0.5 mile haul	617,500	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 4,322,500	
	13.057	Shotcrete portal face	1,387	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 443,769	
	13.058	Steel fiber for shotcrete	21	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 27,042	
	13.059	20 ft rock bolts, 8 ft on center - Drilling	880	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 220,000	
	13.060	3.5" diam grouted hole with #8 bar	40	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 199,986	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	44,100	CY					$ 49.88	$ 2,199,829	
	13.062	Excavate and load material	57,330	LCY	$ 10.00	$ 15.00	$ -	$ -	$ 25.00	$ 1,433,250	
	13.063	Haul to disposal site, 0.5 mile haul	57,330	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 401,310	
	13.064	Shotcrete portal face	569	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 182,120	
	13.065	Steel fiber for shotcrete	9	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 11,098	
	13.066	20 ft rock bolts, 8 ft on center - Drilling	361	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 90,125	
	13.067	3.5" diam grouted hole with #8 bar	16	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 81,926	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
14		Misc allowance for small items, allow 1%	1.0%	%				144,294,457	$ 144,294,457	$ 1,442,945	
		Total Direct Cost Effect	42	Acre	$ 235,263	$ 334,161	$ 151,574	$ (1,301,440)	$ (580,441)	$ (24,378,541)	

Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

3. Construction Cost Summary: Use sloping intake and eliminate bridge

				Total Cost
Total Direct Cost Effect				(14,334,823)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(14,334,823)
General Conditions				
Mobilization			5.0%	(716,741)
Site General Conditions & Requirements			10.0%	(1,505,156)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(182,124)
Bonds			0.6%	(100,433)
GC Home Office Overhead			6.0%	(1,010,357)
GC Profit			8.0%	(1,427,971)
Total Contractor Indirect Markups				(4,942,782)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(19,277,605)**
Contingencies				
Design Contingencies			10.0%	(1,927,760)
Construction Contingencies			15.0%	(3,180,805)
Total Contingency Allowance				(5,108,565)
TOTAL DIRECT COST BEFORE ESCALATION				**(24,386,170)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(238,139)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(24,624,309)**

3. Cost Work Sheet Summary: Use sloping intake and eliminate bridge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 170,115,943	$ 170,115,943	$ (170,115,943)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ -**	Included within Sites Dam estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.023	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.024	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.025	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.027	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*BCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.030	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.040	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
11		**ERS Facility 1**								**$ -**	Included within Saddle Dam 3 Estimate
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.003	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.004	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.005	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.007	*3.5" diam grouted hole with #8 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 0.5 mi assumed*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.010	*Backfill: Compact and grade*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	

3. Cost Work Sheet Summary: Use sloping intake and eliminate bridge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		**ERS Facility 2**								**$ -**	Included within Saddle Dam 5 Estimate
	12.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.003	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.007	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	12.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	12.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	12.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
13		**IO Facility**								**$ 154,238,733**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	9	ACRE	$ 1,230.71	$ 2,147.96	$ -	$ -	$ 3,379	$ 30,408	Light vegetation removal
	13.003	Erosion and Sediment Control	9	ACRE	$ -	$ -	$ -	$ 3,761	$ 3,761	$ 33,845	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	-	LF					$ -	$ -	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	-	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ -	
	13.007	Foundation piles - drilled piers	-	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ -	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	-	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ -	Allow 150lbs/cy
	13.010	Pile testing allowance	0.0%	%	$ -	$ -	$ -	$ -	$ -	$ -	
	13.011	Pile cap / base slab	-	CY					$ -	$ -	5' thick base slab
	13.012	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	36" thick slab
	13.013	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	Formwork to sides
	13.014	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	-	CY							
	13.016	Walls	-	CY					$ -	$ -	
	13.017	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	Average 4' thick
	13.018	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	
	13.019	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 250lbs/cy
	13.020	Slabs - elevated decks	-	CY					$ -	$ -	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	36" thick slab

3. Cost Work Sheet Summary: Use sloping intake and eliminate bridge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.022	*Formwork*	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	
	13.023	*Concrete reinforcement*	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	*Allow 150lbs/cy*
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	*Cast in place concrete*	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.026	*Formwork*	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	*Allow 30sf/cy*
	13.027	*Concrete reinforcement*	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	*Allow 200lbs/cy*
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	*Cast in place concrete*	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.030	*Formwork*	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	13.031	*Concrete reinforcement*	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	*Not required*
	13.032	Bridge Piers	-	CY					$ -	$ -	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	*Cast in place concrete*	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	
	13.034	*Formwork*	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	*Allow 30sf/cy*
	13.035	*Concrete reinforcement*	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	*Allow 200lbs/cy*
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	1	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	1	LS						Included below	
	13.038	Metal ladders	270	LF	$ -	$ -	$ -	$ 2,486.75	$ 2,486.75	$ 671,423	
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 355.25	$ 355.25	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	24	EA	$ -	$ -	$ -	$ 269,208.45	$ 269,208.45	$ 6,461,003	
	13.041	Moveable screens and hoists	6	EA	$ -	$ -	$ -	$ 53,287.50	$ 53,287.50	$ 319,725	
	13.042	Sliding steel plates and hoists	6	EA	$ -	$ -	$ -	$ 71,050.00	$ 71,050.00	$ 426,300	
	13.043	8 ton jib crane	1	EA	$ -	$ -	$ -	$ 85,260.00	$ 85,260.00	$ 85,260	
	13.044	12 ft x 30 ft inlet tunnel roller gate	2	EA	$ -	$ -	$ -	$ 1,322,240.50	$ 1,322,240.50	$ 2,644,481	
	13.045	12 ft x 25 ft outlet tunnel roller gates	4	EA	$ -	$ -	$ -	$ 1,126,853.00	$ 1,126,853.00	$ 4,507,412	
	13.046	Other Metals Intake Tower	1	LS	$ -	$ -	$ -	$ 177,625.00	$ 177,625.00	$ 177,625	
	13.047	Painting	1	LS	$ -	$ -	$ -	$ 35,525.00	$ 35,525.00	$ 35,525	
		Access bridge									
	13.048	Access bridge	-	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ -	
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	6,222	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ 52,834,051	As per May 2020 NODOS Estimate
	13.051	Concrete Liner	5,712	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ 51,883,438	As per May 2020 NODOS Estimate
	13.052	Steel Liner	510	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ 5,267,089	As per May 2020 NODOS Estimate
	13.053	**Lower Intake Channel**	475,000	CY					$ 38.28	$ 18,180,797	
	13.054	*Excavations in common material*	432,250	LCY	$ 6.00	$ 9.00	$ -	$ -	$ 15.00	$ 6,483,750	*Assume 70% in common earth and 30% rock; include a 30% swell factor*
	13.055	*Excavations in rock*	185,250	LCY	$ 10.50	$ 24.50	$ -	$ -	$ 35.00	$ 6,483,750	
	13.056	*Haul to disposal site, 0.5 mile haul*	617,500	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 4,322,500	
	13.057	*Shotcrete portal face*	1,387	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 443,769	
	13.058	*Steel fiber for shotcrete*	21	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 27,042	
	13.059	*20 ft rock bolts, 8 ft on center - Drilling*	880	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 220,000	
	13.060	*3.5" diam grouted hole with #8 bar*	40	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 199,986	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	63,000	CY					$ 49.88	$ 3,142,613	
	13.062	*Excavate and load material*	81,900	LCY	$ 10.00	$ 15.00	$ -	$ -	$ 25.00	$ 2,047,500	
	13.063	*Haul to disposal site, 0.5 mile haul*	81,900	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 573,300	
	13.064	*Shotcrete portal face*	813	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 260,172	
	13.065	*Steel fiber for shotcrete*	12	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 15,854	
	13.066	*20 ft rock bolts, 8 ft on center - Drilling*	515	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 128,750	
	13.067	*3.5" diam grouted hole with #8 bar*	23	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 117,037	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
	13.070	**Sloping intake**	**300**	**LF**					**$ 16,852.21**	**$ 5,055,664**	**Intake tunnel**
	13.071	Excavations including blasting	4,532	LCY					$ 45.00	$ 203,931	Include 30% bulk factor
	13.072	Hauling excavated material to waste area	4,532	LCY					$ 7.00	$ 31,723	
	13.073	Anchors, includes drilling and anchor placement									
	13.074	Setup drill rig	30	EA					$ 350.00	$ 10,500	
	13.075	Drilling	1,500	LF					$ 30.00	$ 45,000	
	13.076	Install soil anchor, #18	1,650	LF					$ 75.00	$ 123,750	
	13.077	Grout, assume 5" diameter	8	CY					$ 5,000.00	$ 37,857	
	13.078	Anchor head and plate	30	EA					$ 650.00	$ 19,500	
	13.079	Testing allowance	5	EA					$ 1,500.00	$ 7,500	
	13.080	Sloping intake structure									
	13.081	Concrete	3,671	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 1,199,672	
	13.082	Formwork	36,706	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 931,423	Allow 10sf/cy
	13.083	Reinforcement	367	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 1,363,603	Allow 200lbs/cy
	13.084	Steel Lining	222	TON					$ 2,800.00	$ 621,600	
	13.085	Un-listed items allowance	10.0%	%					$ 4,596,057.88	$ 459,606	
	13.086	**Vertical shaft**	**40**	**LF**					**$ 55,708.14**	**$ 2,228,326**	**Vertical shaft**
	13.087	Soil investigation	1	LS	$ -	$ -	$ -	$ 10,000.00	$ 10,000.00	$ 10,000	
	13.088	Soil investigation	1	LS	$ -	$ -	$ -	$ 10,000.00	$ 10,000.00	$ 10,000	
	13.089	Excavations including blasting	328	LCY	$ -	$ -	$ -	$ 45.00	$ 45.00	$ 14,742	Include 30% bulk factor
	13.090	Excavations by hand	218	LCY	$ -	$ -	$ -	$ 150.00	$ 150.00	$ 32,760	Assume 40% of excavations to be done by hand
	13.091	Hauling excavated material to waste area	546	CY	$ -	$ -	$ -	$ 7.00	$ 7.00	$ 3,822	
	13.092	Temporary bracing	13,942	SF	$ -	$ -	$ -	$ 65.00	$ 65.00	$ 906,204	
	13.093	Temporary shaft support									
	13.094	Shotcrete portal face	47	CY	$ -	$ -	$ -	$ 450.00	$ 450.00	$ 20,933	Assume 0.5' thick
	13.095	Steel fiber for shotcrete	1	TON	$ -	$ -	$ -	$ 2,500.00	$ 2,500.00	$ 1,744	assume 30lb steel fibers/CY shotcrete.
	13.096	20 ft rock bolts, 8 ft on center - Drilling	39	EA	$ -	$ -	$ -	$ 500.00	$ 500.00	$ 19,625	Assume 8 x 8 spacing
	13.097	3.5" diam grouted hole with #8 bar	2	CY	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ 8,920	

3. Cost Work Sheet Summary: Use sloping intake and eliminate bridge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.098	Shaft									
	13.099	Shaft concrete lining	158	CY	$ -	$ -	$ -	$ 1,500.00	$ 1,500.00	$ 237,000	
	13.100	Steel lining	30	TON	$ -	$ -	$ -	$ 7,000.00	$ 7,000.00	$ 210,000	
	13.101	Slope protection	1	LS	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 50,000	
	13.102	Shaft monitoring	1	LS	$ -	$ -	$ -	$ 250,000.00	$ 250,000.00	$ 250,000	
	13.103	Ground water control	1	LS	$ -	$ -	$ -	$ 250,000.00	$ 250,000.00	$ 250,000	
	13.104	Un-listed items allowance	10.0%	%	$ -	$ -	$ -	$ 2,025,750.59	$ 2,025,750.59	$ 202,575	
14		Misc allowance for small items, allow 1%	1.0%	%				154,238,733	$ 154,238,733	$ 1,542,387	
		Total Direct Cost Effect	42	Acre	$ 193,774	$ 330,650	$ 67,207	$ (970,102)	$ (341,305)	$ (14,334,823)	

Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

4. Construction Cost Summary: Eliminate ERS 1 & ERS 2

				Total Cost
Total Direct Cost Effect				(44,597,820)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(44,597,820)
General Conditions				
Mobilization			5.0%	(2,229,891)
Site General Conditions & Requirements			10.0%	(4,682,771)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(566,615)
Bonds			0.6%	(312,463)
GC Home Office Overhead			6.0%	(3,143,374)
GC Profit			8.0%	(4,442,635)
Total Contractor Indirect Markups				(15,377,749)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(59,975,569)**
Contingencies				
Design Contingencies			10.0%	(5,997,557)
Construction Contingencies			15.0%	(9,895,969)
Total Contingency Allowance				(15,893,526)
TOTAL DIRECT COST BEFORE ESCALATION				**(75,869,095)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(740,887)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(76,609,982)**

4. Cost Work Sheet Summary: Eliminate ERS 1 & ERS 2

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ 4,799,678**	
	10.000	**Omit Sites Dam Diversion Work Estimate**	(1)					$ 50,035,842	$ 50,035,842	$ (50,035,842)	
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	Earth fill coffer dam; included within zone 4 fill work
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required; Earth fill coffer dam*
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	15,800	CY					$ 44.61	$ 704,890	
	10.010	*Excavate and load material*	*17,380*	*LCY*	*$ 1.39*	*$ 2.42*	*$ -*	*$ -*	*$ 3.81*	*$ 66,147*	*Assumed excavating material is either common earth, loam, sand, clay or loose material.*
	10.011	*Haul to disposal site, 0.5 mile haul*	*17,380*	*LCY*	*$ 1.82*	*$ 4.37*	*$ -*	*$ -*	*$ 6.19*	*$ 107,615*	
	10.012	*Shotcrete portal face*	*948*	*CY*	*$ 86.92*	*$ 41.04*	*$ 221.97*	*$ -*	*$ 349.92*	*$ 331,727*	
	10.013	*Steel fiber for shotcrete*	*17*	*TON*	*$ -*	*$ -*	*$ 2,478.25*	*$ -*	*$ 2,478.25*	*$ 41,114*	*Allow 35lbs/CY of concrete*
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	*790*	*EA*	*$ 50.73*	*$ 20.73*	*$ -*	*$ -*	*$ 71.46*	*$ 56,451*	
	10.015	*3.5" diam grouted hole with #10 bar*	*36*	*CY*	*$ 263.49*	*$ 78.40*	*$ 2,522.70*	*$ -*	*$ 2,864.58*	*$ 101,836*	
	10.016	Upstream Portal Backfill	24,500	CY					$ 10.54	$ 258,283	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	*26,950*	*LCY*	*$ 0.99*	*$ 4.34*	*$ -*	*$ -*	*$ 5.33*	*$ 143,587*	
	10.018	*Spread and compact*	*26,950*	*LCY*	*$ 2.11*	*$ 2.15*	*$ -*	*$ -*	*$ 4.26*	*$ 114,697*	
	10.019	Inlet and Valve Structures	2,200	CY					$ 1,092.50	$ 2,403,500	
	10.020	*Pour inlet and valve structures*	*2,200*	*CY*	*$ -*	*$ -*	*$ -*	*$ 1,092.50*	*$ 1,092.50*	*$ 2,403,500*	
	10.021	Downstream Portal Excavation and Rock Bolts	12,500	CY					$ 45.40	$ 567,445	
	10.022	*Excavate and load material*	*13,750*	*LCY*	*$ 1.48*	*$ 2.59*	*$ -*	*$ -*	*$ 4.07*	*$ 55,971*	
	10.023	*Haul to disposal site, 0.5 mile haul*	*13,750*	*LCY*	*$ 1.95*	*$ 4.56*	*$ -*	*$ -*	*$ 6.51*	*$ 89,497*	
	10.024	*Shotcrete portal face*	*750*	*CY*	*$ 87.89*	*$ 41.50*	*$ 221.97*	*$ -*	*$ 351.36*	*$ 263,517*	
	10.025	*Steel fiber for shotcrete*	*13*	*TON*	*$ -*	*$ -*	*$ 2,478.25*	*$ -*	*$ 2,478.25*	*$ 32,527*	*Allow 35lbs/CY of concrete*
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	*625*	*EA*	*$ 52.10*	*$ 21.29*	*$ -*	*$ -*	*$ 73.39*	*$ 45,867*	
	10.027	*3.5" diam grouted hole with #10 bar*	*28*	*CY*	*$ 249.79*	*$ 74.32*	*$ 2,522.70*	*$ -*	*$ 2,846.81*	*$ 80,066*	
	10.028	Downstream Portal Backfill	34,400	CY					$ 10.22	$ 351,620	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	*37,840*	*BCY*	*$ 0.92*	*$ 4.04*	*$ -*	*$ -*	*$ 4.96*	*$ 187,767*	
	10.030	*Spread and compact*	*37,840*	*LCY*	*$ 2.14*	*$ 2.19*	*$ -*	*$ -*	*$ 4.33*	*$ 163,852*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	1,590	LF	$ -	$ -	$ -	$ 7,913.12	$ 7,913.12	$ 12,581,858	Second shift work will apply, 13' diameter tunnel
	10.032	Tunnel Concrete Lining	1,590	LF	$ -	$ -	$ -	$ 7,025.57	$ 7,025.57	$ 11,170,649	Second shift work will apply, 13' diameter tunnel
	10.033	12-Ft Steel Pipe Lining	1,590	LF	$ -	$ -	$ -	$ 10,684.19	$ 10,684.19	$ 16,987,862	Second shift work will apply, 12' diameter
	10.034	Mechanical, Valves, Trash rack, and Metals	1	LS	$ -	$ -	$ -	$ 9,775,000	$ 9,775,000	$ 9,775,000	Allowance
	10.035	Riprap Discharge Channel	75	CY					$ 458.82	$ 34,412	
	10.036	*Blasting operations*	*90*	*LCY*	*$ 59.57*	*$ 64.41*	*$ 4.85*	*$ -*	*$ 128.83*	*$ 11,594*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	*90*	*LCY*	*$ 22.81*	*$ 68.17*	*$ -*	*$ -*	*$ 90.98*	*$ 8,188*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	*90*	*LCY*	*$ 13.36*	*$ 58.58*	*$ -*	*$ -*	*$ 71.95*	*$ 6,475*	
	10.040	*Place at the channel*	*90*	*LCY*	*$ 35.55*	*$ 55.05*	*$ -*	*$ -*	*$ 90.60*	*$ 8,154*	
11		**ERS Facility 1**								**$ (24,457,547)**	
	11.001	Upstream Portal Excavation and Rock Bolts	(27,500)	CY					$ 16.72	$ (459,666)	
	11.002	*Excavate and load material*	*(30,250)*	*LCY*	*$ 1.35*	*$ 2.35*	*$ -*	*$ -*	*$ 3.70*	*$ (111,941)*	*Assumed excavating material is either common earth, loam, sand, clay or loose material.*
	11.003	*Haul to disposal site, 0.5 mile haul*	*(30,250)*	*LCY*	*$ 1.41*	*$ 3.53*	*$ -*	*$ -*	*$ 4.94*	*$ (149,582)*	
	11.004	*Shotcrete portal face*	*(369)*	*CY*	*$ 78.06*	*$ 36.86*	*$ 221.97*	*$ -*	*$ 336.88*	*$ (124,460)*	
	11.005	*Steel fiber for shotcrete*	*(6)*	*TON*	*$ -*	*$ -*	*$ 2,478.25*	*$ -*	*$ 2,478.25*	*$ (13,734)*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	*(312)*	*EA*	*$ 48.21*	*$ 19.70*	*$ -*	*$ -*	*$ 67.91*	*$ (21,169)*	

4. Cost Work Sheet Summary: Eliminate ERS 1 & ERS 2

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.007	3.5" diam grouted hole with #8 bar	(14)	CY	$ 165.28	$ 49.18	$ 2,522.70	$ -	$ 2,737.16	$ (38,780)	
	11.008	Upstream Portal Backfill	(24,800)	CY					$ 9.28	$ (230,240)	
	11.009	Haul excavated material and stockpile, 0.5 mi assumed	(27,280)	LCY	$ 0.89	$ 3.34	$ -	$ -	$ 4.24	$ (115,543)	
	11.010	Backfill: Compact and grade	(27,280)	LCY	$ 2.08	$ 2.12	$ -	$ -	$ 4.20	$ (114,697)	
	11.011	Inlet and Valve Structures	(2,250)	CY					$ 1,092.50	$ (2,458,125)	
	11.012	Pour inlet and valve structures	(2,250)	CY	$ -	$ -	$ -	$ 1,092.50	$ 1,092.50	$ (2,458,125)	
	11.013	Downstream Portal Excavation and Rock Bolts	(35,100)	CY					$ 18.54	$ (650,697)	
	11.014	Excavate and load material	(38,610)	LCY	$ 1.34	$ 2.35	$ -	$ -	$ 3.69	$ (142,470)	
	11.015	Haul to disposal site, 0.5 mile haul	(38,610)	LCY	$ 1.41	$ 3.52	$ -	$ -	$ 4.93	$ (190,377)	
	11.016	Shotcrete portal face	(589)	CY	$ 76.89	$ 36.30	$ 221.97	$ -	$ 335.15	$ (197,553)	
	11.017	Steel fiber for shotcrete	(9)	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ (21,912)	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	(497)	EA	$ 50.36	$ 20.58	$ -	$ -	$ 70.94	$ (35,282)	
	11.019	3.5" diam grouted hole with #8 bar	(23)	CY	$ 207.19	$ 61.65	$ 2,522.70	$ -	$ 2,791.53	$ (63,102)	
	11.020	Downstream Portal Backfill	(37,900)	CY					$ 10.10	$ (382,753)	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	(41,690)	LCY	$ 1.05	$ 3.94	$ -	$ -	$ 4.99	$ (207,977)	
	11.022	Backfill: Compact and grade	(41,690)	LCY	$ 2.07	$ 2.12	$ -	$ -	$ 4.19	$ (174,776)	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	(828)	LF	$ -	$ -	$ -	$ 7,304.42	$ 7,304.42	$ (6,048,057)	Second shift work will apply
	11.024	Tunnel Concrete Lining	(828)	LF	$ -	$ -	$ -	$ 7,205.71	$ 7,205.71	$ (5,966,327)	Second shift work will apply
	11.025	10-Ft Steel Pipe Cut and Cover Section	(388)	LF	$ -	$ -	$ -	$ 8,094.08	$ 8,094.08	$ (3,140,504)	Second shift work will apply
	11.026	Mechanical, Valves, Trash rack, and Metals	(1)	LS	$ -	$ -	$ -	$ 4,887,500	$ 4,887,500	$ (4,887,500)	Allowance
	11.027	Riprap Discharge Channel	(5,000)	CY					$ 46.74	$ (233,677)	
	11.028	Blasting operations	(6,000)	LCY	$ 3.83	$ 5.12	$ 4.85	$ -	$ 13.80	$ (82,812)	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	(6,000)	LCY	$ 1.87	$ 5.43	$ -	$ -	$ 7.30	$ (43,794)	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	(6,000)	LCY	$ 0.80	$ 3.51	$ -	$ -	$ 4.32	$ (25,900)	
	11.032	Place at the channel	(6,000)	LCY	$ 5.38	$ 8.15	$ -	$ -	$ 13.53	$ (81,170)	
12		**ERS Facility 2**								**$ (24,498,389)**	
	12.001	Upstream Portal Excavation and Rock Bolts	(27,215)	CY					$ 16.78	$ (456,701)	
	12.002	Excavate and load material	(29,937)	LCY	$ 1.36	$ 2.38	$ -	$ -	$ 3.74	$ (111,941)	Assumed excavating material is either common earth, loam, sand, clay or loose material.
	12.003	Haul to disposal site, 0.5 mile haul	(29,937)	LCY	$ 1.43	$ 3.57	$ -	$ -	$ 5.00	$ (149,582)	
	12.004	Shotcrete portal face	(361)	CY	$ 79.87	$ 37.71	$ 221.97	$ -	$ 339.54	$ (122,610)	
	12.005	Steel fiber for shotcrete	(5)	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ (13,424)	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	(305)	EA	$ 49.33	$ 20.15	$ -	$ -	$ 69.48	$ (21,169)	
	12.007	3.5" diam grouted hole with #8 bar	(14)	CY	$ 169.10	$ 50.31	$ 2,522.70	$ -	$ 2,742.11	$ (37,974)	
	12.008	Upstream Portal Backfill	(24,500)	CY					$ 9.17	$ (224,778)	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	(26,950)	LCY	$ 0.90	$ 3.38	$ -	$ -	$ 4.29	$ (115,543)	
	12.010	Backfill: Compact and grade	(26,950)	LCY	$ 2.01	$ 2.05	$ -	$ -	$ 4.05	$ (109,235)	
	12.011	Inlet and Valve Structures	(2,200)	CY					$ 1,092.50	$ (2,403,500)	
	12.012	Pour inlet and valve structures	(2,200)	CY	$ -	$ -	$ -	$ 1,092.50	$ 1,092.50	$ (2,403,500)	
	12.013	Downstream Portal Excavation and Rock Bolts	(31,867)	CY					$ 21.53	$ (686,222)	
	12.014	Excavate and load material	(35,054)	LCY	$ 1.32	$ 2.31	$ -	$ -	$ 3.63	$ (127,206)	
	12.015	Haul to disposal site, 0.5 mile haul	(35,054)	LCY	$ 1.38	$ 3.46	$ -	$ -	$ 4.85	$ (169,980)	
	12.016	Shotcrete portal face	(719)	CY	$ 80.28	$ 37.90	$ 221.97	$ -	$ 340.14	$ (244,399)	
	12.017	Steel fiber for shotcrete	(11)	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ (26,710)	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	(606)	EA	$ 49.58	$ 20.26	$ -	$ -	$ 69.84	$ (42,339)	
	12.019	3.5" diam grouted hole with #8 bar	(28)	CY	$ 169.97	$ 50.57	$ 2,522.70	$ -	$ 2,743.24	$ (75,590)	
	12.020	Downstream Portal Backfill	(34,400)	CY					$ 9.98	$ (343,259)	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	(37,840)	LCY	$ 1.03	$ 3.85	$ -	$ -	$ 4.89	$ (184,869)	
	12.022	Backfill: Compact and grade	(37,840)	LCY	$ 2.07	$ 2.12	$ -	$ -	$ 4.19	$ (158,391)	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	(832)	LF	$ -	$ -	$ -	$ 7,304.42	$ 7,304.42	$ (6,077,275)	Second shift work will apply
	12.024	Tunnel Concrete Lining	(832)	LF	$ -	$ -	$ -	$ 7,205.71	$ 7,205.71	$ (5,995,149)	Second shift work will apply
	12.025	10-Ft Steel Pipe Cut and Cover Section	(400)	LF	$ -	$ -	$ -	$ 8,094.08	$ 8,094.08	$ (3,237,633)	Second shift work will apply
	12.026	Mechanical, Valves, Trash rack, and Metals	(1)	LS	$ -	$ -	$ -	$ 4,887,500	$ 4,887,500	$ (4,887,500)	Allowance
	12.027	Riprap Discharge Channel	(4,200)	CY					$ 44.37	$ (186,371)	
	12.028	Blasting operations	(5,040)	LCY	$ 3.04	$ 4.07	$ 4.85	$ -	$ 11.95	$ (60,251)	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	(5,040)	LCY	$ 1.48	$ 4.31	$ -	$ -	$ 5.79	$ (29,196)	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	(5,040)	LCY	$ 0.95	$ 4.18	$ -	$ -	$ 5.14	$ (25,900)	
	12.032	Place at the channel	(5,040)	LCY	$ 5.60	$ 8.49	$ -	$ -	$ 14.09	$ (71,024)	
13		**IO Facility**								**$ -**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Light vegetation removal
	13.003	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	-	LF					$ -	$ -	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	-	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ -	
	13.007	Foundation piles - drilled piers	-	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ -	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	-	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ -	Allow 150lbs/cy
	13.010	Pile testing allowance	0.0%	%	$ -	$ -	$ -	$ -	$ -	$ -	
	13.011	Pile cap / base slab	-	CY					$ -	$ -	5' thick base slab
	13.012	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	36" thick slab
	13.013	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	Formwork to sides
	13.014	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	-	CY							

4. Cost Work Sheet Summary: Eliminate ERS 1 & ERS 2

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.016	Walls	-	CY					$ -	$ -	
	13.017	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	Average 4' thick
	13.018	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	
	13.019	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 250lbs/cy
	13.020	Slabs - elevated decks	-	CY					$ -	$ -	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	36" thick slab
	13.022	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	
	13.023	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 150lbs/cy
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.026	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Allow 30sf/cy
	13.027	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Allow 200lbs/cy
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.030	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	13.031	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	13.032	Bridge Piers	-	CY					$ -	$ -	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	
	13.034	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	Allow 30sf/cy
	13.035	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 200lbs/cy
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	-	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	-	LS						Included below	
	13.038	Metal ladders	-	LF	$ -	$ -	$ -	$ 3,552.50	$ 3,552.50	$ -	As per May 2020 NODOS Estimate
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 507.50	$ 507.50	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	-	EA	$ -	$ -	$ -	$ 384,583.50	$ 384,583.50	$ -	As per May 2020 NODOS Estimate
	13.041	Moveable screens and hoists	-	EA	$ -	$ -	$ -	$ 76,125.00	$ 76,125.00	$ -	As per May 2020 NODOS Estimate
	13.042	Sliding steel plates and hoists	-	EA	$ -	$ -	$ -	$ 101,500.00	$ 101,500.00	$ -	As per May 2020 NODOS Estimate
	13.043	8 ton jib crane	-	EA	$ -	$ -	$ -	$ 121,800.00	$ 121,800.00	$ -	As per May 2020 NODOS Estimate
	13.044	12 ft x 30 ft inlet tunnel roller gate	-	EA	$ -	$ -	$ -	$ 1,888,915.00	$ 1,888,915.00	$ -	As per May 2020 NODOS Estimate
	13.045	12 ft x 25 ft outlet tunnel roller gates	-	EA	$ -	$ -	$ -	$ 1,609,790.00	$ 1,609,790.00	$ -	As per May 2020 NODOS Estimate
	13.046	Other Metals Intake Tower	-	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ -	As per May 2020 NODOS Estimate
	13.047	Painting	-	LS	$ -	$ -	$ -	$ 50,750.00	$ 50,750.00	$ -	As per May 2020 NODOS Estimate
		Access bridge									
	13.048	Access bridge	-	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ -	Assume 500' x 20' wide bridge
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	-	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ -	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	-	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ -	As per May 2020 NODOS Estimate
	13.051	Concrete Liner	-	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ -	As per May 2020 NODOS Estimate
	13.052	Steel Liner	-	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ -	As per May 2020 NODOS Estimate
	13.053	**Lower Intake Channel**	-	CY					$ -	$ -	
	13.054	Excavations in common material	-	LCY	$ 6.00	$ 9.00	$ -	$ -	$ 15.00	$ -	Assume 70% in common earth and 30% rock; include a 30% swell factor
	13.055	Excavations in rock	-	LCY	$ 10.50	$ 24.50	$ -	$ -	$ 35.00	$ -	
	13.056	Haul to disposal site, 0.5 mile haul	-	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ -	
	13.057	Shotcrete portal face	-	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ -	
	13.058	Steel fiber for shotcrete	-	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ -	
	13.059	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ -	
	13.060	3.5" diam grouted hole with #8 bar	-	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ -	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	13.062	Excavate and load material	-	LCY	$ 10.00	$ 15.00	$ -	$ -	$ 25.00	$ -	
	13.063	Haul to disposal site, 0.5 mile haul	-	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ -	
	13.064	Shotcrete portal face	-	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ -	
	13.065	Steel fiber for shotcrete	-	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ -	
	13.066	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ -	
	13.067	3.5" diam grouted hole with #8 bar	-	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ -	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
14		Misc allowance for small items, allow 1%	1.0%	%				(44,156,258)	$ (44,156,258)	$ (441,563)	
		Total Direct Cost Effect	42	Acre	$ (14,541)	$ (27,610)	$ (3,986)	$ (1,015,717)	$ (1,061,853)	$ (44,597,820)	

Sites Reservoir (Alt 1): Sites Lodoga Road Realignment | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

8. Construction Cost Summary: Revised SLR - WatersEdge

				Unit Cost Rate ($/LF)	Total Cost
			LF:	31,767	
Total Direct Cost Effect				(209.99)	(6,670,617)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(209.99)	(6,670,617)
General Conditions					
Mobilization			3.0%	(6.30)	(200,119)
Site General Conditions & Requirements			10.0%	(21.63)	(687,074)
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	(2.62)	(83,136)
Bonds			0.6%	(1.44)	(45,846)
GC Field and Home Office Overhead			5.0%	(12.10)	(384,340)
GC Profit			5.0%	(12.70)	(403,557)
Total Contractor Indirect Markups				(56.79)	(1,804,072)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(266.78)**	**(8,474,689)**
Contingencies					
Design Contingencies			10.0%	(26.68)	(847,469)
Construction Contingencies			15.0%	(44.02)	(1,398,324)
Total Contingency Allowance				(70.70)	(2,245,793)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION				**(337.47)**	**(10,720,482)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(3.30)	(104,689)
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING				**(340.77)**	**(10,825,171)**

8. Cost Work Sheet Summary: Revised SLR - WatersEdge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS				$ 117,947,799	$ 117,947,799	$ (117,947,799)	
		Omit Cost for Sites Lodoga Road Realignment Bridges as per baseline estimate	(1)	LS				$ 86,817,609.60	$ 86,817,610	$ (86,817,610)	
		Add Cost for East Bridge Approach only	57,972	SF				$ 806.32	$ 806.32	$ 46,743,323	
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Elsewhere	
	1.002	Asphalt removal work	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Included elsewhere
	1.003	Load and haul to disposal site, 3 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	76	ACRE	$ 1,091.50	$ 1,796.30	$ -	$ -	$ 2,887.80	$ 219,472	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	23,200	LF					$ 4.20	$ 97,527	
	2.002	Setup temporary silt fence	23,200	LF	$ 1.79	$ 0.73	$ 0.44	$ -	$ 2.96	$ 68,712	
	2.003	Silt fence removal	23,200	LF	$ 0.70	$ 0.30	$ -	$ 0.25	$ 1.24	$ 28,815	Include allowance for dump charges
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required
	2.005	Roadway excavations including existing asphalt layer removal	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	2.006	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	2.007	Crushing Operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	2.008	Screening Operations (Post-crushing)	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	2.009	Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	-	CY					$ -	$ -	Not required
	2.011	Roadway excavations, common earth	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	2.012	Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	164,800	CY					$ 10.79	$ 1,778,290	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	Roadway excavations	189,520	LCY	$ 2.11	$ 2.18	$ -	$ -	$ 4.29	$ 812,958	Include a 15% swell factor
	2.015	Load and haul to disposal site, 0.5 mile haul	189,520	LCY	$ 1.49	$ 3.60	$ -	$ -	$ 5.09	$ 965,332	Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance
	2.016	Roadway Excavation (Rock Cut)	74,900	CY					$ 20.29	$ 1,519,721	Excavated material to be stockpiled for re-use, average 2 mile haul
	2.017	Blasting operations	26,964	LCY	$ 4.26	$ 4.08	$ 4.85	$ -	$ 13.19	$ 355,558	Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr
	2.018	Rock breaking operation	62,916	LCY	$ 2.99	$ 3.85	$ -	$ -	$ 6.84	$ 430,156	Assume 70% of volume will be excavated with ripper
	2.019	Load and haul to processing area, 2 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	2.020	Crushing Operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing required
	2.021	Screening Operations (Post-crushing)	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No screening required
	2.022	Load and haul to stockpile location, 2 mile haul	89,880	LCY	$ 2.25	$ 5.92	$ -	$ -	$ 8.17	$ 734,007	Haul to stockpile location, 2 mile hauling distance assumed
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	1,483,300	CY					$ 9.71	$ 14,404,395	Excavate common earth and direct haul to fill location
	2.024	Roadway excavations	1,631,630	LCY	$ 2.09	$ 2.17	$ -	$ -	$ 4.26	$ 6,955,304	Include 10% swell factor
	2.025	Load and haul to stockpile/fill location, 0.25 mile haul	1,631,630	LCY	$ 1.37	$ 3.20	$ -	$ -	$ 4.57	$ 7,449,091	Assumed 0.25 mile hauling distance
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	1,483,300	CY					$ 6.45	$ 9,564,933	From excavated suitable material, assume available on-site excavation
	3.002	Load at stockpile and haul to fill location, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No double handling and stockpiling required; all material to be hauled directly to fill location
	3.003	Load and haul from excavation site to fill location, 0.25 mile haul	1,483,300	LCY						Included above	Swell factor of 10% included; Direct hauling work included elsewhere
	3.004	Spread and compact	1,483,300	LCY	$ 3.32	$ 3.13	$ -	$ -	$ 6.45	$ 9,564,933	Swell factor of 10% included
	3.005	Roadway Embankment (imported from other excavation sources)	7,984,700	CY					$ 7.17	$ 57,255,889	Backfill material to be sourced from road excavations cut
	3.006	Load and haul from excavation site to fill location, 0.25 mile haul	8,783,170	LCY						Elsewhere	Handling cost included within related excavation project
	3.007	Spread and compact	8,783,170	LCY	$ 3.38	$ 3.14	$ -	$ -	$ 6.52	$ 57,255,889	
	3.008	Class 4 Aggregate subbase	20,000	CY					$ 61.38	$ 1,227,690	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	Purchase processed material from quarry	34,000	TON	$ -	$ -	$ 15.15	$ -	$ 15.15	$ 515,070	Purchase from commercial quarry, 1.7ton/cy
	3.010	Haul material from quarry to site stockpile/fill location, 35 mile haul	23,000	LCY	$ 10.36	$ 12.14	$ -	$ -	$ 22.50	$ 517,404	Haul to fill location, no stockpiling needed
	3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling needed
	3.012	Spread and compact	23,000	LCY	$ 4.37	$ 4.12	$ -	$ -	$ 8.49	$ 195,216	
	3.013	Class 2 Aggregate base	20,000	CY					$ 61.38	$ 1,227,690	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	Purchase processed material from quarry	34,000	TON	$ -	$ -	$ 15.15	$ -	$ 15.15	$ 515,070	Purchase from commercial quarry, 1.7ton/cy
	3.015	Haul material from quarry to site stockpile/fill location, 35 mile haul	23,000	LCY	$ 10.36	$ 12.14	$ -	$ -	$ 22.50	$ 517,404	Haul to fill location, no stockpiling needed
	3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling needed
	3.017	Spread and compact	23,000	LCY	$ 4.37	$ 4.12	$ -	$ -	$ 8.49	$ 195,216	
	3.018	Asphalt concrete	27,000	TON	$ 8.54	$ 4.71	$ 102.88	$ -	$ 116.13	$ 3,135,597	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	20	TON	$ 936.69	$ 469.85	$ 2,498.26	$ -	$ 3,904.80	$ 78,096	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	3,177	LF	$ 5.31	$ 2.36	$ 43.54	$ -	$ 51.20	$ 162,656	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required

8. Cost Work Sheet Summary: Revised SLR - WatersEdge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	2,900	LF					$ 98.89	$ 286,792	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*2,162*	*LCY*	*$ 4.68*	*$ 4.54*	*$ -*	*$ -*	*$ 9.22*	*$ 19,938*	
	4.007	*Load and haul material to disposal site, 0.5 mile haul*	*2,162*	*LCY*	*$ 4.01*	*$ 7.25*	*$ -*	*$ -*	*$ 11.26*	*$ 24,340*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*2,900*	*LF*	*$ 36.37*	*$ 7.01*	*$ 32.10*	*$ -*	*$ 75.49*	*$ 218,915*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*2,162*	*LCY*	*$ 1.67*	*$ 4.95*	*$ -*	*$ -*	*$ 6.62*	*$ 14,304*	
	4.010	*Sand Bedding*	*188*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 9,295*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	63,534	LF	$ 0.26	$ 0.16	$ 0.70	$ -	$ 1.12	$ 71,293	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	63,534	LF	$ 0.26	$ 0.16	$ 0.70	$ -	$ 1.12	$ 71,293	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	32	EA	$ 267.69	$ 114.31	$ 562.46	$ -	$ 944.46	$ 30,223	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	598,900	SF	$ 0.05	$ 0.02	$ 0.07	$ -	$ 0.14	$ 84,310	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	38.67	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 8,151	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	116	EA	$ 39.04	$ 15.18	$ 71.96	$ -	$ 126.17	$ 14,636	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	72,900	SF					$ 72.77	$ 5,304,848	
	4.021	*Setting and removing formwork*	*145,800*	*SF*	*$ 9.54*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.01*	*$ 1,751,324*	
	4.022	*Concrete fill work*	*5,400*	*CY*	*$ 30.70*	*$ 7.38*	*$ 224.18*	*$ -*	*$ 262.27*	*$ 1,416,267*	*Assume wall 24" thick, 5000psi concrete*
	4.023	*Provide/Install Reinforcing*	*540*	*TON*	*$ 1,094.57*	*$ 61.01*	*$ 2,802.31*	*$ -*	*$ 3,957.88*	*$ 2,137,257*	*Allow 200lbs/cy*
	4.024	Rock Slope Protection using rip rap	1,073,000	CY					$ 37.71	$ 40,461,428	
	4.025	*Blasting operations*	*1,287,600*	*LCY*	*$ 4.12*	*$ 4.00*	*$ -*	*$ 5.18*	*$ 13.30*	*$ 17,127,582*	
	4.026	*Load and haul to processing area, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	Not required
	4.028	*Load and haul to stockpile location, 2 mile haul*	*515,040*	*LCY*	*$ 2.15*	*$ 5.70*	*$ -*	*$ -*	*$ 7.85*	*$ 4,044,511*	Assume 40% of material to be stockpiled (double handling allowance)
	4.029	*Load and haul from stockpile to fill location, 0.5 mile haul*	*515,040*	*LCY*	*$ 1.08*	*$ 2.86*	*$ -*	*$ -*	*$ 3.95*	*$ 2,032,120*	40% of material to be double handled
	4.030	*Load and direct haul from excavations to fill location, 2 mile haul*	*772,560*	*LCY*	*$ 2.15*	*$ 5.69*	*$ -*	*$ -*	*$ 7.84*	*$ 6,056,902*	Direct haul to fill location, 60% of material to be hauled directly
	4.031	*Rip rap placement*	*772,560*	*LCY*	*$ 5.61*	*$ 8.88*	*$ -*	*$ -*	*$ 14.50*	*$ 11,200,313*	
	4.032	RSP backing	585,300	CY					$ 13.15	$ 7,698,885	
	4.033	*Load and haul material from stockpile to fill location, 2 mile haul*	*643,830*	*LCY*	*$ 2.15*	*$ 5.70*	*$ -*	*$ -*	*$ 7.84*	*$ 5,050,707*	
	4.034	*Spread and compact*	*643,830*	*LCY*	*$ 1.64*	*$ 2.48*	*$ -*	*$ -*	*$ 4.11*	*$ 2,648,178*	
	4.035	RSP Fabric backing material	995,000	SY	$ -	$ -	$ -	$ 5.18	$ 5.18	$ 5,149,125	
	4.036	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	-	MILE	$ -	$ -	$ -	$ -	$ -	$ -	Not required
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1%	1.0%	%				$ 149,852,939	$ 149,852,939	$ 1,498,529	
		Total Direct Cost Effect	31,767	LF	$ 1,896.62	$ 2,213.70	$ 234.61	$ (4,554.92)	$ (209.99)	$ (6,670,617.16)	

Sites Reservoir (Alt 1): Huffmaster Road Realignment | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

9. Construction Cost Summary: Revised Huffmaster Road Realignment Design - Ladybug

				Unit Cost Rate ($/LF)	Total Cost
			LF:	35,923	
Total Direct Cost Effect				(74.76)	(2,685,647)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(74.76)	(2,685,647)
General Conditions					
Mobilization			3.0%	(2.24)	(80,569)
Site General Conditions & Requirements			10.0%	(7.70)	(276,622)
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	(0.93)	(33,471)
Bonds			0.6%	(0.51)	(18,458)
GC Field and Home Office Overhead			5.0%	(4.31)	(154,738)
GC Profit			5.0%	(4.52)	(162,475)
Total Contractor Indirect Markups				(20.22)	(726,333)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(94.98)**	**(3,411,980)**
Contingencies					
Design Contingencies			10.0%	(9.50)	(341,198)
Construction Contingencies			15.0%	(15.67)	(562,977)
Total Contingency Allowance				(25.17)	(904,175)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION				**(120.15)**	**(4,316,155)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(1.17)	(42,149)
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING				**(121.32)**	**(4,358,304)**

9. Cost Work Sheet Summary: Revised Huffmaster Road Realignment Design - Ladybug

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS				$ 27,129,104.70	$ 27,129,105	$ (27,129,105)	
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Elsewhere	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	*Included elsewhere*
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	37	ACRE	$ 1,186.94	$ 1,953.37	$ -	$ -	$ 3,140.31	$ 116,191	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	29,600	LF					$ 4.13	$ 122,185	
	2.002	*Setup temporary silt fence*	*29,600*	*LF*	$ 1.83	$ 0.75	$ 0.44	$ -	$ 3.02	$ 89,526	
	2.003	*Silt fence removal*	*29,600*	*LF*	$ 0.64	$ 0.27	$ -	$ 0.19	$ 1.10	$ 32,659	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.007	*Crushing Operations*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	797,900	CY					$ 10.15	$ 8,097,461	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*917,585*	*LCY*	$ 2.09	$ 2.17	$ -	$ -	$ 4.26	$ 3,909,939	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*917,585*	*LCY*	$ 1.37	$ 3.20	$ -	$ -	$ 4.56	$ 4,187,522	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	136,500	CY					$ 10.75	$ 1,467,795	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*156,975*	*LCY*	$ 2.10	$ 2.18	$ -	$ -	$ 4.27	$ 671,013	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*156,975*	*LCY*	$ 1.49	$ 3.59	$ -	$ -	$ 5.08	$ 796,782	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	42,200	CY					$ 36.44	$ 1,537,620	Excavated material to be stockpiled for re-use, average 8 mile haul
	2.017	*Blasting operations*	*15,192*	*LCY*	$ 4.54	$ 4.34	$ 4.85	$ -	$ 13.73	$ 208,552	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*35,448*	*LCY*	$ 3.09	$ 3.99	$ -	$ -	$ 7.08	$ 250,924	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 2 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No screening required*
	2.022	*Load and haul to stockpile location, 8 mile haul*	*50,640*	*LCY*	$ 5.40	$ 15.89	$ -	$ -	$ 21.29	$ 1,078,144	*Haul to stockpile location, 8 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	430,200	CY					$ 9.75	$ 4,195,714	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*473,220*	*LCY*	$ 2.10	$ 2.18	$ -	$ -	$ 4.28	$ 2,025,942	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*473,220*	*LCY*	$ 1.37	$ 3.21	$ -	$ -	$ 4.59	$ 2,169,772	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	430,200	CY					$ 6.52	$ 2,805,557	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*430,200*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*430,200*	*LCY*	$ 3.34	$ 3.19	$ -	$ -	$ 6.52	$ 2,805,557	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	3.007	*Spread and compact*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	3.008	Class 4 Aggregate subbase	-	CY					$ -	$ -	Not required
	3.009	*Purchase processed material from quarry*	-	*TON*	$ -	$ -	$ -	$ -	$ -	$ -	
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	3.012	*Spread and compact*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	3.013	Class 2 Aggregate base	20,000	CY					$ 61.38	$ 1,227,690	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*34,000*	*TON*	$ -	$ -	$ 15.15	$ -	$ 15.15	$ 515,070	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*23,000*	*LCY*	$ 10.36	$ 12.14	$ -	$ -	$ 22.50	$ 517,404	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	*No stockpiling needed*
	3.017	*Spread and compact*	*23,000*	*LCY*	$ 4.37	$ 4.12	$ -	$ -	$ 8.49	$ 195,216	
	3.018	Asphalt concrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not Required
	3.019	Tack Coat	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not Required
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	3,592	LF	$ 5.63	$ 2.50	$ 43.54	$ -	$ 51.67	$ 185,628	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	4,230	LF					$ 97.44	$ 412,171	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*3,153*	*LCY*	$ 4.49	$ 4.36	$ -	$ -	$ 8.85	$ 27,913	
	4.007	*Load and haul material to disposal site, 0.5 mile haul*	*3,153*	*LCY*	$ 3.85	$ 6.96	$ -	$ -	$ 10.81	$ 34,075	

9. Cost Work Sheet Summary: Revised Huffmaster Road Realignment Design - Ladybug

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.008	24" Dia pipe, galvanized corrugated metal	4,230	LF	$ 36.02	$ 6.94	$ 32.11	$ -	$ 75.07	$ 317,552	
	4.009	Load at stockpile and haul to fill location, 0.5 mile haul	3,153	LCY	$ 1.53	$ 4.52	$ -	$ -	$ 6.05	$ 19,073	
	4.010	Sand Bedding	274	LCY	$ -	$ -	$ -	$ 49.45	$ 49.45	$ 13,558	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.013	Paint Traffic Stripe - 6" White	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.014	Roadside Signs	36	EA	$ 237.95	$ 101.61	$ 562.46	$ -	$ 902.01	$ 32,472	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	322,300	SF	$ 0.05	$ 0.02	$ 0.07	$ -	$ 0.14	$ 45,681	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	49.33	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 10,400	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	148	EA	$ 40.80	$ 15.86	$ 71.96	$ -	$ 128.61	$ 19,035	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	53,900	SF					$ 72.84	$ 3,925,843	
	4.021	Setting and removing formwork	107,800	SF	$ 9.56	$ 0.18	$ 2.29	$ -	$ 12.03	$ 1,296,820	
	4.022	Concrete fill work	3,993	CY	$ 30.76	$ 7.40	$ 224.18	$ -	$ 262.34	$ 1,047,426	Assume wall 24" thick, 5000psi concrete
	4.023	Provide/Install Reinforcing	399	TON	$ 1,097.83	$ 61.19	$ 2,802.31	$ -	$ 3,961.33	$ 1,581,597	Allow 200lbs/cy
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.026	Load and haul to processing area, 2 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.027	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.028	Load and haul to stockpile location, 2 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.029	Load and haul from stockpile to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.030	Load and direct haul from excavations to fill location, 2 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.031	Rip rap placement	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.032	RSP backing	-	CY					$ -	$ -	Not required
	4.033	Load and haul material from stockpile to fill location, 2 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.034	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.035	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.036	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	-	MILE	$ -	$ -	$ -	$ -	$ -	$ -	Not required
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1%	1.0%	%				$ 24,201,444	$ 24,201,444	$ 242,014	
		Total Direct Cost Effect	35,923	LF	$ 265.86	$ 317.72	$ 89.59	$ (747.93)	$ (74.76)	$ (2,685,647)	

Sites Reservoir (Alt 1): Sites Lodoga Road Realignment | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

10. Construction Cost Summary: Eliminate west bridge and replace with embankment fill

				Unit Cost Rate ($/LF)	Total Cost
			LF:	30,324	
Estimated Cost Effect				(242.93)	(7,366,632)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(242.93)	(7,366,632)
General Conditions					
Mobilization			3.0%	(7.29)	(220,999)
Site General Conditions & Requirements			10.0%	(25.02)	(758,763)
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	(3.03)	(91,810)
Bonds			0.6%	(1.67)	(50,629)
GC Field and Home Office Overhead			5.0%	(14.00)	(424,442)
GC Profit			5.0%	(14.70)	(445,664)
Total Contractor Indirect Markups				(65.70)	(1,992,307)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(308.63)**	**(9,358,939)**
Contingencies					
Design Contingencies			10.0%	(30.86)	(935,894)
Construction Contingencies			15.0%	(50.92)	(1,544,225)
Total Contingency Allowance				(81.79)	(2,480,119)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION				**(390.42)**	**(11,839,058)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(3.81)	(115,612)
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING				**(394.23)**	**(11,954,670)**

10. Cost Work Sheet Summary: Eliminate west bridge and replace with embankment fill

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost / Baseline Cost Adjustment**									
		Omit Cost for West Approach as per baseline estimate	(1)	LS				$ 86,817,609.60	$ 86,817,610	$ (86,817,610)	
		Omit Cost for Sites Lodoga Road Realignment Bridges as per baseline estimate	(1)	LS				$ 117,947,799	$ 117,947,799	$ (117,947,799)	
		Add Cost for East Bridge Approach only	57,972	SF				$ 806.32	$ 806.32	$ 46,743,323	
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Elsewhere	
	1.002	*Asphalt removal work*	-	*SY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Included elsewhere*
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	1.004	Clearing and Grubbing	70	ACRE	$ 1,115.34	$ 1,835.55	$ -	$ -	$ 2,950.89	$ 206,562	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	21,600	LF					$ 4.10	$ 88,479	
	2.002	*Setup temporary silt fence*	*21,600*	*LF*	*$ 1.77*	*$ 0.72*	*$ 0.44*	*$ -*	*$ 2.94*	*$ 63,509*	
	2.003	*Silt fence removal*	*21,600*	*LF*	*$ 0.62*	*$ 0.27*	*$ -*	*$ 0.27*	*$ 1.16*	*$ 24,970*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	-	CY					$ -	$ -	Not required
	2.011	*Roadway excavations, common earth*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	165,900	CY					$ 10.72	$ 1,778,290	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*190,785*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.26*	*$ 812,958*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*190,785*	*LCY*	*$ 1.48*	*$ 3.58*	*$ -*	*$ -*	*$ 5.06*	*$ 965,332*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	75,400	CY					$ 20.37	$ 1,535,582	Excavated material to be stockpiled for re-use, average 2 mile haul
	2.017	*Blasting operations*	*27,144*	*LCY*	*$ 4.52*	*$ 4.32*	*$ 4.85*	*$ -*	*$ 13.68*	*$ 371,419*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*63,336*	*LCY*	*$ 2.97*	*$ 3.83*	*$ -*	*$ -*	*$ 6.79*	*$ 430,156*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 2 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 2 mile haul*	*90,480*	*LCY*	*$ 2.23*	*$ 5.88*	*$ -*	*$ -*	*$ 8.11*	*$ 734,007*	*Haul to stockpile location, 2 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	1,492,700	CY					$ 9.72	$ 14,511,292	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*1,641,970*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.27*	*$ 7,006,920*	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*1,641,970*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.57*	*$ 7,504,372*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	1,492,700	CY					$ 6.44	$ 9,617,106	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*1,492,700*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*1,492,700*	*LCY*	*$ 3.32*	*$ 3.13*	*$ -*	*$ -*	*$ 6.44*	*$ 9,617,106*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	7,966,500	CY					$ 7.17	$ 57,123,902	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	*8,763,150*	*LCY*						*Elsewhere*	*Handling cost included within related excavation project*
	3.007	*Spread and compact*	*8,763,150*	*LCY*	*$ 3.38*	*$ 3.14*	*$ -*	*$ -*	*$ 6.52*	*$ 57,123,902*	
	3.008	Class 4 Aggregate subbase	19,100	CY					$ 62.50	$ 1,193,666	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*32,470*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 491,892*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*21,965*	*LCY*	*$ 10.84*	*$ 12.71*	*$ -*	*$ -*	*$ 23.56*	*$ 517,404*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*21,965*	*LCY*	*$ 4.32*	*$ 4.08*	*$ -*	*$ -*	*$ 8.39*	*$ 184,371*	
	3.013	Class 2 Aggregate base	19,100	CY					$ 62.50	$ 1,193,666	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*32,470*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 491,892*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*21,965*	*LCY*	*$ 10.84*	*$ 12.71*	*$ -*	*$ -*	*$ 23.56*	*$ 517,404*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*21,965*	*LCY*	*$ 4.32*	*$ 4.08*	*$ -*	*$ -*	*$ 8.39*	*$ 184,371*	
	3.018	Asphalt concrete	25,780	TON	$ 8.57	$ 4.73	$ 102.88	$ -	$ 116.18	$ 2,995,234	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	19	TON	$ 941.17	$ 472.10	$ 2,510.29	$ -	$ 3,923.56	$ 74,548	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	3,032	LF	$ 5.56	$ 2.47	$ 43.53	$ -	$ 51.56	$ 156,364	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required

10. Cost Work Sheet Summary: Eliminate west bridge and replace with embankment fill

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	2,860	LF					$ 98.81	$ 282,596	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*2,132*	*LCY*	*$ 4.74*	*$ 4.61*	*$ -*	*$ -*	*$ 9.35*	*$ 19,938*	
	4.007	*Load and haul material to disposal site, 0.5 mile haul*	*2,132*	*LCY*	*$ 4.07*	*$ 7.35*	*$ -*	*$ -*	*$ 11.42*	*$ 24,340*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*2,860*	*LF*	*$ 36.06*	*$ 6.95*	*$ 32.11*	*$ -*	*$ 75.12*	*$ 214,847*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*2,132*	*LCY*	*$ 1.69*	*$ 5.02*	*$ -*	*$ -*	*$ 6.71*	*$ 14,304*	
	4.010	*Sand Bedding*	*185*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 9,167*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	60,648	LF	$ 0.25	$ 0.15	$ 0.70	$ -	$ 1.09	$ 66,294	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	60,648	LF	$ 0.25	$ 0.15	$ 0.70	$ -	$ 1.09	$ 66,294	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	31	EA	$ 276.33	$ 118.00	$ 562.46	$ -	$ 956.78	$ 29,660	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	565,000	SF	$ 0.05	$ 0.02	$ 0.07	$ -	$ 0.15	$ 81,936	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	33.33	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 7,027	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	100	EA	$ 45.28	$ 17.61	$ 71.96	$ -	$ 134.85	$ 13,485	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	66,400	SF					$ 72.78	$ 4,832,395	
	4.021	*Setting and removing formwork*	*132,800*	*SF*	*$ 9.56*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.02*	*$ 1,596,872*	
	4.022	*Concrete fill work*	*4,919*	*CY*	*$ 30.59*	*$ 7.35*	*$ 224.18*	*$ -*	*$ 262.13*	*$ 1,289,283*	*Assume wall 24" thick, 5000psi concrete*
	4.023	*Provide/Install Reinforcing*	*492*	*TON*	*$ 1,093.70*	*$ 60.96*	*$ 2,802.31*	*$ -*	*$ 3,956.96*	*$ 1,946,240*	*Allow 200lbs/cy*
	4.024	Rock Slope Protection using rip rap	1,073,000	CY					$ 37.71	$ 40,461,428	
	4.025	*Blasting operations*	*1,287,600*	*LCY*	*$ 4.12*	*$ 4.00*	*$ -*	*$ 5.18*	*$ 13.30*	*$ 17,127,582*	
	4.026	*Load and haul to processing area, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	Not required
	4.028	*Load and haul to stockpile location, 2 mile haul*	*515,040*	*LCY*	*$ 2.15*	*$ 5.70*	*$ -*	*$ -*	*$ 7.85*	*$ 4,044,511*	Assume 40% of material to be stockpiled (double handling allowance)
	4.029	*Load and haul from stockpile to fill location, 0.5 mile haul*	*515,040*	*LCY*	*$ 1.08*	*$ 2.86*	*$ -*	*$ -*	*$ 3.95*	*$ 2,032,120*	40% of material to be double handled
	4.030	*Load and direct haul from excavations to fill location, 2 mile haul*	*772,560*	*LCY*	*$ 2.15*	*$ 5.69*	*$ -*	*$ -*	*$ 7.84*	*$ 6,056,902*	Direct haul to fill location, 60% of material to be hauled directly
	4.031	*Rip rap placement*	*772,560*	*LCY*	*$ 5.61*	*$ 8.88*	*$ -*	*$ -*	*$ 14.50*	*$ 11,200,313*	
	4.032	RSP backing	585,300	CY					$ 13.15	$ 7,698,885	
	4.033	*Load and haul material from stockpile to fill location, 2 mile haul*	*643,830*	*LCY*	*$ 2.15*	*$ 5.70*	*$ -*	*$ -*	*$ 7.84*	*$ 5,050,707*	
	4.034	*Spread and compact*	*643,830*	*LCY*	*$ 1.64*	*$ 2.48*	*$ -*	*$ -*	*$ 4.11*	*$ 2,648,178*	
	4.035	RSP Fabric backing material	995,000	SY	$ -	$ -	$ -	$ 5.18	$ 5.18	$ 5,149,125	
	4.036	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	-	MILE	$ -	$ -	$ -	$ -	$ -	$ -	Not required
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1%	1.0%	%				$ 149,163,816	$ 149,163,816	$ 1,491,638	
		Total Direct Cost Effect	30,324	LF	$ 1,979.58	$ 2,318.89	$ 230.50	$ (4,771.90)	$ (242.93)	$ (7,366,632.28)	

Sites Reservoir (Alt 1): Golden Gate Dam | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

11.1. Construction Cost Summary: Dam Shell Re-design

				Total Cost
Total Direct Cost Effect				(76,960,537)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(76,960,537)
General Conditions				
Mobilization			5.0%	(3,848,027)
Site General Conditions & Requirements			10.0%	(8,080,856)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(977,784)
Bonds			0.6%	(539,203)
GC Home Office Overhead			6.0%	(5,424,384)
GC Profit			8.0%	(7,666,463)
Total Contractor Indirect Markups				(26,536,717)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(103,497,254)**
Contingencies				
Design Contingencies			10.0%	(10,349,725)
Construction Contingencies			15.0%	(17,077,047)
Total Contingency Allowance				(27,426,772)
TOTAL DIRECT COST BEFORE ESCALATION				**(130,924,026)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(1,278,517)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(132,202,543)**

11.2 Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 352,593,965	$ 352,593,965	$ (352,593,965)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	59	ACRE	$ 3,078.85	$ 5,373.52	$ -	$ -	$ 8,452.37	$ 501,732	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	59	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 223,223	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	726,000	Tons					$ 37.14	$ 26,964,478	
	2.002	*Purchase processed material from quarry*	*726,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 16,114,659*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*491,118*	*LCY*	*$ 10.56*	*$ 11.54*	*$ -*	*$ -*	*$ 22.09*	*$ 10,849,819*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	803,000	Tons					$ 37.15	$ 29,832,148	
	2.005	*Purchase processed material from quarry*	*803,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 17,823,790*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*543,206*	*LCY*	*$ 10.56*	*$ 11.54*	*$ -*	*$ -*	*$ 22.11*	*$ 12,008,359*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	107,800	Tons					$ 37.21	$ 4,011,061	
	2.008	*Purchase processed material from quarry*	*107,800*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,392,783*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*72,924*	*LCY*	*$ 10.60*	*$ 11.59*	*$ -*	*$ -*	*$ 22.19*	*$ 1,618,278*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% waste factor / additional material supply*
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% waste factor / additional material supply*
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	131,250	BCY					$ 8.41	$ 1,104,253	
	3.002	*Excavations - remove top soil layer*	*144,375*	*LCY*	*$ 1.42*	*$ 2.21*	*$ -*	*$ -*	*$ 3.63*	*$ 524,411*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*144,375*	*LCY*	*$ 1.12*	*$ 2.90*	*$ -*	*$ -*	*$ 4.02*	*$ 579,842*	
	3.004	Dam Foundation Excavation - Common	341,250	BCY					$ 8.56	$ 2,921,473	
	3.005	*Excavations - remove top soil layer*	*375,375*	*LCY*	*$ 1.56*	*$ 2.21*	*$ -*	*$ -*	*$ 3.77*	*$ 1,413,882*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*375,375*	*LCY*	*$ 1.12*	*$ 2.90*	*$ -*	*$ -*	*$ 4.02*	*$ 1,507,590*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	1,040,550	BCY					$ 11.71	$ 12,182,875	
	3.008	*Rock excavations, no blasting*	*1,196,633*	*LCY*	*$ 2.51*	*$ 3.67*	*$ -*	*$ -*	*$ 6.18*	*$ 7,396,539*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*1,196,633*	*LCY*	*$ 1.11*	*$ 2.89*	*$ -*	*$ -*	*$ 4.00*	*$ 4,786,336*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	166,950	BCY					$ 24.20	$ 4,039,693	
	3.011	*Blasting operations*	*200,340*	*LCY*	*$ 4.28*	*$ 5.73*	*$ 4.85*	*$ -*	*$ 14.86*	*$ 2,976,934*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 1 mile haul*	*200,340*	*LCY*	*$ 1.50*	*$ 3.81*	*$ -*	*$ -*	*$ 5.30*	*$ 1,062,758*	
	3.013	*Crush and screen material*	*200,340*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	65,000	SY					$ 20.06	$ 1,304,206	
	4.002	*Initial foundation core cleanup*	*65,000*	*SY*	*$ 11.48*	*$ 5.52*	*$ -*	*$ -*	*$ 17.00*	*$ 1,105,176*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*17,875*	*CY*	*$ 3.73*	*$ 7.40*	*$ -*	*$ -*	*$ 11.13*	*$ 199,030*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	65,000	SY					$ 17.00	$ 1,105,176	
	4.005	*Final foundation core cleanup*	*65,000*	*SY*	*$ 11.48*	*$ 5.52*	*$ -*	*$ -*	*$ 17.00*	*$ 1,105,176*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	3,700	CY					$ 120.02	$ 444,064	
	4.008	*Dental excavations*	*4,070*	*LCY*	*$ 67.94*	*$ 30.73*	*$ -*	*$ -*	*$ 98.68*	*$ 401,609*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*4,070*	*LCY*	*$ 3.83*	*$ 6.60*	*$ -*	*$ -*	*$ 10.43*	*$ 42,454*	
	4.010	Dental Concrete	3,700	CY	$ 44.39	$ 20.16	$ 183.12	$ -	$ 247.68	$ 916,398	
	4.011	Grout Cap with Anchors	9,900	CY	$ 78.42	$ 22.69	$ 519.68	$ 4.07	$ 624.86	$ 6,186,119	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	96,100	LF					$ 78.68	$ 7,561,102	
	4.013	*Drill setup for all holes*	*1,281*	*ea.*	*$ 191.11*	*$ 319.80*	*$ -*	*$ -*	*$ 510.91*	*$ 654,641*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*96,100*	*lft*	*$ 10.34*	*$ 11.14*	*$ -*	*$ -*	*$ 21.48*	*$ 2,064,377*	
	4.015	*Redrill grout holes*	*9,610*	*lft*	*$ 10.42*	*$ 11.24*	*$ -*	*$ -*	*$ 21.66*	*$ 208,172*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*4,805*	*ea.*	*$ 91.45*	*$ -*	*$ -*	*$ -*	*$ 91.45*	*$ 439,409*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*6,407*	*hr*	*$ 485.23*	*$ 100.02*	*$ -*	*$ -*	*$ 585.25*	*$ 3,749,497*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*1,281*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 445,007*	
	4.019	Consolidation Grouting	40,000	LF					$ 78.69	$ 3,147,635	
	4.020	*Drill setup for all holes*	*533*	*ea.*	*$ 191.31*	*$ 320.13*	*$ -*	*$ -*	*$ 511.44*	*$ 272,767*	*Assume 75' drilling lengths*
	4.021	*Drill curtain grout holes*	*40,000*	*lft*	*$ 10.33*	*$ 11.14*	*$ -*	*$ -*	*$ 21.47*	*$ 858,711*	
	4.022	*Redrill grout holes*	*4,000*	*lft*	*$ 10.43*	*$ 11.25*	*$ -*	*$ -*	*$ 21.68*	*$ 86,739*	*Assume 10% to be redrilled*
	4.023	*Hookup to grout holes and grout nipples*	*2,000*	*ea.*	*$ 91.39*	*$ -*	*$ -*	*$ -*	*$ 91.39*	*$ 182,779*	*1 x hookup every 20'*

11.2 Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.024	Inject portland cement grout	2,667	hr	$ 485.46	$ 100.07	$ -	$ -	$ 585.53	$ 1,561,413	Allow 5 hours per hole
	4.025	Perform hydraulic conductivity tests	533	ea.	$ -	$ -	$ -	$ 347.30	$ 347.30	$ 185,227	
	4.026	Type III Cement	4,800	Tons	$ 176.73	$ 73.00	$ 113.14	$ -	$ 362.87	$ 1,741,756	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	170,240	SY					$ 4.51	$ 767,396	
	5.002	Initial dam shell cleanup	170,240	SY	$ 1.33	$ 0.41	$ -	$ -	$ 1.74	$ 295,679	
	5.003	Load and haul to disposal area, 0.5 mile haul	31,211	LCY	$ 5.55	$ 9.56	$ -	$ -	$ 15.11	$ 471,716	Assume removal of top layer, 0.5' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	500	LF	$ 47.70	$ 29.60	$ 35.56	$ -	$ 112.86	$ 56,428	
	6.002	Furnish and Install Foundation Drain Manholes	3	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 17,275	
	6.003	Seepage Partition Walls	700	CY	$ 523.27	$ 116.49	$ 465.37	$ -	$ 1,105.13	$ 773,589	3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	1,150,000	BCY					$ 7.48	$ 8,605,073	Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	1,265,000	LCY	$ 0.98	$ 2.68	$ -	$ -	$ 3.65	$ 4,623,091	Include 10% swell factor
	7.004	Load and haul to site stockpile, 0.25 mile haul	1,265,000	LCY	$ 0.84	$ 2.30	$ -	$ -	$ 3.15	$ 3,981,982	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	73,333	BCY					$ 9.14	$ 669,951	
	7.006	Embankment excavations	80,666	LCY	$ 1.45	$ 3.06	$ -	$ -	$ 4.52	$ 364,216	Include 10% swell factor
	7.007	Load and haul to site stockpile, 0.25 mile haul	80,666	LCY	$ 1.06	$ 2.73	$ -	$ -	$ 3.79	$ 305,735	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	200,000	BCY					$ 9.01	$ 1,801,938	
	7.009	Embankment excavations	220,000	LCY	$ 1.43	$ 3.02	$ -	$ -	$ 4.45	$ 979,616	Include 10% swell factor
	7.010	Load and haul to site stockpile, 0.25 mile haul	220,000	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.74	$ 822,322	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	
	7.012	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	355,833	ECY					$ 6.75	$ 2,402,878	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	Load and haul to site stockpile, 0.25 mile haul	391,417	LCY	$ 1.10	$ 2.97	$ -	$ -	$ 4.07	$ 1,593,499	
	7.016	Spread and compact	391,417	LCY	$ 1.14	$ 0.93	$ -	$ -	$ 2.07	$ 809,379	
	7.017	Topsoil Replacement	125,000	ECY					$ 9.82	$ 1,227,668	Backfill burrow area using material from stockpile
	7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	137,500	LCY	$ 1.76	$ 5.05	$ -	$ -	$ 6.81	$ 935,851	
	7.019	Spread and compact	137,500	LCY	$ 1.17	$ 0.95	$ -	$ -	$ 2.12	$ 291,817	
	7.020	Furnish and Install Zone 1 - Core	2,400,000	ECY					$ 13.56	$ 32,549,513	
	7.021	Excavate from burrow area	2,640,000	LCY	$ 1.43	$ 3.02	$ -	$ -	$ 4.45	$ 11,755,390	Include 10% swell factor
	7.022	Load and haul to zone-1 fill location, 0.5 mile haul	2,640,000	LCY	$ 1.28	$ 2.88	$ -	$ -	$ 4.16	$ 10,975,156	No stockpiling required
	7.023	Spread and compact	2,640,000	LCY	$ 1.50	$ 2.22	$ -	$ -	$ 3.72	$ 9,818,968	
	7.024	Load, Haul and Place - Zone 2A - Filter	726,000	Tons					$ 3.19	$ 2,316,629	
	7.025	Load at stockpile and haul to fill location, 0.5 mile haul	147,335	LCY	$ 0.92	$ 2.52	$ -	$ -	$ 3.44	$ 507,319	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	Direct hauling from quarry	343,782	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	Spread and compact	491,118	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 1,809,310	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	803,000	Tons					$ 3.20	$ 2,570,498	
	7.028	Load at stockpile and haul to fill location, 0.5 mile haul	162,962	LCY	$ 0.94	$ 2.56	$ -	$ -	$ 3.50	$ 570,734	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	Direct hauling from quarry	380,244	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	Spread and compact	543,206	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 1,999,764	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	451,000	Tons					$ 3.21	$ 1,446,193	
	7.031	Load at stockpile and haul to fill location, 0.5 mile haul	91,526	LCY	$ 0.93	$ 2.53	$ -	$ -	$ 3.46	$ 317,075	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	Direct hauling from quarry	213,562	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	Spread and compact	305,088	LCY	$ 1.46	$ 2.24	$ -	$ -	$ 3.70	$ 1,129,118	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	
	7.034	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0341	Direct hauling from quarry	-	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.035	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 15% swell factor
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	
	7.037	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0371	Direct hauling from quarry	-	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.038	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 15% swell factor
	7.039	Furnish and Install Zone 3 - Rockfill	1,677,000	ECY					$ 27.54	$ 46,179,994	
	7.040	Blasting operations	2,012,400	LCY	$ 4.26	$ 5.69	$ 4.85	$ -	$ 14.80	$ 29,777,169	Include 20% swell factor
	7.041	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	Crush and screen material	2,012,400	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	Load and haul to zone-3, 1.25 mile haul	2,012,400	LCY	$ 1.11	$ 3.35	$ -	$ -	$ 4.47	$ 8,988,736	No stockpiling required, direct haul
	7.044	Spread and compact	2,012,400	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 7,414,090	

11.2 Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.045	Furnish and Install Zone 4 - Random	5,190,000	ECY					$ 9.48	$ 49,208,348	
	7.046	Excavations in common soil	945,300	LCY	$ 1.55	$ 2.20	$ -	$ -	$ 3.75	$ 3,549,537	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	945,300	LCY	$ 1.25	$ 3.48	$ -	$ -	$ 4.73	$ 4,468,704	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	5,023,200	LCY	$ 1.05	$ 2.77	$ -	$ -	$ 3.83	$ 19,233,518	Include 15% swell factor
	7.050	Spread and compact	5,968,500	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 21,956,589	
	7.051	Furnish and Install Riprap	149,000	ECY					$ 40.05	$ 5,967,843	
	7.052	Blasting operations	178,800	LCY	$ 4.29	$ 5.73	$ 4.85	$ -	$ 14.86	$ 2,657,613	Include 20% swell factor
	7.053	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	178,800	LCY	$ 0.93	$ 2.54	$ -	$ -	$ 3.48	$ 621,466	
	7.056	Riprap placement	178,800	LCY	$ 5.98	$ 9.06	$ -	$ -	$ 15.04	$ 2,688,763	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 2,300,000.00	$ 2,300,000.00	$ 2,300,000	Allowance
	8.003	Seeding and Mulching	261,360	SF	$ -	$ -	$ -	$ 0.69	$ 0.69	$ 180,338	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	2,500	CY					$ 85.72	$ 214,291	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	2,875	LCY	$ 10.26	$ 11.11	$ 37.73	$ -	$ 59.11	$ 169,929	Include 15% swell factor
	8.007	Place and compact	2,875	LCY	$ 5.03	$ 10.40	$ -	$ -	$ 15.43	$ 44,362	
	8.008	Developing haul routes - Haul routes inside reservoir	12	ACRES					$ 27,947.01	$ 335,364	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	522,720	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 104,650	
	8.0091	Load and haul earth fill	9,680	CY	$ 1.74	$ 4.75	$ -	$ -	$ 6.49	$ 62,793	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	522,720	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.32	$ 167,922	
	8.011	Developing haul routes - Haul routes outside reservoir	25	ACRES					$ 27,008.54	$ 675,213	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	1,089,000	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 209,299	
	8.0121	Load and haul earth fill	20,167	CY	$ 1.73	$ 4.72	$ -	$ -	$ 6.45	$ 130,071	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	1,089,000	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 335,844	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	8,700	CY	$ 94.61	$ 50.34	$ 233.06	$ -	$ 378.01	$ 3,288,706	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.020	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 1,150,000.00	$ 1,150,000.00	$ 1,150,000	Allowance
9		**Golden Gate Dam Bypass Pipeline Facilities**									
	9.001	Upstream Cofferdam	-	CY						Included above	Earth fill coffer dam; included within zone 4 fill work
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required; Earth fill coffer dam
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	2,100	LF					$ 1,893.98	$ 3,977,357	
	9.010	Excavate trench in bedrock	4,107	LCY	$ 71.51	$ 51.86	$ -	$ -	$ 123.38	$ 506,670	
	9.011	Load and haul material to disposal site, 0.5 mile haul	4,107	LCY	$ 3.11	$ 7.79	$ -	$ -	$ 10.89	$ 44,740	
	9.012	48" steel pipe placement	2,100	LF	$ 60.87	$ 27.46	$ 845.32	$ -	$ 933.66	$ 1,960,680	
	9.013	Concrete backfill for pipe trench (dam footprint)	2,200	CY	$ 83.28	$ 21.01	$ 194.22	$ -	$ 298.51	$ 656,609	
	9.014	Reinforcement for concrete backfill	132	TON	$ 135.25	$ 9.35	$ 2,663.58	$ -	$ 2,808.18	$ 370,616	Allow 60lbs/CY for reinforcement
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	1	LS	$ 21,679.93	$ 6,197.40	$ 161,625.00	$ -	$ 189,502.33	$ 189,502	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	10	LF	$ -	$ -	$ -	$ 3,450.00	$ 3,450.00	$ 34,500	
	9.017	Install 48"x48" debris rack on conc. Manhole	1	LS	$ -	$ -	$ -	$ 5,865.00	$ 5,865.00	$ 5,865	
	9.018	Grout pipe	1,050	CY	$ 26.27	$ 5.26	$ 151.73	$ -	$ 183.26	$ 192,420	Allow 0.5CY of grout/lf of pipe
	9.019	Field Survey	1	LS	$ -	$ -	$ -	$ 15,755.00	$ 15,755.00	$ 15,755	
	9.020	Riprap Discharge Channel	75	CY					$ 460.11	$ 34,508	
	9.021	Blasting operations	90	LCY	$ 85.14	$ 113.82	$ 4.85	$ -	$ 203.81	$ 18,343	Include 20% swell factor
	9.022	Excavate	90	LCY	$ 22.12	$ 42.13	$ -	$ -	$ 64.25	$ 5,782	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	90	LCY	$ 18.89	$ 32.86	$ -	$ -	$ 51.75	$ 4,657	
	9.025	Place at the channel	90	LCY	$ 37.90	$ 25.72	$ -	$ -	$ 63.62	$ 5,725	
10		Misc allowance for small items, allow 1%	1.0%	%				272,904,385	$ 272,904,385	$ 2,729,044	
		Total Direct Cost Effect	53	Acre	$ 1,550,135.98	$ 2,386,984.86	$ 1,125,600.27	$ (6,514,806.72)	$ (1,452,085.60)	$ (76,960,537)	

Sites Reservoir (Alt 1): Sites Dam | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

11.2. Construction Cost Summary: Dam Shell Re-design

				Total Cost
Total Direct Cost Effect				(25,175,369)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(25,175,369)
General Conditions				
Mobilization			5.0%	(1,258,768)
Site General Conditions & Requirements			10.0%	(2,643,414)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(319,853)
Bonds			0.6%	(176,384)
GC Home Office Overhead			6.0%	(1,774,427)
GC Profit			8.0%	(2,507,857)
Total Contractor Indirect Markups				(8,680,703)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(33,856,072)**
Contingencies				
Design Contingencies			10.0%	(3,385,607)
Construction Contingencies			15.0%	(5,586,252)
Total Contingency Allowance				(8,971,859)
TOTAL DIRECT COST BEFORE ESCALATION				**(42,827,931)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(418,229)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCION COST SAVING				**(43,246,160)**

11.2. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 176,240,299	$ 176,240,299	$ (176,240,299)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	30	ACRE	$ 3,113.40	$ 5,433.83	$ -	$ -	$ 8,547.23	$ 258,468	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	30	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 113,718	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	242,000	Tons					$ 37.01	$ 8,957,510	
	2.002	*Purchase processed material from quarry*	*242,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 5,371,553*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*163,706*	*LCY*	*$ 10.47*	*$ 11.44*	*$ -*	*$ -*	*$ 21.90*	*$ 3,585,957*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	297,000	Tons					$ 36.99	$ 10,987,457	
	2.005	*Purchase processed material from quarry*	*297,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 6,592,361*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*200,912*	*LCY*	*$ 10.45*	*$ 11.42*	*$ -*	*$ -*	*$ 21.88*	*$ 4,395,096*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	42,900	Tons					$ 37.20	$ 1,595,863	
	2.008	*Purchase processed material from quarry*	*42,900*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 952,230*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*29,021*	*LCY*	*$ 10.60*	*$ 11.58*	*$ -*	*$ -*	*$ 22.18*	*$ 643,633*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% waste factor / additional material supply*
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% waste factor / additional material supply*
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	60,900	BCY					$ 8.57	$ 522,010	
	3.002	*Excavations - remove top soil layer*	*66,990*	*LCY*	*$ 1.45*	*$ 2.25*	*$ -*	*$ -*	*$ 3.70*	*$ 247,903*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*66,990*	*LCY*	*$ 1.14*	*$ 2.95*	*$ -*	*$ -*	*$ 4.09*	*$ 274,107*	
	3.004	Dam Foundation Excavation - Common	127,050	BCY					$ 8.52	$ 1,082,784	
	3.005	*Excavations - remove top soil layer*	*139,755*	*LCY*	*$ 1.55*	*$ 2.20*	*$ -*	*$ -*	*$ 3.75*	*$ 524,026*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*139,755*	*LCY*	*$ 1.11*	*$ 2.88*	*$ -*	*$ -*	*$ 4.00*	*$ 558,757*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	361,200	BCY					$ 11.73	$ 4,237,708	
	3.008	*Rock excavations, no blasting*	*415,380*	*LCY*	*$ 2.51*	*$ 3.68*	*$ -*	*$ -*	*$ 6.19*	*$ 2,571,978*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*415,380*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 1,665,729*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	49,350	BCY					$ 24.20	$ 1,194,337	
	3.011	*Blasting operations*	*59,220*	*LCY*	*$ 4.27*	*$ 5.71*	*$ 4.85*	*$ -*	*$ 14.83*	*$ 878,060*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 0.5 mile haul*	*59,220*	*LCY*	*$ 1.49*	*$ 3.85*	*$ -*	*$ -*	*$ 5.34*	*$ 316,278*	
	3.013	*Crush and screen material*	*59,220*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	20,000	SY					$ 20.29	$ 405,775	
	4.002	*Initial foundation core cleanup*	*20,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 343,578*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*5,500*	*CY*	*$ 3.79*	*$ 7.52*	*$ -*	*$ -*	*$ 11.31*	*$ 62,197*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	20,000	SY					$ 17.18	$ 343,578	
	4.005	*Final foundation core cleanup*	*20,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 343,578*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	800	CY					$ 122.13	$ 97,700	
	4.008	*Dental excavations*	*880*	*LCY*	*$ 69.06*	*$ 31.24*	*$ -*	*$ -*	*$ 100.30*	*$ 88,266*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*880*	*LCY*	*$ 3.94*	*$ 6.78*	*$ -*	*$ -*	*$ 10.72*	*$ 9,434*	
	4.010	Dental Concrete	800	CY	$ 44.52	$ 20.23	$ 183.12	$ -	$ 247.87	$ 198,296	
	4.011	Grout Cap with Anchors	3,500	CY	$ 80.66	$ 23.34	$ 519.68	$ 11.50	$ 635.18	$ 2,223,144	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	31,800	LF					$ 78.89	$ 2,508,759	
	4.013	*Drill setup for all holes*	*424*	*ea.*	*$ 192.51*	*$ 322.15*	*$ -*	*$ -*	*$ 514.65*	*$ 218,214*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*31,800*	*lft*	*$ 10.37*	*$ 11.18*	*$ -*	*$ -*	*$ 21.55*	*$ 685,234*	
	4.015	*Redrill grout holes*	*3,180*	*lft*	*$ 10.50*	*$ 11.32*	*$ -*	*$ -*	*$ 21.82*	*$ 69,391*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*1,590*	*ea.*	*$ 91.73*	*$ -*	*$ -*	*$ -*	*$ 91.73*	*$ 145,854*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*2,120*	*hr*	*$ 486.04*	*$ 100.19*	*$ -*	*$ -*	*$ 586.23*	*$ 1,242,811*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*424*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 147,255*	
	4.019	Consolidation Grouting	13,900	LF					$ 79.83	$ 1,109,693	
	4.020	*Drill setup for all holes*	*185*	*ea.*	*$ 201.86*	*$ 337.79*	*$ -*	*$ -*	*$ 539.65*	*$ 100,015*	*Assume 75' drilling lengths*
	4.021	*Drill curtain grout holes*	*13,900*	*lft*	*$ 10.51*	*$ 11.33*	*$ -*	*$ -*	*$ 21.84*	*$ 303,585*	
	4.022	*Redrill grout holes*	*1,390*	*lft*	*$ 12.01*	*$ 12.95*	*$ -*	*$ -*	*$ 24.96*	*$ 34,695*	*Assume 10% to be redrilled*
	4.023	*Hookup to grout holes and grout nipples*	*695*	*ea.*	*$ 92.98*	*$ -*	*$ -*	*$ -*	*$ 92.98*	*$ 64,619*	*1 x hookup every 20'*

11.2. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.024	*Inject portland cement grout*	927	hr	$ 485.30	$ 100.04	$ -	$ -	$ 585.34	$ 542,413	Allow 5 hours per hole
	4.025	*Perform hydraulic conductivity tests*	185	ea.	$ -	$ -	$ -	$ 347.30	$ 347.30	$ 64,366	
	4.026	Type III Cement	1,600	Tons	$ 177.36	$ 73.26	$ 113.14	$ -	$ 363.75	$ 582,007	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	77,392	SY					$ 3.64	$ 281,752	
	5.002	*Initial dam shell cleanup*	77,392	SY	$ 1.34	$ 0.41	$ -	$ -	$ 1.75	$ 135,520	
	5.003	*Load and haul to disposal area, 0.5 mile haul*	14,189	LCY	$ 3.79	$ 6.52	$ -	$ -	$ 10.31	$ 146,232	Assume removal of top layer, 0.5' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	500	LF	$ 43.36	$ 26.91	$ 35.56	$ -	$ 105.83	$ 52,914	
	6.002	Furnish and Install Foundation Drain Manholes	1	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 5,758	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	339,000	BCY					$ 7.50	$ 2,544,108	Assumed common earth, 3000' haul w/ scraper
	7.003	*Embankment excavations*	372,900	LCY	$ 0.98	$ 2.69	$ -	$ -	$ 3.67	$ 1,366,827	Include 10% swell factor
	7.004	*Load and haul to site stockpile, 0.25 mile haul*	372,900	LCY	$ 0.85	$ 2.31	$ -	$ -	$ 3.16	$ 1,177,282	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	143,333	BCY					$ 9.03	$ 1,293,699	
	7.006	*Embankment excavations*	157,666	LCY	$ 1.43	$ 3.03	$ -	$ -	$ 4.46	$ 703,314	Include 10% swell factor
	7.007	*Load and haul to site stockpile, 0.25 mile haul*	157,666	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.74	$ 590,385	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	
	7.009	*Embankment excavations*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 10% swell factor
	7.010	*Load and haul to site stockpile, 0.25 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	
	7.012	*Embankment excavations*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	*Load and haul to site stockpile, 0.25 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	120,583	ECY					$ 6.78	$ 817,305	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	*Load and haul to site stockpile, 0.25 mile haul*	132,642	LCY	$ 1.11	$ 2.98	$ -	$ -	$ 4.09	$ 542,007	
	7.016	*Spread and compact*	132,642	LCY	$ 1.15	$ 0.93	$ -	$ -	$ 2.08	$ 275,299	
	7.017	Topsoil Replacement	58,000	ECY					$ 9.82	$ 569,581	Backfill burrow area using material from stockpile
	7.018	*Excavate, Load and haul excavated backfill material to fill location, 1 mile*	63,800	LCY	$ 1.75	$ 5.02	$ -	$ -	$ 6.77	$ 431,931	
	7.019	*Spread and compact*	63,800	LCY	$ 1.19	$ 0.97	$ -	$ -	$ 2.16	$ 137,649	
	7.020	Furnish and Install Zone 1 - Core	710,000	ECY					$ 13.11	$ 9,305,924	
	7.021	*Excavate from burrow area*	781,000	LCY	$ 1.43	$ 3.02	$ -	$ -	$ 4.45	$ 3,478,892	Include 10% swell factor
	7.022	*Load and haul to zone-1 fill location, 1 mile haul*	781,000	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.74	$ 2,920,297	No stockpiling required
	7.023	*Spread and compact*	781,000	LCY	$ 1.50	$ 2.22	$ -	$ -	$ 3.72	$ 2,906,734	
	7.024	Load, Haul and Place - Zone 2A - Filter	242,000	Tons					$ 3.23	$ 782,749	
	7.025	*Load at stockpile and haul to fill location, 0.5 mile haul*	49,112	LCY	$ 0.83	$ 2.65	$ -	$ -	$ 3.47	$ 170,576	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	*Direct hauling from quarry*	114,594	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	*Spread and compact*	163,706	LCY	$ 1.48	$ 2.26	$ -	$ -	$ 3.74	$ 612,173	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	297,000	Tons					$ 3.22	$ 955,339	
	7.028	*Load at stockpile and haul to fill location, 0.5 mile haul*	60,274	LCY	$ 0.82	$ 2.62	$ -	$ -	$ 3.44	$ 207,128	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	*Direct hauling from quarry*	140,638	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	*Spread and compact*	200,912	LCY	$ 1.47	$ 2.26	$ -	$ -	$ 3.72	$ 748,211	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	42,900	Tons					$ 3.39	$ 145,383	
	7.031	*Load at stockpile and haul to fill location, 0.5 mile haul*	8,706	LCY	$ 1.00	$ 3.20	$ -	$ -	$ 4.20	$ 36,552	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	*Direct hauling from quarry*	20,314	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	*Spread and compact*	29,021	LCY	$ 1.48	$ 2.27	$ -	$ -	$ 3.75	$ 108,831	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	
	7.034	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0341	*Direct hauling from quarry*	-	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.035	*Spread and compact*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 15% swell factor
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	
	7.037	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0371	*Direct hauling from quarry*	-	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.038	*Spread and compact*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 15% swell factor
	7.039	Furnish and Install Zone 3 - Rockfill	693,000	ECY					$ 26.75	$ 18,535,957	
	7.040	*Blasting operations*	831,600	LCY	$ 4.26	$ 5.69	$ 4.85	$ -	$ 14.80	$ 12,305,055	Include 20% swell factor
	7.041	*Load and haul to processing area, 0.5 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	*Crush and screen material*	831,600	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	*Load and haul to zone-3, 1 mile haul*	831,600	LCY	$ 0.88	$ 2.93	$ -	$ -	$ 3.81	$ 3,170,038	No stockpiling required, direct haul
	7.044	*Spread and compact*	831,600	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 3,060,863	
	7.045	Furnish and Install Zone 4 - Random	1,860,000	ECY					$ 9.01	$ 16,760,897	

11.2. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.046	Excavations in common soil	358,800	LCY	$ 1.42	$ 2.22	$ -	$ -	$ 3.64	$ 1,306,259	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	358,800	LCY	$ 1.26	$ 3.50	$ -	$ -	$ 4.75	$ 1,705,327	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	1,780,200	LCY	$ 0.79	$ 2.51	$ -	$ -	$ 3.30	$ 5,872,691	Include 15% swell factor
	7.050	Spread and compact	2,139,000	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 7,876,620	
	7.051	Furnish and Install Riprap	152,000	ECY					$ 39.93	$ 6,069,723	
	7.052	Blasting operations	182,400	LCY	$ 4.28	$ 5.73	$ 4.85	$ -	$ 14.86	$ 2,710,882	Include 20% swell factor
	7.053	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	182,400	LCY	$ 0.80	$ 2.54	$ -	$ -	$ 3.34	$ 609,200	
	7.056	Riprap placement	182,400	LCY	$ 5.99	$ 9.08	$ -	$ -	$ 15.07	$ 2,749,641	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 2,300,000.00	$ 2,300,000.00	$ 2,300,000	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	870	CY					$ 100.72	$ 87,627	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	1,001	LCY	$ 13.33	$ 14.34	$ 37.73	$ -	$ 65.41	$ 65,446	Include 15% swell factor
	8.007	Place and compact	1,001	LCY	$ 7.23	$ 14.94	$ -	$ -	$ 22.17	$ 22,181	
	8.008	Developing haul routes - Haul routes inside reservoir	22	ACRES					$ 26,990.65	$ 593,794	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	958,320	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 183,137	
	8.0091	Load and haul earth fill	17,747	CY	$ 1.69	$ 4.62	$ -	$ -	$ 6.32	$ 112,130	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	958,320	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 298,528	
	8.011	Developing haul routes - Haul routes outside reservoir	15	ACRES					$ 27,785.55	$ 416,783	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	653,400	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 130,812	
	8.0121	Load and haul earth fill	12,100	CY	$ 1.79	$ 4.88	$ -	$ -	$ 6.67	$ 80,733	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	653,400	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.31	$ 205,238	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	2,700	CY	$ 94.53	$ 50.30	$ 233.06	$ -	$ 377.89	$ 1,020,296	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.02	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 575,000.00	$ 575,000.00	$ 575,000	Allowance
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included within Golden Gate Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	Excavate trench in bedrock	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.011	Load and haul material to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.012	48" steel pipe placement	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.013	Concrete backfill for pipe trench (dam footprint)	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.014	Reinforcement for concrete backfill	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.017	Install 48"x48" debris rack on conc. Manhole	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.018	Grout pipe	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.019	Field Survey	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.022	Excavate	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.025	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
10		**Sites Dam Diversion Facilities**									
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	Earth fill coffer dam; included within zone 4 fill work
	10.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required; Earth fill coffer dam
	10.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.004	Load and haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	

11.2. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	10.005	*Purchase processed material from quarry*	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	10.006	*Import material to site stockpile, 40 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.007	*Load at stockpile and haul to fill location, 1 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.008	*Spread and compact*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.009	Upstream Portal Excavation and Rock Bolts	15,800	CY					$ 44.61	$ 704,890	
	10.010	*Excavate and load material*	17,380	LCY	$ 1.39	$ 2.42	$ -	$ -	$ 3.81	$ 66,147	*Assumed excavating material is either common earth, loam, sand, clay or loose material.*
	10.011	*Haul to disposal site, 0.5 mile haul*	17,380	LCY	$ 1.82	$ 4.37	$ -	$ -	$ 6.19	$ 107,615	
	10.012	*Shotcrete portal face*	948	CY	$ 86.92	$ 41.04	$ 221.97	$ -	$ 349.92	$ 331,727	
	10.013	*Steel fiber for shotcrete*	17	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 41,114	*Allow 35lbs/CY of concrete*
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	790	EA	$ 50.73	$ 20.73	$ -	$ -	$ 71.46	$ 56,451	
	10.015	*3.5" diam grouted hole with #10 bar*	36	CY	$ 263.49	$ 78.40	$ 2,522.70	$ -	$ 2,864.58	$ 101,836	
	10.016	Upstream Portal Backfill	24,500	CY					$ 10.54	$ 258,283	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	26,950	LCY	$ 0.99	$ 4.34	$ -	$ -	$ 5.33	$ 143,587	
	10.018	*Spread and compact*	26,950	LCY	$ 2.11	$ 2.15	$ -	$ -	$ 4.26	$ 114,697	
	10.019	Inlet and Valve Structures	2,200	CY					$ 1,092.50	$ 2,403,500	
	10.020	*Pour inlet and valve structures*	2,200	CY	$ -	$ -	$ -	$ 1,092.50	$ 1,092.50	$ 2,403,500	
	10.021	Downstream Portal Excavation and Rock Bolts	12,500	CY					$ 45.40	$ 567,445	
	10.022	*Excavate and load material*	13,750	LCY	$ 1.48	$ 2.59	$ -	$ -	$ 4.07	$ 55,971	
	10.023	*Haul to disposal site, 0.5 mile haul*	13,750	LCY	$ 1.95	$ 4.56	$ -	$ -	$ 6.51	$ 89,497	
	10.024	*Shotcrete portal face*	750	CY	$ 87.89	$ 41.50	$ 221.97	$ -	$ 351.36	$ 263,517	
	10.025	*Steel fiber for shotcrete*	13	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 32,527	*Allow 35lbs/CY of concrete*
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	625	EA	$ 52.10	$ 21.29	$ -	$ -	$ 73.39	$ 45,867	
	10.027	*3.5" diam grouted hole with #10 bar*	28	CY	$ 249.79	$ 74.32	$ 2,522.70	$ -	$ 2,846.81	$ 80,066	
	10.028	Downstream Portal Backfill	34,400	CY					$ 10.22	$ 351,620	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	37,840	BCY	$ 0.92	$ 4.04	$ -	$ -	$ 4.96	$ 187,767	
	10.030	*Spread and compact*	37,840	LCY	$ 2.14	$ 2.19	$ -	$ -	$ 4.33	$ 163,852	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	1,590	LF	$ -	$ -	$ -	$ 7,304.42	$ 7,304.42	$ 11,614,023	Second shift work will apply
	10.032	Tunnel Concrete Lining	1,590	LF	$ -	$ -	$ -	$ 7,205.71	$ 7,205.71	$ 11,457,076	Second shift work will apply
	10.033	10-Ft Steel Pipe Cut and Cover Section	1,590	LF	$ -	$ -	$ -	$ 8,094.08	$ 8,094.08	$ 12,869,593	Second shift work will apply
	10.034	Mechanical, Valves, Trash rack, and Metals	1	LS	$ -	$ -	$ -	$ 9,775,000	$ 9,775,000	$ 9,775,000	Allowance
	10.035	Riprap Discharge Channel	75	CY					$ 458.82	$ 34,412	
	10.036	*Blasting operations*	90	LCY	$ 59.57	$ 64.41	$ 4.85	$ -	$ 128.83	$ 11,594	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	90	LCY	$ 22.81	$ 68.17	$ -	$ -	$ 90.98	$ 8,188	
	10.038	*Crush and screen material*			$ -	$ -	$ -	$ -			
	10.039	*Load and haul to stockpile, 1 mile haul*	90	LCY	$ 13.36	$ 58.58	$ -	$ -	$ 71.95	$ 6,475	
	10.040	*Place at the channel*	90	LCY	$ 35.55	$ 55.05	$ -	$ -	$ 90.60	$ 8,154	
11		**ERS Facility**									Included within Saddle Dam 3 estimate
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.003	*Haul to disposal site, 1 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.004	*Shotcrete portal face*	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.005	*Steel fiber for shotcrete*	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.006	*20 ft rock bolts, 5 ft on center - Drilling*	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.007	*3.5" diam grouted hole with #10 bar*	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 1 mi assumed*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.010	*Backfill: Compact and grade*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	11.012	*Pour inlet and valve structures*	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	*Excavate and load material*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	*Haul to disposal site, 1 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	*Shotcrete portal face*	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	*Steel fiber for shotcrete*	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	*20 ft rock bolts, 5 ft on center - Drilling*	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	*3.5" diam grouted hole with #10 bar*	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	*Haul excavated material and stockpile, 1 mi assumed*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	*Backfill: Compact and grade*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	*Blasting operations*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	*Excavate, load and haul to stockpile/processing area, 1 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	*Crush and screen material*		LCY	$ -	$ -	$ -	$ -			
	11.031	*Load and haul to stockpile, 1 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	*Place at the channel*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		Misc allowance for small items, allow 1%	1.0%	%				149,569,238	$ 149,569,238	$ 1,495,692	
		Total Direct Cost Effect	27	Acre	$ 1,103,796.35	$ 1,734,858.00	$ 798,732.96	$ (4,569,808.38)	$ (932,421.07)	$ (25,175,369)	

Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

12. Construction Cost Summary: Assume 10% drawdown in 10 days

				Total Cost
Total Direct Cost Effect				(8,914,696)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(8,914,696)
General Conditions				
Mobilization			5.0%	(445,735)
Site General Conditions & Requirements			10.0%	(936,043)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(113,261)
Bonds			0.6%	(62,458)
GC Home Office Overhead			6.0%	(628,332)
GC Profit			8.0%	(888,042)
Total Contractor Indirect Markups				(3,073,871)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(11,988,567)**
Contingencies				
Design Contingencies			10.0%	(1,198,857)
Construction Contingencies			15.0%	(1,978,114)
Total Contingency Allowance				(3,176,971)
TOTAL DIRECT COST BEFORE ESCALATION				**(15,165,538)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(148,097)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(15,313,635)**

12. Cost Work Sheet Summary: Assume 10% drawdown in 10 days

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 170,115,943	$ 170,115,943	$ (170,115,943)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ -**	Included within Sites Dam estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.023	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.024	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.025	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.027	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*BCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.030	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.040	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
11		**ERS Facility 1**								**$ -**	Included within Saddle Dam 3 Estimate
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.003	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.004	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.005	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.007	*3.5" diam grouted hole with #8 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 0.5 mi assumed*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.010	*Backfill: Compact and grade*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	

12. Cost Work Sheet Summary: Assume 10% drawdown in 10 days

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		**ERS Facility 2**								**$ -**	Included within Saddle Dam 5 Estimate
	12.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.003	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.007	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	12.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	12.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	12.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
13		**IO Facility**								**$ 159,605,195**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	9	ACRE	$ 1,230.71	$ 2,147.96	$ -	$ -	$ 3,379	$ 30,408	Light vegetation removal
	13.003	Erosion and Sediment Control	9	ACRE	$ -	$ -	$ -	$ 3,761	$ 3,761	$ 33,845	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	378.00	LF					$ 490.40	$ 185,371	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	2.00	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ 50,000	
	13.007	Foundation piles - drilled piers	378.00	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ 62,370	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	28	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ 73,001	Allow 150lbs/cy
	13.010	Pile testing allowance	15.0%	%	$ -	$ -	$ -	$ 185,371.25	$ 185,371.25	$ 27,806	
	13.011	Pile cap / base slab	342	CY					$ 672.95	$ 230,362	5' thick base slab
	13.012	Cast in place concrete	342	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 111,880	36" thick slab
	13.013	Formwork	911	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 23,106	Formwork to sides
	13.014	Concrete reinforcement	26	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 95,376	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	5,858	CY							
	13.016	Walls	5,275	CY					$ 1,133.76	$ 5,979,991	
	13.017	Cast in place concrete	5,275	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 1,723,865	Average 4' thick
	13.018	Formwork	71,206	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 1,806,846	
	13.019	Concrete reinforcement	659	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 2,449,280	Allow 250lbs/cy
	13.020	Slabs - elevated decks	505	CY					$ 833.82	$ 421,414	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	Cast in place concrete	505	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 165,180	36" thick slab

12. Cost Work Sheet Summary: Assume 10% drawdown in 10 days

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.022	Formwork	4,549	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 115,421	
	13.023	Concrete reinforcement	38	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 140,813	Allow 150lbs/cy
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.026	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Allow 30sf/cy
	13.027	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Allow 200lbs/cy
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.030	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	13.031	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	13.032	Bridge Piers	78	CY					$ 1,459.57	$ 114,430	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	Cast in place concrete	78	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 25,623	
	13.034	Formwork	2,352	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 59,682	Allow 30sf/cy
	13.035	Concrete reinforcement	8	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 29,125	Allow 200lbs/cy
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	1	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	1	LS						Included below	
	13.038	Metal ladders	270	LF	$ -	$ -	$ -	$ 3,552.50	$ 3,552.50	$ 959,175	As per May 2020 NODOS Estimate
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 507.50	$ 507.50	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	24	EA	$ -	$ -	$ -	$ 384,583.50	$ 384,583.50	$ 9,230,004	As per May 2020 NODOS Estimate
	13.041	Moveable screens and hoists	6	EA	$ -	$ -	$ -	$ 76,125.00	$ 76,125.00	$ 456,750	As per May 2020 NODOS Estimate
	13.042	Sliding steel plates and hoists	6	EA	$ -	$ -	$ -	$ 101,500.00	$ 101,500.00	$ 609,000	As per May 2020 NODOS Estimate
	13.043	8 ton jib crane	1	EA	$ -	$ -	$ -	$ 121,800.00	$ 121,800.00	$ 121,800	As per May 2020 NODOS Estimate
	13.044	12 ft x 30 ft inlet tunnel roller gate	2	EA	$ -	$ -	$ -	$ 1,888,915.00	$ 1,888,915.00	$ 3,777,830	As per May 2020 NODOS Estimate
	13.045	12 ft x 25 ft outlet tunnel roller gates	4	EA	$ -	$ -	$ -	$ 1,609,790.00	$ 1,609,790.00	$ 6,439,160	As per May 2020 NODOS Estimate
	13.046	Other Metals Intake Tower	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
	13.047	Painting	1	LS	$ -	$ -	$ -	$ 50,750.00	$ 50,750.00	$ 50,750	As per May 2020 NODOS Estimate
		Access bridge									
	13.048	Access bridge	10,000	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ 5,000,000	Assume 500' x 20' wide bridge
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	-	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ -	23' Diameter tunnel
	13.051	Concrete Liner	-	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ -	23' Diameter tunnel
	13.052	Steel Liner	-	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ -	23' Diameter tunnel
	13.052a	Excavation	6,222	LF	$ -	$ -	$ -	$ 8,167.74	$ 8,167.74	$ 50,819,695	18' diameter reduced tunnel
	13.052b	Concrete Liner	5,712	LF	$ -	$ -	$ -	$ 8,571.18	$ 8,571.18	$ 48,958,593	18' diameter reduced tunnel
	13.052c	Steel Liner	510	LF	$ -	$ -	$ -	$ 9,718.48	$ 9,718.48	$ 4,956,423	18' diameter reduced tunnel
	13.053	**Lower Intake Channel**	475,000	CY					$ 38.28	$ 18,180,797	
	13.054	Excavations in common material	432,250	LCY	$ 6.00	$ 9.00	$ -	$ -	$ 15.00	$ 6,483,750	Assume 70% in common earth and 30% rock; include a 30% swell factor
	13.055	Excavations in rock	185,250	LCY	$ 10.50	$ 24.50	$ -	$ -	$ 35.00	$ 6,483,750	
	13.056	Haul to disposal site, 0.5 mile haul	617,500	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 4,322,500	
	13.057	Shotcrete portal face	1,387	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 443,769	
	13.058	Steel fiber for shotcrete	21	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 27,042	
	13.059	20 ft rock bolts, 8 ft on center - Drilling	880	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 220,000	
	13.060	3.5" diam grouted hole with #8 bar	40	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 199,986	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	50,400	CY					$ 49.88	$ 2,514,091	
	13.062	Excavate and load material	65,520	LCY	$ 10.00	$ 15.00	$ -	$ -	$ 25.00	$ 1,638,000	
	13.063	Haul to disposal site, 0.5 mile haul	65,520	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 458,640	
	13.064	Shotcrete portal face	650	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 208,137	
	13.065	Steel fiber for shotcrete	10	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 12,683	
	13.066	20 ft rock bolts, 8 ft on center - Drilling	412	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 103,000	
	13.067	3.5" diam grouted hole with #8 bar	19	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 93,630	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
14		Misc allowance for small items, allow 1%	1.0%	%				159,605,195	$ 159,605,195	$ 1,596,052	
		Total Direct Cost Effect	42	Acre	$ 215,746.63	$ 331,182.77	$ 111,567.35	$ (870,751.42)	$ (212,254.67)	$ (8,914,696)	

Sites Reservoir (Alt 1): Roadwork VE Review | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

14. Construction Cost Summary: Produce aggregate base materials from on-site materials

				Unit Cost Rate ($/LF)	Total Cost
			LF:	284,337	
Estimated Cost Effect				(8.55)	(2,430,278)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(8.55)	(2,430,278)
General Conditions					
Mobilization			5.0%	(0.43)	(121,514)
Site General Conditions & Requirements			10.0%	(0.90)	(255,179)
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	(0.11)	(30,877)
Bonds			0.6%	(0.06)	(17,027)
GC Field and Home Office Overhead			5.0%	(0.50)	(142,744)
GC Profit			5.0%	(0.53)	(149,881)
Total Contractor Indirect Markups				(2.52)	(717,222)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(11.07)**	**(3,147,500)**
Contingencies					
Design Contingencies			10.0%	(1.11)	(314,750)
Construction Contingencies			15.0%	(1.83)	(519,337)
Total Contingency Allowance				(2.93)	(834,087)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION				**(14.00)**	**(3,981,587)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(0.14)	(38,882)
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING				**(14.14)**	**(4,020,469)**

14. Cost Work Sheet Summary: Produce aggregate base materials from on-site materials

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
3		**Road Fill and Layer Work**									
	3.008	Class 4 Aggregate subbase	(43,200)	CY					$ 51.12	$ (2,208,229)	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*(73,440)*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ (1,112,551)*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*(49,680)*	*LCY*	*$ 10.15*	*$ 11.90*	*$ -*	*$ -*	*$ 22.05*	*$ (1,095,678)*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not included as part of review*
	3.013	Class 2 Aggregate base	(120,000)	CY					$ 51.12	$ (6,133,969)	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*(204,000)*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ (3,090,419)*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*(138,000)*	*LCY*	*$ 10.15*	*$ 11.90*	*$ -*	*$ -*	*$ 22.05*	*$ (3,043,550)*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not included as part of review*
	3.022	Produce aggregate base materials from on-site materials	163,200	CY					$ 36.23	$ 5,911,920	
	3.021	*Excavate material*	*187,680*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 15.00*	*$ 15.00*	*$ 2,815,200*	
	3.022	*Haul excavated material to processing yard, 1 mile haul*	*187,680*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 5.00*	*$ 4.50*	*$ 844,560*	
	3.023	*Crush material*	*187,680*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 5.50*	*$ 5.00*	*$ 938,400*	
	3.024	*Screen material*	*187,680*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 2.50*	*$ 2.50*	*$ 469,200*	
	3.025	*Haul to stockpile / haul to fill location, 1 mile haul*	*187,680*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 5.00*	*$ 4.50*	*$ 844,560*	
		Total Direct Cost Effect	284,337	LF	$ (6.70)	$ (7.86)	$ (14.78)	$ 21.78	$ (8.55)	$ (2,430,278)	

Sites Reservoir (Alt 1): Other Saddle Dams | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

15. Construction Cost Summary: Use spillway conduit

				Total Cost
Total Direct Cost Effect				(2,553,167)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(2,553,167)
General Conditions				
Mobilization			5.0%	(127,658)
Site General Conditions & Requirements			10.0%	(268,082)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(32,438)
Bonds			0.6%	(17,888)
GC Home Office Overhead			6.0%	(179,954)
GC Profit			8.0%	(254,335)
Total Contractor Indirect Markups				(880,355)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(3,433,522)**
Contingencies				
Design Contingencies			10.0%	(343,352)
Construction Contingencies			15.0%	(566,531)
Total Contingency Allowance				(909,883)
TOTAL DIRECT COST BEFORE ESCALATION				**(4,343,405)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(42,415)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(4,385,820)**

15. Cost Work Sheet Summary: Use spillway conduit

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 71,429,050	$ 71,429,050	$ (71,429,050)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	49	ACRE	$ 3,164.68	$ 5,523.33	$ -	$ -	$ 8,688.01	$ 425,712	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	49	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 184,265	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	181,100	Tons					$ 37.22	$ 6,741,436	
	2.002	*Purchase processed material from quarry*	*181,100*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 4,019,786*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*122,509*	*LCY*	*$ 10.61*	*$ 11.60*	*$ -*	*$ -*	*$ 22.22*	*$ 2,721,649*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	183,806	Tons					$ 37.00	$ 6,801,499	
	2.005	*Purchase processed material from quarry*	*183,806*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 4,079,850*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*124,339*	*LCY*	*$ 10.46*	*$ 11.43*	*$ -*	*$ -*	*$ 21.89*	*$ 2,721,649*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	49,900	Tons					$ 37.31	$ 1,861,576	
	2.008	*Purchase processed material from quarry*	*49,900*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 1,107,605*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*33,756*	*LCY*	*$ 10.67*	*$ 11.66*	*$ -*	*$ -*	*$ 22.34*	*$ 753,970*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	74,000	BCY					$ 8.41	$ 622,397	
	3.002	*Excavations - remove top soil layer*	*81,400*	*LCY*	*$ 1.42*	*$ 2.21*	*$ -*	*$ -*	*$ 3.63*	*$ 295,577*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*81,400*	*LCY*	*$ 1.12*	*$ 2.90*	*$ -*	*$ -*	*$ 4.01*	*$ 326,820*	
	3.004	Dam Foundation Excavation - Common	33,500	BCY					$ 8.54	$ 286,018	
	3.005	*Excavations - remove top soil layer*	*36,850*	*LCY*	*$ 1.55*	*$ 2.21*	*$ -*	*$ -*	*$ 3.76*	*$ 138,422*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*36,850*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 147,596*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	302,500	BCY					$ 11.71	$ 3,543,342	
	3.008	*Rock excavations, no blasting*	*347,875*	*LCY*	*$ 2.51*	*$ 3.68*	*$ -*	*$ -*	*$ 6.19*	*$ 2,151,720*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*347,875*	*LCY*	*$ 1.11*	*$ 2.89*	*$ -*	*$ -*	*$ 4.00*	*$ 1,391,622*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	-	BCY					$ -	$ -	Not required
	3.011	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.012	*Excavate, load and haul to stockpile, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	18,900	SY					$ 12.01	$ 227,006	
	4.002	*Initial foundation core cleanup*	*18,900*	*SY*	*$ 7.49*	*$ 2.22*	*$ -*	*$ -*	*$ 9.71*	*$ 183,468*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*5,198*	*CY*	*$ 2.81*	*$ 5.57*	*$ -*	*$ -*	*$ 8.38*	*$ 43,538*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	18,900	SY					$ 9.71	$ 183,468	
	4.005	*Final foundation core cleanup*	*18,900*	*SY*	*$ 7.49*	*$ 2.22*	*$ -*	*$ -*	*$ 9.71*	*$ 183,468*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	1,500	CY					$ 121.44	$ 182,160	
	4.008	*Dental excavations*	*1,650*	*LCY*	*$ 68.14*	*$ 30.82*	*$ -*	*$ -*	*$ 98.96*	*$ 163,292*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*1,650*	*LCY*	*$ 4.20*	*$ 7.23*	*$ -*	*$ -*	*$ 11.44*	*$ 18,869*	
	4.010	Dental Concrete	1,500	CY	$ 44.85	$ 20.38	$ 183.12	$ -	$ 248.35	$ 372,524	
	4.011	Grout Cap with Anchors	6,500	CY	$ 79.27	$ 22.94	$ 519.68	$ 6.19	$ 628.08	$ 4,082,495	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	16,200	LF					$ 78.49	$ 1,271,561	
	4.013	*Drill setup for all holes*	*216*	*ea.*	*$ 188.94*	*$ 316.18*	*$ -*	*$ -*	*$ 505.12*	*$ 109,107*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*16,200*	*lft*	*$ 10.31*	*$ 11.11*	*$ -*	*$ -*	*$ 21.42*	*$ 346,954*	
	4.015	*Redrill grout holes*	*1,620*	*lft*	*$ 10.31*	*$ 11.11*	*$ -*	*$ -*	*$ 21.42*	*$ 34,695*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*810*	*ea.*	*$ 91.17*	*$ -*	*$ -*	*$ -*	*$ 91.17*	*$ 73,850*	
	4.017	*Inject portland cement grout*	*1,080*	*hr*	*$ 485.13*	*$ 100.00*	*$ -*	*$ -*	*$ 585.13*	*$ 631,938*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*216*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 75,017*	
	4.019	Consolidation Grouting	-	LF					$ -	$ -	Not required
	4.020	*Drill setup for all holes*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.021	*Drill curtain grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Redrill grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Hookup to grout holes and grout nipples*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	*Inject portland cement grout*	*-*	*hr*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.025	*Perform hydraulic conductivity tests*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	Type III Cement	571	Tons	$ 177.11	$ 73.16	$ 113.14	$ -	$ 363.41	$ 207,507	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	44,600	SY					$ 3.91	$ 174,423	
	5.002	*Initial dam shell cleanup*	*44,600*	*SY*	*$ 1.38*	*$ 0.42*	*$ -*	*$ -*	*$ 1.80*	*$ 80,080*	

15. Cost Work Sheet Summary: Use spillway conduit

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	5.003	Load and haul to disposal area, 0.5 mile haul	8,177	LCY	$ 4.24	$ 7.30	$ -	$ -	$ 11.54	$ 94,343	Assume removal of top layer, 0.5' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	1,200	LF	$ 45.17	$ 28.03	$ 35.56	$ -	$ 108.76	$ 130,508	
	6.002	Furnish and Install Foundation Drain Manholes	4	EA	$ 1,252.73	$ 762.78	$ 3,070.88	$ -	$ 5,086.39	$ 20,346	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	212,000	BCY					$ 7.59	$ 1,608,774	Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	233,200	LCY	$ 0.99	$ 2.72	$ -	$ -	$ 3.71	$ 864,317	Include 10% swell factor
	7.004	Load and haul to site stockpile, 0.25 mile haul	233,200	LCY	$ 0.86	$ 2.34	$ -	$ -	$ 3.19	$ 744,458	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	174,000	BCY					$ 9.03	$ 1,570,920	
	7.006	Embankment excavations	191,400	LCY	$ 1.43	$ 3.03	$ -	$ -	$ 4.46	$ 854,024	Include 10% swell factor
	7.007	Load and haul to site stockpile, 0.25 mile haul	191,400	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.75	$ 716,896	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	Not required
	7.009	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.010	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	Not required
	7.012	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	96,500	ECY					$ 7.03	$ 678,739	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	Load and haul to site stockpile, 0.25 mile haul	106,150	LCY	$ 1.29	$ 3.02	$ -	$ -	$ 4.32	$ 458,500	
	7.016	Spread and compact	106,150	LCY	$ 1.15	$ 0.93	$ -	$ -	$ 2.07	$ 220,239	
	7.017	Topsoil Replacement	58,000	ECY					$ 9.82	$ 569,581	Backfill burrow area using material from stockpile
	7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	63,800	LCY	$ 1.75	$ 5.02	$ -	$ -	$ 6.77	$ 431,931	
	7.019	Spread and compact	63,800	LCY	$ 1.19	$ 0.97	$ -	$ -	$ 2.16	$ 137,649	
	7.020	Furnish and Install Zone 1 - Core	470,000	ECY					$ 13.08	$ 6,147,931	
	7.021	Excavate from burrow area	517,000	LCY	$ 1.44	$ 3.03	$ -	$ -	$ 4.47	$ 2,310,889	Include 10% swell factor
	7.022	Load and haul to zone-1 fill location, 0.25 mile haul	517,000	LCY	$ 1.14	$ 2.56	$ -	$ -	$ 3.69	$ 1,909,208	No stockpiling required
	7.023	Spread and compact	517,000	LCY	$ 1.51	$ 2.22	$ -	$ -	$ 3.73	$ 1,927,834	
	7.024	Load, Haul and Place - Zone 2A - Filter	181,100	Tons					$ 3.25	$ 589,360	
	7.025	Load at stockpile and haul to fill location, 0.5 mile haul	36,753	LCY	$ 0.93	$ 2.53	$ -	$ -	$ 3.45	$ 126,830	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	Direct hauling from quarry	85,756	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	Spread and compact	122,509	LCY	$ 1.49	$ 2.29	$ -	$ -	$ 3.78	$ 462,530	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	183,666	Tons					$ 3.28	$ 602,043	
	7.028	Load at stockpile and haul to fill location, 0.5 mile haul	37,273	LCY	$ 1.00	$ 2.74	$ -	$ -	$ 3.74	$ 139,513	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	Direct hauling from quarry	86,971	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	Spread and compact	124,245	LCY	$ 1.47	$ 2.25	$ -	$ -	$ 3.72	$ 462,530	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	49,900	Tons					$ 3.49	$ 174,087	
	7.031	Load at stockpile and haul to fill location, 0.5 mile haul	10,127	LCY	$ 1.01	$ 2.75	$ -	$ -	$ 3.76	$ 38,049	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	Direct hauling from quarry	23,629	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	Spread and compact	33,756	LCY	$ 1.59	$ 2.44	$ -	$ -	$ 4.03	$ 136,038	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	7.034	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0341	Direct hauling from quarry	-	LCY						Elsewhere	
	7.035	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	7.037	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0371	Direct hauling from quarry	-	LCY						Elsewhere	
	7.038	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.039	Furnish and Install Zone 3 - Rockfill	241,000	ECY					$ 28.73	$ 6,924,452	
	7.040	Blasting operations	289,200	LCY	$ 4.27	$ 5.70	$ 4.85	$ -	$ 14.82	$ 4,285,216	Include 20% swell factor
	7.041	Excavate, load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	Crush and screen material	289,200	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	Load and haul to zone-3, 2 mile haul	289,200	LCY	$ 1.18	$ 4.23	$ -	$ -	$ 5.41	$ 1,564,533	No stockpiling required, direct haul
	7.044	Spread and compact	289,200	LCY	$ 1.47	$ 2.25	$ -	$ -	$ 3.72	$ 1,074,703	
	7.045	Furnish and Install Zone 4 - Random	622,000	ECY					$ 11.13	$ 6,921,098	
	7.046	Excavations in common soil	430,100	LCY	$ 1.42	$ 2.21	$ -	$ -	$ 3.64	$ 1,563,697	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	430,100	LCY	$ 1.12	$ 2.90	$ -	$ -	$ 4.02	$ 1,728,985	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	285,200	LCY	$ 0.93	$ 2.54	$ -	$ -	$ 3.47	$ 989,273	Include 15% swell factor
	7.050	Spread and compact	715,300	LCY	$ 1.46	$ 2.23	$ -	$ -	$ 3.69	$ 2,639,144	
	7.051	Furnish and Install Riprap	55,700	ECY					$ 40.58	$ 2,260,145	
	7.052	Blasting operations	66,840	LCY	$ 4.36	$ 5.82	$ 4.85	$ -	$ 15.03	$ 1,004,540	Include 20% swell factor
	7.053	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	66,840	LCY	$ 0.97	$ 2.64	$ -	$ -	$ 3.61	$ 240,977	
	7.056	Riprap placement	66,840	LCY	$ 6.04	$ 9.14	$ -	$ -	$ 15.18	$ 1,014,628	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	

15. Cost Work Sheet Summary: Use spillway conduit

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 517,500.00	$ 517,500.00	$ 517,500	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	3,900	CY					$ 85.31	$ 332,707	
	8.006	*Purchase and Import gravel to fill location and stockpile, 35 mi haul*	*4,485*	*LCY*	*$ 10.41*	*$ 11.20*	*$ 37.73*	*$ -*	*$ 59.35*	*$ 266,164*	*Include 15% swell factor*
	8.007	*Place and compact*	*4,485*	*LCY*	*$ 4.84*	*$ 10.00*	*$ -*	*$ -*	*$ 14.84*	*$ 66,543*	
	8.008	Developing haul routes - Haul routes inside reservoir	48	ACRES					$ 28,033.64	$ 1,345,615	Clear, grade, provide gravel fill layer and compact
	8.009	*Clear and grub*	*2,090,880*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 392,436*	
	8.0091	*Load and haul earth fill*	*38,720*	*CY*	*$ 2.14*	*$ 5.85*	*$ -*	*$ -*	*$ 7.99*	*$ 309,478*	*Use existing earth fill material from stockpile*
	8.010	*Grade and Compact surface for earthen road*	*2,090,880*	*SF*	*$ 0.13*	*$ 0.17*	*$ -*	*$ -*	*$ 0.31*	*$ 643,700*	
	8.011	Developing haul routes - Haul routes outside reservoir	32	ACRES					$ 30,193.52	$ 966,193	Clear, grade, provide gravel fill layer and compact
	8.012	*Clear and grub*	*1,393,920*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 261,624*	
	8.0121	*Load and haul earth fill*	*25,813*	*CY*	*$ 2.77*	*$ 7.90*	*$ -*	*$ -*	*$ 10.67*	*$ 275,435*	*Use existing earth fill material from stockpile*
	8.013	*Grade and Compact surface for earthen road*	*1,393,920*	*SF*	*$ 0.13*	*$ 0.17*	*$ -*	*$ -*	*$ 0.31*	*$ 429,133*	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	2,500	CY	$ 89.33	$ 47.53	$ 174.80	$ -	$ 311.66	$ 779,141	
	8.016	Concrete for spillway	-	CY							
	8.017	Spillway walls, reinforced concrete	-	CY					$ -	$ 342,940	
	8.018	*Formwork*	*2,600*	*SF*	*$ 19.82*	*$ 0.38*	*$ 5.24*	*$ -*	*$ 25.44*	*$ 66,152*	
	8.019	*Concrete*	*420*	*CY*	*$ 43.86*	*$ 10.55*	*$ 233.06*	*$ -*	*$ 287.47*	*$ 120,739*	
	8.02	*Reinforcement*	*52.50*	*TON*	*$ 59.07*	*$ -*	*$ 2,913.29*	*$ -*	*$ 2,972.36*	*$ 156,049*	*Allow reinforcement of 250 lbs/cy*
	8.021	Spillway slab concrete, reinforced concrete	-	CY					$ -	$ -	
	8.022	*Formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Allow formwork of 5SF/CY*
	8.023	*Concrete*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.024	*Reinforcement*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Allow reinforcement of 150 lbs/cy*
	8.025	Spillway mass concrete	-	CY					$ -	$ -	
	8.026	*Formwork*	*-*	*SF*						*Not required*	
	8.027	*Concrete*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.028	*Reinforcement*	*-*	*TON*						*Not required*	
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.030	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.031	Clay Backfill	-	CY					$ -	$ -	
	8.032	*Clay excavations from burrow area*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.033	*Load and haul from stockpile to fill location, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.034	*Place clay backfill material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.035	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.036	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.037	*Load and haul to processing area, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.038	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.039	*Load and haul from stockpile to fill location, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.040	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.041	Rim Grouting	51,300	LF	$ -	$ -	$ -	$ 120.75	*$ 120.75*	*$ 6,194,475*	Includes clearing & grubbing, furnishing cement material, drill setup for holes, soil drilling to rock, drill curtain holes in rock, grout backfill, hydroseed area.
	8.042	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 287,500.00	$ 287,500.00	$ 287,500	Allowance
	8.043	54" Culvert with concrete encasement	750	LF	$ -	$ -	$ -	$ 750.00	$ 750.00	$ 562,500	Trench, excavations, inlet, energy dissipator, concrete fill
	8.044	Add signal spillway	1	EA	$ -	$ -	$ -	$ 1,500,000.00	$ 1,500,000.00	$ 1,500,000	
9		Misc allowance for small items, allow 1%	1.0%	%				68,193,944	$ 68,193,944	$ 681,939	
		Total Direct Cost Effect	49	Acre	$ 349,242	$ 533,534	$ 317,886	$ (1,252,767)	$ (52,105)	$ (2,553,167)	

Appendix B

Construction Feasibility-Level Cost Estimate Tables – HR – Alternative 2

Sites Reservoir (Alt 2): Site Demolition and Clearing Work | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **February 19, 2021**

20. Construction Cost Summary: Site Demolition and Clearing Work

				Unit Cost Rate ($/ACRE)	Total Cost
			ACRE:	1,050	
Total Direct Cost				15,809.25	16,599,710
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				15,809.25	16,599,710
General Conditions					
Mobilization			5.0%	790.46	829,986
Site General Conditions & Requirements			10.0%	1,659.97	1,742,970
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	200.86	210,899
Bonds			0.6%	110.76	116,301
GC Field and Home Office Overhead			5.0%	928.56	974,993
GC Profit			5.0%	974.99	1,023,743
Total Contractor Indirect Markups				4,665.61	4,898,892
TOTAL DIRECT COST BEFORE CONTINGENCIES				**20,474.86**	**21,498,602**
Contingencies					
Design Contingencies			15.0%	3,071.23	3,224,790
Construction Contingencies			15.0%	3,531.91	3,708,509
Total Contingency Allowance				6,603.14	6,933,299
TOTAL DIRECT COST BEFORE ESCALATION				**27,078.00**	**28,431,901**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	264.43	277,647
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**27,342.43**	**28,709,548**

20. Cost Work Sheet Summary: Site Demolition and Clearing Work

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**General Clearing and Grubbing**									
	1.001	Clearing and Grubbing	289	ACRE	$ 2,460.94	$ 1,484.32	$ -	$ -	$ 3,945.25	$ 1,140,179	Light vegetation clearing work (1050 Acres of clearing work)
2		**Reservoir Clearing and Demolition (Carried over from May 2020 NODOS Estimate)**									Reference Estimate: 2.NODOS_Clear-Grade_2020-04-30
	2.001	Remove and Dispose of Trees - Oak Woodlands	700	ACRE	$ 2,600.00	$ 1,500.00	$ -	$ 6,400.00	$ 10,500.00	$ 7,350,000	Costs as per May 2020 NODOS Estimate
		a. Oak woodland around reservoir									
		b. Remove and dispose off site									
		c. Cut stumps within 12" of ground									
		d. Stump removal not required									
		e. Provide access to tree cutting locations									
	2.002	Vegetation Removal - Occupied Areas	61	ACRE	$ 37,000.00	$ 33,000.00	$ -	$ 10,500.00	$ 80,500.00	$ 4,910,500	
		a. Trees, shrubs									
		b. Town of Sites and homesteads									
		c. Remove and dispose off site									
		d. Cut tree stumps within 12" of ground									
		e. Tree Stump removal not required									
	2.003	Demolish Residential Housing	24	EA	$ -	$ -	$ -	$ 10,000.00	$ 10,000.00	$ 240,000	
		a. Demolish, remove, dispose off site									
		b. Remove concrete foundations and walls in designated borrow areas									
	2.004	Demolish Barns	29	EA	$ -	$ -	$ -	$ 7,900.00	$ 7,900.00	$ 229,100	
		a. Demolish, remove, dispose off site									
	2.005	Demolish Out-buildings - Sheds & Garages	36	EA	$ -	$ -	$ -	$ 8,100.00	$ 8,100.00	$ 291,600	
		a. Demolish, remove, dispose off site									
	2.006	Demolish silos & water towers	12	EA	$ -	$ -	$ -	$ 11,000.00	$ 11,000.00	$ 132,000	
		a. Demolish, remove, dispose off site									
	2.007	Remove Motor Homes	2	EA	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ 10,000	
		a. Demolish, remove, dispose off site									
	2.008	Demolish and clean Septic Systems	28	EA	$ 2,700.00	$ 5,600.00	$ -	$ 3,600.00	$ 11,900.00	$ 333,200	
		a. Pump and dispose of contents									
		b. Remove and dispose of lid, walls, bottom									
		c. Remove any gravel surround									
		d. Backfill excavation with clay soils									
	2.009	Plug Groundwater Wells	38	EA	$ 1,350.00	$ 2,800.00	$ 320.00	$ 2,600.00	$ 7,070.00	$ 268,660	
		a. Follow Colusa or Glenn County standards									
		b. Remove and dispose of pumps, motors, electrical									
	2.010	Remove Underground Fuel Tanks	15	EA	$ 2,700.00	$ 5,600.00	$ -	$ 3,300.00	$ 11,600.00	$ 174,000	
		a. Follow County/State Standards									
		b. Dispose off site									
		c. Remove contaminated soils, backfill excavation with clay soils									
	2.011	Remove Metal Fencing and Posts (No Salvage)	40	MILE	$ -	$ -	$ -	$ 13,500.00	$ 13,500.00	$ 540,000	
		a. Dispose off site									
	2.012	Remove Asphalt Paving (Two-Lane Roads)	73,906	SY	$ 3.10	$ 5.60	$ -	$ 1.05	$ 9.75	$ 720,586	As per Alt 1 roadwork sheet
		a. Dispose off site									
		b. AB removal not required if present									
		c. Does not include removal of temporary north bypass road in reservoir (In road estimates)									
	2.013	Locate Decommissioned Gas Wells, Verify Closure	10	EA	$ -	$ -	$ -	$ 3,000.00	$ 3,000.00	$ 30,000	
		a. Locate wells, excavate top, verify closure									
		b. Wells in reservoir identified as plugged dry gas wells in DOGGR records									
	2.014	Cost escalation on May 2020 NODOS Estimate items carried over	1.51%	LS				$ 15,229,646	$ 15,229,646	$ 229,886	Escalation from May 2020 to Dec 2020 at a rate of 3% per annum
		Total Direct Cost	1,050	ACRE	$ 4,937.83	$ 4,050.52	$ 11.58	$ 6,809.32	$ 15,809.25	$ 16,599,710	

Sites Reservoir (Alt 2): Golden Gate Dam | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

21. Construction Cost Summary: Golden Gate Dam

				Total Cost
Total Direct Cost				298,528,075
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				298,528,075
General Conditions				
Mobilization			5.0%	14,926,404
Site General Conditions & Requirements			10.0%	31,345,448
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	3,792,799
Bonds			0.6%	2,091,556
GC Home Office Overhead			6.0%	21,041,057
GC Profit			8.0%	29,738,027
Total Contractor Indirect Markups				102,935,291
TOTAL DIRECT COST BEFORE CONTINGENCIES				**401,463,366**
Contingencies				
Design Contingencies			10.0%	40,146,337
Construction Contingencies			15.0%	66,241,455
Total Contingency Allowance				106,387,792
TOTAL DIRECT COST BEFORE ESCALATION				**507,851,158**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	4,959,337
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**512,810,495**

21. Cost Work Sheet Summary: Golden Gate Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	46	ACRE	$ 3,134.83	$ 5,471.22	$ -	$ -	$ 8,606.05	$ 395,304	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	46	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 172,732	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	616,000	Tons					$ 37.15	$ 22,886,195	
	2.002	*Purchase processed material from quarry*	*616,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 13,673,044*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*416,706*	*LCY*	*$ 10.56*	*$ 11.55*	*$ -*	*$ -*	*$ 22.11*	*$ 9,213,151*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	682,000	Tons					$ 37.16	$ 25,344,198	
	2.005	*Purchase processed material from quarry*	*682,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 15,138,013*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*461,353*	*LCY*	*$ 10.57*	*$ 11.55*	*$ -*	*$ -*	*$ 22.12*	*$ 10,206,185*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	91,300	Tons					$ 37.30	$ 3,405,755	
	2.008	*Purchase processed material from quarry*	*91,300*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,026,540*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*61,762*	*LCY*	*$ 10.67*	*$ 11.66*	*$ -*	*$ -*	*$ 22.33*	*$ 1,379,214*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	385,000	Tons					$ 37.15	$ 14,301,573	
	2.011	*Purchase processed material from quarry*	*385,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 8,545,653*	*Include 10% waste factor / additional material supply*
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*260,441*	*LCY*	*$ 10.56*	*$ 11.54*	*$ -*	*$ -*	*$ 22.10*	*$ 5,755,921*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.013	Process and Stockpile on Project - Zone 2B - Transition	407,000	Tons					$ 37.15	$ 15,120,908	
	2.014	*Purchase processed material from quarry*	*407,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 9,033,976*	*Include 10% waste factor / additional material supply*
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*275,324*	*LCY*	*$ 10.56*	*$ 11.55*	*$ -*	*$ -*	*$ 22.11*	*$ 6,086,932*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	106,000	BCY					$ 8.52	$ 903,480	
	3.002	*Excavations - remove top soil layer*	*116,600*	*LCY*	*$ 1.44*	*$ 2.24*	*$ -*	*$ -*	*$ 3.68*	*$ 429,063*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*116,600*	*LCY*	*$ 1.13*	*$ 2.94*	*$ -*	*$ -*	*$ 4.07*	*$ 474,417*	
	3.004	Dam Foundation Excavation - Common	276,000	BCY					$ 8.59	$ 2,369,866	
	3.005	*Excavations - remove top soil layer*	*303,600*	*LCY*	*$ 1.56*	*$ 2.22*	*$ -*	*$ -*	*$ 3.78*	*$ 1,146,926*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*303,600*	*LCY*	*$ 1.12*	*$ 2.91*	*$ -*	*$ -*	*$ 4.03*	*$ 1,222,940*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	842,000	BCY					$ 11.72	$ 9,864,146	
	3.008	*Rock excavations, no blasting*	*968,300*	*LCY*	*$ 2.51*	*$ 3.67*	*$ -*	*$ -*	*$ 6.18*	*$ 5,984,473*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*968,300*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 3,879,673*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	135,000	BCY					$ 24.08	$ 3,251,463	
	3.011	*Blasting operations*	*162,000*	*LCY*	*$ 4.26*	*$ 5.69*	*$ 4.85*	*$ -*	*$ 14.80*	*$ 2,397,089*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 1 mile haul*	*162,000*	*LCY*	*$ 1.49*	*$ 3.79*	*$ -*	*$ -*	*$ 5.27*	*$ 854,374*	
	3.013	*Crush and screen material*	*162,000*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	55,000	SY					$ 20.02	$ 1,101,318	
	4.002	*Initial foundation core cleanup*	*55,000*	*SY*	*$ 11.46*	*$ 5.51*	*$ -*	*$ -*	*$ 16.97*	*$ 933,387*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*15,125*	*CY*	*$ 3.72*	*$ 7.38*	*$ -*	*$ -*	*$ 11.10*	*$ 167,932*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	55,000	SY					$ 16.97	$ 933,387	
	4.005	*Final foundation core cleanup*	*55,000*	*SY*	*$ 11.46*	*$ 5.51*	*$ -*	*$ -*	*$ 16.97*	*$ 933,387*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	3,200	CY					$ 120.75	$ 386,387	
	4.008	*Dental excavations*	*3,520*	*LCY*	*$ 68.20*	*$ 30.85*	*$ -*	*$ -*	*$ 99.05*	*$ 348,650*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*3,520*	*LCY*	*$ 3.94*	*$ 6.78*	*$ -*	*$ -*	*$ 10.72*	*$ 37,737*	
	4.010	Dental Concrete	3,200	CY	$ 44.52	$ 20.23	$ 183.12	$ -	$ 247.87	$ 793,183	
	4.011	Grout Cap with Anchors	9,200	CY	$ 79.02	$ 22.87	$ 519.68	$ 4.38	$ 625.94	$ 5,758,641	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	84,000	LF					$ 78.69	$ 6,610,296	
	4.013	*Drill setup for all holes*	*1,120*	*ea.*	*$ 191.31*	*$ 320.13*	*$ -*	*$ -*	*$ 511.44*	*$ 572,811*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*84,000*	*lft*	*$ 10.34*	*$ 11.14*	*$ -*	*$ -*	*$ 21.48*	*$ 1,804,161*	
	4.015	*Redrill grout holes*	*8,400*	*lft*	*$ 10.43*	*$ 11.25*	*$ -*	*$ -*	*$ 21.68*	*$ 182,151*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*4,200*	*ea.*	*$ 91.43*	*$ -*	*$ -*	*$ -*	*$ 91.43*	*$ 384,021*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*5,600*	*hr*	*$ 485.34*	*$ 100.04*	*$ -*	*$ -*	*$ 585.39*	*$ 3,278,177*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*1,120*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 388,976*	
	4.019	Consolidation Grouting	35,000	LF					$ 78.81	$ 2,758,350	
	4.020	*Drill setup for all holes*	*467*	*ea.*	*$ 189.48*	*$ 317.08*	*$ -*	*$ -*	*$ 506.57*	*$ 236,398*	*Assume 75' drilling lengths*
	4.021	*Drill curtain grout holes*	*35,000*	*lft*	*$ 10.38*	*$ 11.19*	*$ -*	*$ -*	*$ 21.56*	*$ 754,625*	
	4.022	*Redrill grout holes*	*3,500*	*lft*	*$ 10.73*	*$ 11.57*	*$ -*	*$ -*	*$ 22.30*	*$ 78,065*	*Assume 10% to be redrilled*
	4.023	*Hookup to grout holes and grout nipples*	*1,750*	*ea.*	*$ 91.79*	*$ -*	*$ -*	*$ -*	*$ 91.79*	*$ 160,624*	*1 x hookup every 20'*
	4.024	*Inject portland cement grout*	*2,333*	*hr*	*$ 485.58*	*$ 100.09*	*$ -*	*$ -*	*$ 585.67*	*$ 1,366,565*	*Allow 5 hours per hole*
	4.025	*Perform hydraulic conductivity tests*	*467*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 162,073*	

21. Cost Work Sheet Summary: Golden Gate Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.026	Type III Cement	4,200	Tons	$ 176.82	$ 73.04	$ 113.14	$ -	$ 362.99	$ 1,524,570	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	130,000	SY					$ 4.51	$ 586,424	
	5.002	*Initial dam shell cleanup*	*130,000*	*SY*	*$ 1.34*	*$ 0.41*	*$ -*	*$ -*	*$ 1.75*	*$ 227,919*	
	5.003	*Load and haul to disposal area, 0.5 mile haul*	*23,833*	*LCY*	*$ 5.53*	*$ 9.51*	*$ -*	*$ -*	*$ 15.04*	*$ 358,504*	*Assume removal of top layer, 0.5' thick*
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	500	LF	$ 47.70	$ 29.60	$ 35.56	$ -	$ 112.86	$ 56,428	
	6.002	Furnish and Install Foundation Drain Manholes	3	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 17,275	
	6.003	Seepage Partition Walls	700	CY	$ 523.27	$ 116.49	$ 465.37	$ -	$ 1,105.13	$ 773,589	3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	977,000	BCY					$ 7.51	$ 7,333,019	Assumed common earth, 3000' haul w/ scraper
	7.003	*Embankment excavations*	*1,074,700*	*LCY*	*$ 0.98*	*$ 2.69*	*$ -*	*$ -*	*$ 3.67*	*$ 3,939,677*	*Include 10% swell factor*
	7.004	*Load and haul to site stockpile, 0.25 mile haul*	*1,074,700*	*LCY*	*$ 0.85*	*$ 2.31*	*$ -*	*$ -*	*$ 3.16*	*$ 3,393,341*	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	424,000	BCY					$ 9.04	$ 3,834,893	
	7.006	*Embankment excavations*	*466,400*	*LCY*	*$ 1.44*	*$ 3.03*	*$ -*	*$ -*	*$ 4.47*	*$ 2,084,823*	*Include 10% swell factor*
	7.007	*Load and haul to site stockpile, 0.25 mile haul*	*466,400*	*LCY*	*$ 1.05*	*$ 2.71*	*$ -*	*$ -*	*$ 3.75*	*$ 1,750,070*	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	3,270,000	BCY					$ 9.01	$ 29,454,753	
	7.009	*Embankment excavations*	*3,597,000*	*LCY*	*$ 1.43*	*$ 3.02*	*$ -*	*$ -*	*$ 4.45*	*$ 16,012,951*	*Include 10% swell factor*
	7.010	*Load and haul to site stockpile, 0.25 mile haul*	*3,597,000*	*LCY*	*$ 1.04*	*$ 2.70*	*$ -*	*$ -*	*$ 3.74*	*$ 13,441,802*	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	
	7.012	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.013	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	1,167,750	ECY					$ 6.73	$ 7,862,478	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	*Load and haul to site stockpile, 0.25 mile haul*	*1,284,525*	*LCY*	*$ 1.10*	*$ 2.96*	*$ -*	*$ -*	*$ 4.06*	*$ 5,214,103*	
	7.016	*Spread and compact*	*1,284,525*	*LCY*	*$ 1.14*	*$ 0.92*	*$ -*	*$ -*	*$ 2.06*	*$ 2,648,376*	
	7.017	Topsoil Replacement	106,000	ECY					$ 9.81	$ 1,039,643	Backfill burrow area using material from stockpile
	7.018	*Excavate, Load and haul excavated backfill material to fill location, 1 mile haul*	*116,600*	*LCY*	*$ 1.75*	*$ 5.04*	*$ -*	*$ -*	*$ 6.79*	*$ 791,874*	
	7.019	*Spread and compact*	*116,600*	*LCY*	*$ 1.17*	*$ 0.95*	*$ -*	*$ -*	*$ 2.12*	*$ 247,769*	
	7.020	Furnish and Install Zone 1 - Core	2,030,000	ECY					$ 13.57	$ 27,546,777	
	7.021	*Excavate from burrow area*	*2,233,000*	*LCY*	*$ 1.43*	*$ 3.02*	*$ -*	*$ -*	*$ 4.45*	*$ 9,946,868*	*Include 10% swell factor*
	7.022	*Load and haul to zone-1 fill location, 0.5 mile haul*	*2,233,000*	*LCY*	*$ 1.28*	*$ 2.88*	*$ -*	*$ -*	*$ 4.16*	*$ 9,289,247*	*No stockpiling required*
	7.023	*Spread and compact*	*2,233,000*	*LCY*	*$ 1.50*	*$ 2.22*	*$ -*	*$ -*	*$ 3.72*	*$ 8,310,662*	
	7.024	Load, Haul and Place - Zone 2A - Filter	616,000	Tons					$ 3.20	$ 1,968,455	
	7.025	*Load at stockpile and haul to fill location, 0.5 mile haul*	*125,012*	*LCY*	*$ 0.93*	*$ 2.52*	*$ -*	*$ -*	*$ 3.45*	*$ 431,222*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0251	*Direct hauling from quarry*	*291,694*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.026	*Spread and compact*	*416,706*	*LCY*	*$ 1.46*	*$ 2.23*	*$ -*	*$ -*	*$ 3.69*	*$ 1,537,233*	*Include 15% swell factor*
	7.027	Load, Haul and Place - Zone 2A - Drain	682,000	Tons					$ 3.20	$ 2,182,433	
	7.028	*Load at stockpile and haul to fill location, 0.5 mile haul*	*138,406*	*LCY*	*$ 0.93*	*$ 2.55*	*$ -*	*$ -*	*$ 3.48*	*$ 481,953*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0281	*Direct hauling from quarry*	*322,947*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.029	*Spread and compact*	*461,353*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.69*	*$ 1,700,479*	*Include 15% swell factor*
	7.030	Load, Haul and Place - Zone 2A - Transition	385,000	Tons					$ 3.23	$ 1,244,898	
	7.031	*Load at stockpile and haul to fill location, 0.5 mile haul*	*78,132*	*LCY*	*$ 0.96*	*$ 2.61*	*$ -*	*$ -*	*$ 3.57*	*$ 279,026*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0311	*Direct hauling from quarry*	*182,309*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.032	*Spread and compact*	*260,441*	*LCY*	*$ 1.46*	*$ 2.25*	*$ -*	*$ -*	*$ 3.71*	*$ 965,872*	*Include 15% swell factor*
	7.033	Load, Haul and Place - Zone 2B - Filter	91,300	Tons					$ 3.37	$ 307,363	
	7.034	*Load at stockpile and haul to fill location, 0.5 mile haul*	*18,529*	*LCY*	*$ 1.10*	*$ 3.01*	*$ -*	*$ -*	*$ 4.11*	*$ 76,098*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0341	*Direct hauling from quarry*	*43,233*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.035	*Spread and compact*	*61,762*	*LCY*	*$ 1.48*	*$ 2.27*	*$ -*	*$ -*	*$ 3.74*	*$ 231,265*	*Include 15% swell factor*
	7.036	Load, Haul and Place - Zone 2B - Transition	407,000	Tons					$ 3.22	$ 1,311,996	
	7.037	*Load at stockpile and haul to fill location, 0.5 mile haul*	*82,597*	*LCY*	*$ 0.95*	*$ 2.58*	*$ -*	*$ -*	*$ 3.53*	*$ 291,709*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0371	*Direct hauling from quarry*	*192,726*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.038	*Spread and compact*	*275,324*	*LCY*	*$ 1.46*	*$ 2.24*	*$ -*	*$ -*	*$ 3.71*	*$ 1,020,288*	*Include 15% swell factor*
	7.039	Furnish and Install Zone 3 - Rockfill	2,170,000	ECY					$ 27.52	$ 59,725,188	
	7.040	*Blasting operations*	*2,604,000*	*LCY*	*$ 4.26*	*$ 5.69*	*$ 4.85*	*$ -*	*$ 14.80*	*$ 38,536,951*	*Include 20% swell factor*
	7.041	*Load and haul to processing area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling required, material to be hauled to fill location directly*
	7.042	*Crush and screen material*	*2,604,000*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
	7.043	*Load and haul to zone-3, 1.25 mile haul*	*2,604,000*	*LCY*	*$ 1.11*	*$ 3.35*	*$ -*	*$ -*	*$ 4.46*	*$ 11,611,138*	*No stockpiling required, direct haul*
	7.044	*Spread and compact*	*2,604,000*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.68*	*$ 9,577,099*	
	7.045	Furnish and Install Zone 4 - Random	1,850,000	ECY					$ 9.80	$ 18,131,990	

21. Cost Work Sheet Summary: Golden Gate Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.046	Excavations in common soil	461,150	LCY	$ 1.55	$ 2.20	$ -	$ -	$ 3.75	$ 1,730,276	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	461,150	LCY	$ 1.25	$ 3.48	$ -	$ -	$ 4.72	$ 2,178,338	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	1,666,350	LCY	$ 1.06	$ 2.78	$ -	$ -	$ 3.83	$ 6,387,568	Include 15% swell factor
	7.050	Spread and compact	2,127,500	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 7,835,809	
	7.051	Furnish and Install Riprap	84,000	ECY					$ 40.10	$ 3,368,587	
	7.052	Blasting operations	100,800	LCY	$ 4.26	$ 5.69	$ 4.85	$ -	$ 14.80	$ 1,491,522	Include 20% swell factor
	7.053	Load and haul to processing area, 1 mile haul		LCY	$ -	$ -	$ -	$ -	$ -	$	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	100,800	LCY	$ 0.95	$ 2.58	$ -	$ -	$ 3.52	$ 355,124	
	7.056	Riprap placement	100,800	LCY	$ 6.00	$ 9.10	$ -	$ -	$ 15.10	$ 1,521,942	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 1,840,000.00	$ 1,840,000.00	$ 1,840,000	Allowance
	8.003	Seeding and Mulching	261,360	SF	$ -	$ -	$ -	$ 0.69	$ 0.69	$ 180,338	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	1,200	CY					$ 87.48	$ 104,976	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	1,380	LCY	$ 10.69	$ 11.57	$ 37.73	$ -	$ 60.00	$ 82,795	Include 15% swell factor
	8.007	Place and compact	1,380	LCY	$ 5.24	$ 10.83	$ -	$ -	$ 16.07	$ 22,181	
	8.008	Developing haul routes - Haul routes inside reservoir	12	ACRES					$ 27,947.01	$ 335,364	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	522,720	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 104,650	
	8.0091	Load and haul earth fill	9,680	CY	$ 1.74	$ 4.75	$ -	$ -	$ 6.49	$ 62,793	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	522,720	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.32	$ 167,922	
	8.011	Developing haul routes - Haul routes outside reservoir	25	ACRES					$ 27,008.54	$ 675,213	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	1,089,000	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 209,299	
	8.0121	Load and haul earth fill	20,167	CY	$ 1.73	$ 4.72	$ -	$ -	$ 6.45	$ 130,071	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	1,089,000	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 335,844	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	7,400	CY	$ 94.85	$ 50.47	$ 233.06	$ -	$ 378.38	$ 2,799,987	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.020	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 996,666.67	$ 996,666.67	$ 996,667	Allowance
9		**Golden Gate Dam Bypass Pipeline Facilities**									
	9.001	Upstream Cofferdam	-	CY						Included above	Earth fill coffer dam; included within zone 4 fill work
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required; Earth fill coffer dam
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	2,100	LF					$ 1,893.98	$ 3,977,357	
	9.010	Excavate trench in bedrock	4,107	LCY	$ 71.51	$ 51.86	$ -	$ -	$ 123.38	$ 506,670	
	9.011	Load and haul material to disposal site, 0.5 mile haul	4,107	LCY	$ 3.11	$ 7.79	$ -	$ -	$ 10.89	$ 44,740	
	9.012	48" steel pipe placement	2,100	LF	$ 60.87	$ 27.46	$ 845.32	$ -	$ 933.66	$ 1,960,680	
	9.013	Concrete backfill for pipe trench (dam footprint)	2,200	CY	$ 83.28	$ 21.01	$ 194.22	$ -	$ 298.51	$ 656,609	
	9.014	Reinforcement for concrete backfill	132	TON	$ 135.25	$ 9.35	$ 2,663.58	$ -	$ 2,808.18	$ 370,616	Allow 60lbs/CY for reinforcement
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	1	LS	$ 21,679.93	$ 6,197.40	$ 161,625.00	$ -	$ 189,502.33	$ 189,502	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	10	LF	$ -	$ -	$ -	$ 3,450.00	$ 3,450.00	$ 34,500	
	9.017	Install 48'x48" debris rack on conc. Manhole	1	LS	$ -	$ -	$ -	$ 5,865.00	$ 5,865.00	$ 5,865	
	9.018	Grout pipe	1,050	CY	$ 26.27	$ 5.26	$ 151.73	$ -	$ 183.26	$ 192,420	Allow 0.5CY of grout/lf of pipe
	9.019	Field Survey	1	LS	$ -	$ -	$ -	$ 15,755.00	$ 15,755.00	$ 15,755	
	9.020	Riprap Discharge Channel	75	CY					$ 460.11	$ 34,508	
	9.021	Blasting operations	90	LCY	$ 85.14	$ 113.82	$ 4.85	$ -	$ 203.81	$ 18,343	Include 20% swell factor
	9.022	Excavate	90	LCY	$ 22.12	$ 42.13	$ -	$ -	$ 64.25	$ 5,782	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	90	LCY	$ 18.89	$ 32.86	$ -	$ -	$ 51.75	$ 4,657	
	9.025	Place at the channel	90	LCY	$ 37.90	$ 25.72	$ -	$ -	$ 63.62	$ 5,725	
10		Misc allowance for small items, allow 1%	1.0%	%				295,572,352	$ 295,572,352	$ 2,955,724	
		Total Direct Cost	53	Acre	$ 1,608,932.56	$ 2,515,040.68	$ 1,380,464.40	$ 128,167.55	$ 5,632,605.19	$ 298,528,075	

Sites Reservoir (Alt 2): Sites Dam | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

22. Construction Cost Summary: Sites Dam

				Total Cost
Total Direct Cost				163,312,242
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				163,312,242
General Conditions				
Mobilization			5.0%	8,165,612
Site General Conditions & Requirements			10.0%	17,147,785
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	2,074,882
Bonds			0.6%	1,144,203
GC Home Office Overhead			6.0%	11,510,683
GC Profit			8.0%	16,268,433
Total Contractor Indirect Markups				56,311,598
TOTAL DIRECT COST BEFORE CONTINGENCIES				**219,623,840**
Contingencies				
Design Contingencies			10.0%	21,962,384
Construction Contingencies			15.0%	36,237,934
Total Contingency Allowance				58,200,318
TOTAL DIRECT COST BEFORE ESCALATION				**277,824,158**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2,713,046
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**280,537,204**

22. Cost Work Sheet Summary: Sites Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	23	ACRE	$ 3,076.78	$ 5,369.90	$ -	$ -	$ 8,446.68	$ 197,652	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	23	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 87,996	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	220,000	Tons					$ 36.99	$ 8,138,176	
	2.002	*Purchase processed material from quarry*	*220,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 4,883,230*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*148,824*	*LCY*	*$ 10.45*	*$ 11.42*	*$ -*	*$ -*	*$ 21.87*	*$ 3,254,946*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	264,000	Tons					$ 37.03	$ 9,776,844	
	2.005	*Purchase processed material from quarry*	*264,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 5,859,876*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*178,588*	*LCY*	*$ 10.48*	*$ 11.45*	*$ -*	*$ -*	*$ 21.93*	*$ 3,916,968*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	38,500	Tons					$ 37.00	$ 1,424,640	
	2.008	*Purchase processed material from quarry*	*38,500*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 854,565*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*26,044*	*LCY*	*$ 10.46*	*$ 11.43*	*$ -*	*$ -*	*$ 21.89*	*$ 570,075*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	132,000	Tons					$ 37.10	$ 4,897,617	
	2.011	*Purchase processed material from quarry*	*132,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,929,938*	*Include 10% waste factor / additional material supply*
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*89,294*	*LCY*	*$ 10.53*	*$ 11.51*	*$ -*	*$ -*	*$ 22.04*	*$ 1,967,679*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.013	Process and Stockpile on Project - Zone 2B - Transition	143,000	Tons					$ 36.99	$ 5,288,895	
	2.014	*Purchase processed material from quarry*	*143,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 3,174,100*	*Include 10% waste factor / additional material supply*
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*96,735*	*LCY*	*$ 10.44*	*$ 11.42*	*$ -*	*$ -*	*$ 21.86*	*$ 2,114,795*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	52,000	BCY					$ 8.49	$ 441,701	
	3.002	*Excavations - remove top soil layer*	*57,200*	*LCY*	*$ 1.43*	*$ 2.23*	*$ -*	*$ -*	*$ 3.67*	*$ 209,764*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*57,200*	*LCY*	*$ 1.13*	*$ 2.93*	*$ -*	*$ -*	*$ 4.05*	*$ 231,937*	
	3.004	Dam Foundation Excavation - Common	109,000	BCY					$ 8.62	$ 939,774	
	3.005	*Excavations - remove top soil layer*	*119,900*	*LCY*	*$ 1.57*	*$ 2.23*	*$ -*	*$ -*	*$ 3.79*	*$ 454,815*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*119,900*	*LCY*	*$ 1.13*	*$ 2.92*	*$ -*	*$ -*	*$ 4.04*	*$ 484,959*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	310,000	BCY					$ 11.73	$ 3,635,944	
	3.008	*Rock excavations, no blasting*	*356,500*	*LCY*	*$ 2.51*	*$ 3.67*	*$ -*	*$ -*	*$ 6.18*	*$ 2,202,151*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*356,500*	*LCY*	*$ 1.12*	*$ 2.90*	*$ -*	*$ -*	*$ 4.02*	*$ 1,433,792*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	43,000	BCY					$ 24.51	$ 1,054,136	
	3.011	*Blasting operations*	*51,600*	*LCY*	*$ 4.31*	*$ 5.76*	*$ 4.85*	*$ -*	*$ 14.91*	*$ 769,486*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 0.5 mile haul*	*51,600*	*LCY*	*$ 1.54*	*$ 3.98*	*$ -*	*$ -*	*$ 5.52*	*$ 284,650*	
	3.013	*Crush and screen material*	*51,600*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	18,000	SY					$ 20.29	$ 365,197	
	4.002	*Initial foundation core cleanup*	*18,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 309,220*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*4,950*	*CY*	*$ 3.79*	*$ 7.52*	*$ -*	*$ -*	*$ 11.31*	*$ 55,977*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	18,000	SY					$ 17.18	$ 309,220	
	4.005	*Final foundation core cleanup*	*18,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 309,220*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	720	CY					$ 123.44	$ 88,874	
	4.008	*Dental excavations*	*792*	*LCY*	*$ 69.06*	*$ 31.24*	*$ -*	*$ -*	*$ 100.30*	*$ 79,439*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*792*	*LCY*	*$ 4.38*	*$ 7.53*	*$ -*	*$ -*	*$ 11.91*	*$ 9,434*	
	4.010	Dental Concrete	720	CY	$ 43.97	$ 19.98	$ 183.12	$ -	$ 247.07	$ 177,891	
	4.011	Grout Cap with Anchors	3,240	CY	$ 80.60	$ 23.32	$ 519.68	$ 12.42	$ 636.03	$ 2,060,726	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	27,500	LF					$ 78.86	$ 2,168,658	
	4.013	*Drill setup for all holes*	*367*	*ea.*	*$ 194.78*	*$ 325.95*	*$ -*	*$ -*	*$ 520.74*	*$ 190,937*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*27,500*	*lft*	*$ 10.32*	*$ 11.13*	*$ -*	*$ -*	*$ 21.45*	*$ 589,822*	
	4.015	*Redrill grout holes*	*2,750*	*lft*	*$ 10.62*	*$ 11.45*	*$ -*	*$ -*	*$ 22.08*	*$ 60,717*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*1,375*	*ea.*	*$ 91.31*	*$ -*	*$ -*	*$ -*	*$ 91.31*	*$ 125,545*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*1,833*	*hr*	*$ 485.83*	*$ 100.15*	*$ -*	*$ -*	*$ 585.98*	*$ 1,074,294*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*367*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 127,343*	

22. Cost Work Sheet Summary: Sites Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.019	Consolidation Grouting	12,300	LF					$ 80.53	$ 990,551	
	4.020	Drill setup for all holes	164	ea.	$ 207.38	$ 347.03	$ -	$ -	$ 554.40	$ 90,922	Assume 75' drilling lengths
	4.021	Drill curtain grout holes	12,300	lft	$ 10.52	$ 11.34	$ -	$ -	$ 21.86	$ 268,889	
	4.022	Redrill grout holes	1,230	lft	$ 13.57	$ 14.63	$ -	$ -	$ 28.21	$ 34,695	Assume 10% to be redrilled
	4.023	Hookup to grout holes and grout nipples	615	ea.	$ 93.06	$ -	$ -	$ -	$ 93.06	$ 57,234	1 x hookup every 20'
	4.024	Inject portland cement grout	820	hr	$ 487.20	$ 100.43	$ -	$ -	$ 587.62	$ 481,852	Allow 5 hours per hole
	4.025	Perform hydraulic conductivity tests	164	ea.	$ -	$ -	$ -	$ 347.30	$ 347.30	$ 56,957	
	4.026	Type III Cement	1,400	Tons	$ 176.82	$ 73.04	$ 113.14	$ -	$ 362.99	$ 508,190	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	62,000	SY					$ 3.69	$ 228,809	
	5.002	Initial dam shell cleanup	62,000	SY	$ 1.37	$ 0.42	$ -	$ -	$ 1.79	$ 110,880	
	5.003	Load and haul to disposal area, 0.5 mile haul	11,367	LCY	$ 3.81	$ 6.56	$ -	$ -	$ 10.37	$ 117,929	Assume removal of top layer, 0.5' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	500	LF	$ 43.36	$ 26.91	$ 35.56	$ -	$ 105.83	$ 52,914	
	6.002	Furnish and Install Foundation Drain Manholes	1	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 5,758	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	305,000	BCY					$ 7.48	$ 2,282,215	Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	335,500	LCY	$ 0.98	$ 2.68	$ -	$ -	$ 3.65	$ 1,226,124	Include 10% swell factor
	7.004	Load and haul to site stockpile, 0.25 mile haul	335,500	LCY	$ 0.84	$ 2.30	$ -	$ -	$ 3.15	$ 1,056,091	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	1,590,000	BCY					$ 9.01	$ 14,323,096	
	7.006	Embankment excavations	1,749,000	LCY	$ 1.43	$ 3.02	$ -	$ -	$ 4.45	$ 7,786,690	Include 10% swell factor
	7.007	Load and haul to site stockpile, 0.25 mile haul	1,749,000	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.74	$ 6,536,406	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	
	7.009	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 10% swell factor
	7.010	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	
	7.012	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	473,750	ECY					$ 6.73	$ 3,187,491	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	Load and haul to site stockpile, 0.25 mile haul	521,125	LCY	$ 1.10	$ 2.96	$ -	$ -	$ 4.06	$ 2,113,825	
	7.016	Spread and compact	521,125	LCY	$ 1.14	$ 0.92	$ -	$ -	$ 2.06	$ 1,073,666	
	7.017	Topsoil Replacement	52,000	ECY					$ 9.94	$ 517,068	Backfill burrow area using material from stockpile
	7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile	57,200	LCY	$ 1.79	$ 5.14	$ -	$ -	$ 6.92	$ 395,937	
	7.019	Spread and compact	57,200	LCY	$ 1.17	$ 0.95	$ -	$ -	$ 2.12	$ 121,132	
	7.020	Furnish and Install Zone 1 - Core	640,000	ECY					$ 13.13	$ 8,402,490	
	7.021	Excavate from burrow area	704,000	LCY	$ 1.43	$ 3.03	$ -	$ -	$ 4.46	$ 3,139,794	Include 10% swell factor
	7.022	Load and haul to zone-1 fill location, 1 mile haul	704,000	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.74	$ 2,635,648	No stockpiling required
	7.023	Spread and compact	704,000	LCY	$ 1.51	$ 2.22	$ -	$ -	$ 3.73	$ 2,627,048	
	7.024	Load, Haul and Place - Zone 2A - Filter	220,000	Tons					$ 3.26	$ 716,149	
	7.025	Load at stockpile and haul to fill location, 0.5 mile haul	44,647	LCY	$ 0.85	$ 2.70	$ -	$ -	$ 3.55	$ 158,392	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	Direct hauling from quarry	104,176	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	Spread and compact	148,824	LCY	$ 1.48	$ 2.27	$ -	$ -	$ 3.75	$ 557,757	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	264,000	Tons					$ 3.22	$ 849,348	
	7.028	Load at stockpile and haul to fill location, 0.5 mile haul	53,576	LCY	$ 0.81	$ 2.60	$ -	$ -	$ 3.41	$ 182,760	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	Direct hauling from quarry	125,012	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	Spread and compact	178,588	LCY	$ 1.47	$ 2.26	$ -	$ -	$ 3.73	$ 666,588	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	38,500	Tons					$ 3.78	$ 145,383	
	7.031	Load at stockpile and haul to fill location, 0.5 mile haul	7,813	LCY	$ 1.11	$ 3.56	$ -	$ -	$ 4.68	$ 36,552	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	Direct hauling from quarry	18,231	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	Spread and compact	26,044	LCY	$ 1.65	$ 2.53	$ -	$ -	$ 4.18	$ 108,831	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	132,000	Tons					$ 3.46	$ 456,800	
	7.034	Load at stockpile and haul to fill location, 0.5 mile haul	26,788	LCY	$ 1.12	$ 3.24	$ -	$ -	$ 4.36	$ 116,704	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0341	Direct hauling from quarry	62,506	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.035	Spread and compact	89,294	LCY	$ 1.50	$ 2.31	$ -	$ -	$ 3.81	$ 340,096	Include 15% swell factor
	7.036	Load, Haul and Place - Zone 2B - Transition	143,000	Tons					$ 3.25	$ 464,776	
	7.037	Load at stockpile and haul to fill location, 0.5 mile haul	29,021	LCY	$ 0.80	$ 2.56	$ -	$ -	$ 3.36	$ 97,472	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0371	Direct hauling from quarry	67,715	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.038	Spread and compact	96,735	LCY	$ 1.50	$ 2.30	$ -	$ -	$ 3.80	$ 367,304	Include 15% swell factor

22. Cost Work Sheet Summary: Sites Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.039	Furnish and Install Zone 3 - Rockfill	950,000	ECY					$ 26.78	$ 25,437,444	
	7.040	Blasting operations	1,140,000	LCY	$ 4.26	$ 5.70	$ 4.85	$ -	$ 14.81	$ 16,880,340	Include 20% swell factor
	7.041	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	Crush and screen material	1,140,000	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	Load and haul to zone-3, 1 mile haul	1,140,000	LCY	$ 0.88	$ 2.94	$ -	$ -	$ 3.82	$ 4,353,519	No stockpiling required, direct haul
	7.044	Spread and compact	1,140,000	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.69	$ 4,203,585	
	7.045	Furnish and Install Zone 4 - Random	600,000	ECY					$ 10.17	$ 6,104,122	
	7.046	Excavations in common soil	250,815	LCY	$ 1.43	$ 2.22	$ -	$ -	$ 3.65	$ 915,335	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	250,815	LCY	$ 1.26	$ 3.51	$ -	$ -	$ 4.76	$ 1,194,974	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	439,185	LCY	$ 0.79	$ 2.51	$ -	$ -	$ 3.30	$ 1,449,897	Include 15% swell factor
	7.050	Spread and compact	690,000	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.69	$ 2,543,917	
	7.051	Furnish and Install Riprap	36,000	ECY					$ 39.86	$ 1,434,793	
	7.052	Blasting operations	43,200	LCY	$ 4.26	$ 5.69	$ 4.85	$ -	$ 14.80	$ 639,224	Include 20% swell factor
	7.053	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	43,200	LCY	$ 0.81	$ 2.58	$ -	$ -	$ 3.38	$ 146,208	
	7.056	Riprap placement	43,200	LCY	$ 5.98	$ 9.05	$ -	$ -	$ 15.03	$ 649,362	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 1,993,333.33	$ 1,993,333.33	$ 1,993,333	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	800	CY					$ 105.74	$ 84,590	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	920	LCY	$ 14.50	$ 15.60	$ 37.73	$ -	$ 67.84	$ 62,409	Include 15% swell factor
	8.007	Place and compact	920	LCY	$ 7.86	$ 16.25	$ -	$ -	$ 24.11	$ 22,181	
	8.008	Developing haul routes - Haul routes inside reservoir	22	ACRES					$ 26,990.65	$ 593,794	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	958,320	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 183,137	
	8.0091	Load and haul earth fill	17,747	CY	$ 1.69	$ 4.62	$ -	$ -	$ 6.32	$ 112,130	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	958,320	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 298,528	
	8.011	Developing haul routes - Haul routes outside reservoir	15	ACRES					$ 27,785.55	$ 416,783	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	653,400	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 130,812	
	8.0121	Load and haul earth fill	12,100	CY	$ 1.79	$ 4.88	$ -	$ -	$ 6.67	$ 80,733	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	653,400	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.31	$ 205,238	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	2,400	CY	$ 95.71	$ 50.93	$ 233.06	$ -	$ 379.70	$ 911,274	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.02	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 498,333.33	$ 498,333.33	$ 498,333	Allowance
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included within Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	Excavate trench in bedrock	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.011	Load and haul material to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.012	48" steel pipe placement	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.013	Concrete backfill for pipe trench (dam footprint)	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.014	Reinforcement for concrete backfill	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.017	Install 48"x48" debris rack on conc. Manhole	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.018	Grout pipe	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.019	Field Survey	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.022	Excavate	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	

22. Cost Work Sheet Summary: Sites Dam

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	9.025	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
10		**Sites Dam Diversion Facilities**									
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	Earth fill coffer dam; included within zone 4 fill work
	10.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required; Earth fill coffer dam
	10.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.004	Load and haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	10.006	Import material to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.007	Load at stockpile and haul to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.009	Upstream Portal Excavation and Rock Bolts	15,800	CY					$ 44.61	$ 704,890	
	10.010	Excavate and load material	17,380	LCY	$ 1.39	$ 2.42	$ -	$ -	$ 3.81	$ 66,147	Assumed excavating material is either common earth, loam, sand, clay or loose material.
	10.011	Haul to disposal site, 0.5 mile haul	17,380	LCY	$ 1.82	$ 4.37	$ -	$ -	$ 6.19	$ 107,615	
	10.012	Shotcrete portal face	948	CY	$ 86.92	$ 41.04	$ 221.97	$ -	$ 349.92	$ 331,727	
	10.013	Steel fiber for shotcrete	17	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 41,114	Allow 35lbs/CY of concrete
	10.014	20 ft rock bolts, 5 ft on center - Drilling	790	EA	$ 50.73	$ 20.73	$ -	$ -	$ 71.46	$ 56,451	
	10.015	3.5" diam grouted hole with #10 bar	36	CY	$ 263.49	$ 78.40	$ 2,522.70	$ -	$ 2,864.58	$ 101,836	
	10.016	Upstream Portal Backfill	24,500	CY					$ 10.54	$ 258,283	
	10.017	Load at stockpile and haul to fill location, 0.5 mile haul	26,950	LCY	$ 0.99	$ 4.34	$ -	$ -	$ 5.33	$ 143,587	
	10.018	Spread and compact	26,950	LCY	$ 2.11	$ 2.15	$ -	$ -	$ 4.26	$ 114,697	
	10.019	Inlet and Valve Structures	2,200	CY					$ 1,092.50	$ 2,403,500	
	10.020	Pour inlet and valve structures	2,200	CY	$ -	$ -	$ -	$ 1,092.50	$ 1,092.50	$ 2,403,500	
	10.021	Downstream Portal Excavation and Rock Bolts	12,500	CY					$ 45.40	$ 567,445	
	10.022	Excavate and load material	13,750	LCY	$ 1.48	$ 2.59	$ -	$ -	$ 4.07	$ 55,971	
	10.023	Haul to disposal site, 0.5 mile haul	13,750	LCY	$ 1.95	$ 4.56	$ -	$ -	$ 6.51	$ 89,497	
	10.024	Shotcrete portal face	750	CY	$ 87.89	$ 41.50	$ 221.97	$ -	$ 351.36	$ 263,517	
	10.025	Steel fiber for shotcrete	13	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 32,527	Allow 35lbs/CY of concrete
	10.026	20 ft rock bolts, 5 ft on center - Drilling	625	EA	$ 52.10	$ 21.29	$ -	$ -	$ 73.39	$ 45,867	
	10.027	3.5" diam grouted hole with #10 bar	28	CY	$ 249.79	$ 74.32	$ 2,522.70	$ -	$ 2,846.81	$ 80,066	
	10.028	Downstream Portal Backfill	34,400	CY					$ 10.22	$ 351,620	
	10.029	Load at stockpile and haul to fill location, 0.5 mile haul	37,840	BCY	$ 0.92	$ 4.04	$ -	$ -	$ 4.96	$ 187,767	
	10.030	Spread and compact	37,840	LCY	$ 2.14	$ 2.19	$ -	$ -	$ 4.33	$ 163,852	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	1,590	LF	$ -	$ -	$ -	$ 7,304.42	$ 7,304.42	$ 11,614,023	Second shift work will apply
	10.032	Tunnel Concrete Lining	1,590	LF	$ -	$ -	$ -	$ 7,205.71	$ 7,205.71	$ 11,457,076	Second shift work will apply
	10.033	10-Ft Steel Pipe Cut and Cover Section	1,590	LF	$ -	$ -	$ -	$ 8,094.08	$ 8,094.08	$ 12,869,593	Second shift work will apply
	10.034	Mechanical, Valves, Trash rack, and Metals	1	LS	$ -	$ -	$ -	$ 9,775,000	$ 9,775,000	$ 9,775,000	Allowance
	10.035	Riprap Discharge Channel	75	CY					$ 458.82	$ 34,412	
	10.036	Blasting operations	90	LCY	$ 59.57	$ 64.41	$ 4.85	$ -	$ 128.83	$ 11,594	
	10.037	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	90	LCY	$ 22.81	$ 68.17	$ -	$ -	$ 90.98	$ 8,188	
	10.038	Crush and screen material			$ -	$ -	$ -	$ -			
	10.039	Load and haul to stockpile, 1 mile haul	90	LCY	$ 13.36	$ 58.58	$ -	$ -	$ 71.95	$ 6,475	
	10.040	Place at the channel	90	LCY	$ 35.55	$ 55.05	$ -	$ -	$ 90.60	$ 8,154	
11		**ERS Facility**									Not required
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.003	Haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.006	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.007	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	Haul excavated material and stockpile, 1 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 1 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		Misc allowance for small items, allow 1%	1.0%	%				161,695,289	$ 161,695,289	$ 1,616,953	
		Total Direct Cost	27	Acre	$ 1,194,168.96	$ 1,912,587.29	$ 995,906.15	$ 1,945,939.15	$ 6,048,601.55	$ 163,312,242	

Sites Reservoir (Alt 2): Saddle Dam 3 | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

23. Construction Cost Summary: Saddle Dam 3

				Total Cost
Total Direct Cost				68,184,786
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				68,184,786
General Conditions				
Mobilization			5.0%	3,409,239
Site General Conditions & Requirements			10.0%	7,159,403
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	866,288
Bonds			0.6%	477,718
GC Home Office Overhead			6.0%	4,805,846
GC Profit			8.0%	6,792,262
Total Contractor Indirect Markups				23,510,756
TOTAL DIRECT COST BEFORE CONTINGENCIES				**91,695,542**
Contingencies				
Design Contingencies			10.0%	9,169,554
Construction Contingencies			15.0%	15,129,764
Total Contingency Allowance				24,299,318
TOTAL DIRECT COST BEFORE ESCALATION				**115,994,860**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	1,132,729
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**117,127,589**

23. Cost Work Sheet Summary: Saddle Dam 3

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	48	ACRE	$ 3,115.23	$ 5,437.02	$ -	$ -	$ 8,552.26	$ 410,508	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	48	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 180,504	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	165,000	Tons					$ 37.02	$ 6,108,229	
	2.002	*Purchase processed material from quarry*	*165,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 3,662,423*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*111,618*	*LCY*	*$ 10.47*	*$ 11.44*	*$ -*	*$ -*	*$ 21.91*	*$ 2,445,807*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	165,000	Tons					$ 37.02	$ 6,108,229	
	2.005	*Purchase processed material from quarry*	*165,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 3,662,423*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*111,618*	*LCY*	*$ 10.47*	*$ 11.44*	*$ -*	*$ -*	*$ 21.91*	*$ 2,445,807*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	48,400	Tons					$ 37.01	$ 1,791,502	
	2.008	*Purchase processed material from quarry*	*48,400*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 1,074,311*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*32,741*	*LCY*	*$ 10.47*	*$ 11.44*	*$ -*	*$ -*	*$ 21.90*	*$ 717,191*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Haul material from quarry to site stockpile/fill location, 40 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.015	*Haul material from quarry to site stockpile/fill location, 40 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	84,000	BCY					$ 8.23	$ 691,156	
	3.002	*Excavations - remove top soil layer*	*92,400*	*LCY*	*$ 1.45*	*$ 2.26*	*$ -*	*$ -*	*$ 3.71*	*$ 343,251*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*92,400*	*LCY*	*$ 1.05*	*$ 2.72*	*$ -*	*$ -*	*$ 3.77*	*$ 347,905*	
	3.004	Dam Foundation Excavation - Common	92,000	BCY					$ 8.32	$ 765,138	
	3.005	*Excavations - remove top soil layer*	*101,200*	*LCY*	*$ 1.57*	*$ 2.24*	*$ -*	*$ -*	*$ 3.81*	*$ 385,604*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*101,200*	*LCY*	*$ 1.04*	*$ 2.71*	*$ -*	*$ -*	*$ 3.75*	*$ 379,533*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	178,000	BCY					$ 11.44	$ 2,036,651	
	3.008	*Rock excavations, no blasting*	*204,700*	*LCY*	*$ 2.53*	*$ 3.71*	*$ -*	*$ -*	*$ 6.24*	*$ 1,277,584*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*204,700*	*LCY*	*$ 1.03*	*$ 2.68*	*$ -*	*$ -*	*$ 3.71*	*$ 759,066*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	-	BCY					$ -	$ -	
	3.011	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 20% swell factor*
	3.012	*Excavate, load and haul to stockpile, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	24,500	SY					$ 19.35	$ 473,997	
	4.002	*Initial foundation core cleanup*	*24,500*	*SY*	*$ 11.52*	*$ 5.54*	*$ -*	*$ -*	*$ 17.06*	*$ 418,020*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*6,738*	*CY*	*$ 2.79*	*$ 5.52*	*$ -*	*$ -*	*$ 8.31*	*$ 55,977*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	25,500	SY					$ 17.07	$ 435,199	
	4.005	*Final foundation core cleanup*	*25,500*	*SY*	*$ 11.53*	*$ 5.54*	*$ -*	*$ -*	*$ 17.07*	*$ 435,199*	
	4.006	*Load and haul to disposal area, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	1,800	CY					$ 120.98	$ 217,771	
	4.008	*Dental excavations*	*1,980*	*LCY*	*$ 67.53*	*$ 30.54*	*$ -*	*$ -*	*$ 98.07*	*$ 194,185*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*1,980*	*LCY*	*$ 4.38*	*$ 7.53*	*$ -*	*$ -*	*$ 11.91*	*$ 23,586*	
	4.010	Dental Concrete	1,800	CY	$ 43.97	$ 19.98	$ 183.12	$ -	$ 247.07	$ 444,726	
	4.011	Grout Cap with Anchors	6,040	CY	$ 79.46	$ 22.99	$ 519.68	$ 6.66	$ 628.80	$ 3,797,940	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	24,120	LF					$ 91.56	$ 2,208,394	
	4.013	*Drill setup for all holes*	*322*	*ea.*	*$ 190.35*	*$ 318.54*	*$ -*	*$ -*	*$ 508.89*	*$ 163,660*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*24,120*	*lft*	*$ 10.38*	*$ 11.19*	*$ -*	*$ -*	*$ 21.58*	*$ 520,431*	
	4.015	*Redrill grout holes*	*2,412*	*lft*	*$ 10.38*	*$ 11.19*	*$ -*	*$ -*	*$ 21.58*	*$ 52,043*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*1,206*	*ea.*	*$ 91.85*	*$ -*	*$ -*	*$ -*	*$ 91.85*	*$ 110,775*	
	4.017	*Inject portland cement grout*	*1,608*	*hr*	*$ 486.03*	*$ 100.19*	*$ -*	*$ -*	*$ 586.22*	*$ 942,640*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*1,206*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 418,844*	
	4.019	Consolidation Grouting	-	LF					$ -	$ -	Not required
	4.020	*Drill setup for all holes*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.021	*Drill curtain grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Redrill grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Hookup to grout holes and grout nipples*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	*Inject portland cement grout*	*-*	*hr*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.025	*Perform hydraulic conductivity tests*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	Type III Cement	850	Tons	$ 177.58	$ 73.35	$ 113.14	$ -	$ 364.07	$ 309,458	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	

23. Cost Work Sheet Summary: Saddle Dam 3

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	91,200	SY					$ 4.86	$ 443,189	
	5.002	*Initial dam shell cleanup*	*91,200*	*SY*	*$ 1.35*	*$ 0.41*	*$ -*	*$ -*	*$ 1.76*	*$ 160,160*	
	5.003	*Load and haul to disposal area, 0.5 mile haul*	*25,080*	*LCY*	*$ 4.15*	*$ 7.14*	*$ -*	*$ -*	*$ 11.29*	*$ 283,030*	*Assume removal of top layer, 0.75' thick*
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	1,000	LF	$ 45.53	$ 28.26	$ 35.56	$ -	$ 109.34	$ 109,342	
	6.002	Furnish and Install Foundation Drain Manholes	3	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 17,275	
	6.003	Seepage Partition Walls	600	CY	$ 524.39	$ 116.74	$ 465.37	$ -	$ 1,106.49	$ 663,897	3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	229,000	BCY					$ 7.52	$ 1,721,015	Assumed common earth, 3000' haul w/ scraper
	7.003	*Embankment excavations*	*251,900*	*LCY*	*$ 0.98*	*$ 2.69*	*$ -*	*$ -*	*$ 3.67*	*$ 924,618*	*Include 10% swell factor*
	7.004	*Load and haul to site stockpile, 0.25 mile haul*	*251,900*	*LCY*	*$ 0.85*	*$ 2.31*	*$ -*	*$ -*	*$ 3.16*	*$ 796,396*	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	161,000	BCY					$ 9.04	$ 1,455,411	
	7.006	*Embankment excavations*	*177,100*	*LCY*	*$ 1.44*	*$ 3.03*	*$ -*	*$ -*	*$ 4.47*	*$ 791,228*	*Include 10% swell factor*
	7.007	*Load and haul to site stockpile, 0.25 mile haul*	*177,100*	*LCY*	*$ 1.04*	*$ 2.71*	*$ -*	*$ -*	*$ 3.75*	*$ 664,183*	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	103,400	BCY					$ 9.16	$ 947,172	
	7.009	*Embankment excavations*	*113,740*	*LCY*	*$ 1.45*	*$ 3.07*	*$ -*	*$ -*	*$ 4.53*	*$ 514,926*	*Include 10% swell factor*
	7.010	*Load and haul to site stockpile, 0.25 mile haul*	*113,740*	*LCY*	*$ 1.06*	*$ 2.74*	*$ -*	*$ -*	*$ 3.80*	*$ 432,246*	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	Not required
	7.012	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.013	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	123,350	ECY					$ 6.23	$ 768,235	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	*Load and haul to site stockpile, 0.25 mile haul*	*135,685*	*LCY*	*$ 1.16*	*$ 2.43*	*$ -*	*$ -*	*$ 3.59*	*$ 487,430*	
	7.016	*Spread and compact*	*135,685*	*LCY*	*$ 1.14*	*$ 0.93*	*$ -*	*$ -*	*$ 2.07*	*$ 280,805*	
	7.017	Topsoil Replacement	56,000	ECY					$ 10.07	$ 564,075	Backfill burrow area using material from stockpile
	7.018	*Excavate, Load and haul excavated backfill material to fill location, 1 mile haul*	*61,600*	*LCY*	*$ 1.81*	*$ 5.20*	*$ -*	*$ -*	*$ 7.01*	*$ 431,931*	
	7.019	*Spread and compact*	*61,600*	*LCY*	*$ 1.18*	*$ 0.96*	*$ -*	*$ -*	*$ 2.15*	*$ 132,143*	
	7.020	Furnish and Install Zone 1 - Core	480,000	ECY					$ 14.91	$ 7,156,396	
	7.021	*Excavate from burrow area*	*528,000*	*LCY*	*$ 1.44*	*$ 3.04*	*$ -*	*$ -*	*$ 4.47*	*$ 2,361,125*	*Include 10% swell factor*
	7.022	*Load and haul to zone-1 fill location, 1.25 mile haul*	*528,000*	*LCY*	*$ 1.36*	*$ 4.00*	*$ -*	*$ -*	*$ 5.36*	*$ 2,827,481*	*No stockpiling required*
	7.023	*Spread and compact*	*528,000*	*LCY*	*$ 1.51*	*$ 2.22*	*$ -*	*$ -*	*$ 3.73*	*$ 1,967,789*	
	7.024	Load, Haul and Place - Zone 2A - Filter	165,000	Tons					$ 3.29	$ 542,325	
	7.025	*Load at stockpile and haul to fill location, 0.5 mile haul*	*33,485*	*LCY*	*$ 0.87*	*$ 2.73*	*$ -*	*$ -*	*$ 3.60*	*$ 120,606*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0251	*Direct hauling from quarry*	*78,132*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.026	*Spread and compact*	*111,618*	*LCY*	*$ 1.49*	*$ 2.29*	*$ -*	*$ -*	*$ 3.78*	*$ 421,719*	*Include 15% swell factor*
	7.027	Load, Haul and Place - Zone 2A - Drain	165,000	Tons					$ 3.29	$ 542,325	
	7.028	*Load at stockpile and haul to fill location, 0.5 mile haul*	*33,485*	*LCY*	*$ 0.87*	*$ 2.73*	*$ -*	*$ -*	*$ 3.60*	*$ 120,606*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0281	*Direct hauling from quarry*	*78,132*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.029	*Spread and compact*	*111,618*	*LCY*	*$ 1.49*	*$ 2.29*	*$ -*	*$ -*	*$ 3.78*	*$ 421,719*	*Include 15% swell factor*
	7.030	Load, Haul and Place - Zone 2A - Transition	48,400	Tons					$ 3.28	$ 158,616	
	7.031	*Load at stockpile and haul to fill location, 0.5 mile haul*	*9,822*	*LCY*	*$ 0.89*	*$ 2.80*	*$ -*	*$ -*	*$ 3.68*	*$ 36,182*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0311	*Direct hauling from quarry*	*22,919*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.032	*Spread and compact*	*32,741*	*LCY*	*$ 1.48*	*$ 2.26*	*$ -*	*$ -*	*$ 3.74*	*$ 122,435*	*Include 15% swell factor*
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	7.034	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.0341	*Direct hauling from quarry*	*-*	*LCY*						*Elsewhere*	
	7.035	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	7.037	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.0371	*Direct hauling from quarry*	*-*	*LCY*						*Elsewhere*	
	7.038	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.039	Furnish and Install Zone 3 - Rockfill	320,000	ECY					$ 27.54	$ 8,812,232	
	7.040	*Blasting operations*	*384,000*	*LCY*	*$ 4.27*	*$ 5.71*	*$ 4.85*	*$ -*	*$ 14.83*	*$ 5,693,926*	*Include 20% swell factor*
	7.041	*Excavate, load and haul to stockpile, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling required, material to be hauled to fill location directly*
	7.042	*Crush and screen material*	*384,000*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
	7.043	*Load and haul to zone-3, 1.5 mile haul*	*384,000*	*LCY*	*$ 1.08*	*$ 3.35*	*$ -*	*$ -*	*$ 4.44*	*$ 1,703,508*	*No stockpiling required, direct haul*
	7.044	*Spread and compact*	*384,000*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.68*	*$ 1,414,799*	
	7.045	Furnish and Install Zone 4 - Random	845,000	ECY					$ 13.09	$ 11,060,848	
	7.046	*Excavations in common soil*	*767,050*	*LCY*	*$ 1.42*	*$ 2.20*	*$ -*	*$ -*	*$ 3.62*	*$ 2,774,608*	*No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor*
	7.047	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	7.048	*Direct hauling from quarry excavation, 1 mile haul*	*767,050*	*LCY*	*$ 1.39*	*$ 3.87*	*$ -*	*$ -*	*$ 5.26*	*$ 4,033,036*	*Include 15% swell factor, no stockpiling required, direct haul*
	7.049	*Load at stockpile and haul to fill location, 0.5 mile haul*	*204,700*	*LCY*	*$ 0.79*	*$ 2.51*	*$ -*	*$ -*	*$ 3.30*	*$ 675,395*	*Include 15% swell factor*
	7.050	*Spread and compact*	*971,750*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.68*	*$ 3,577,808*	
	7.051	Furnish and Install Riprap	70,000	ECY					$ 39.92	$ 2,794,583	
	7.052	*Blasting operations*	*84,000*	*LCY*	*$ 4.29*	*$ 5.73*	*$ 4.85*	*$ -*	*$ 14.87*	*$ 1,248,904*	*Include 20% swell factor*

23. Cost Work Sheet Summary: Saddle Dam 3

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.053	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	84,000	LCY	$ 0.79	$ 2.51	$ -	$ -	$ 3.30	$ 277,394	
	7.056	Riprap placement	84,000	LCY	$ 6.00	$ 9.10	$ -	$ -	$ 15.10	$ 1,268,285	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 348,833.33	$ 348,833.33	$ 348,833	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	2,000	CY					$ 87.72	$ 175,447	
	8.006	Purchase and import gravel to fill location and stockpile, 35 mi haul	2,300	LCY	$ 11.60	$ 12.48	$ 37.73	$ -	$ 61.82	$ 142,175	Include 15% swell factor
	8.007	Place and compact	2,300	LCY	$ 4.71	$ 9.75	$ -	$ -	$ 14.47	$ 33,272	
	8.008	Developing haul routes - Haul routes inside reservoir	51	ACRES					$ 26,932.75	$ 1,373,570	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	2,221,560	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 418,599	
	8.0091	Load and haul earth fill, 0.5 mile haul	41,140	CY	$ 1.72	$ 4.71	$ -	$ -	$ 6.43	$ 264,626	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	2,221,560	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 690,345	
	8.011	Developing haul routes - Haul routes outside reservoir	12	ACRES					$ 27,947.01	$ 335,364	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	522,720	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 104,650	
	8.0121	Load and haul earth fill, 0.5 mile haul	9,680	CY	$ 1.74	$ 4.75	$ -	$ -	$ 6.49	$ 62,793	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	522,720	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.32	$ 167,922	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	3,400	CY	$ 95.71	$ 50.93	$ 233.06	$ -	$ 379.70	$ 1,290,972	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.02	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 249,166.67	$ 249,166.67	$ 249,167	
9		Misc allowance for small items, allow 1%	1.0%	%				67,509,689	$ 67,509,689	$ 675,097	
		Total Direct Cost	63	Acre	$ 317,745.24	$ 489,173.53	$ 245,019.19	$ 30,360.23	$ 1,082,298.19	$ 68,184,786	

Sites Reservoir (Alt 2): Saddle Dam 5 | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

24. Construction Cost Summary: Saddle Dam 5

				Total Cost
Total Direct Cost				37,668,110
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				37,668,110
General Conditions				
Mobilization			5.0%	1,883,406
Site General Conditions & Requirements			10.0%	3,955,152
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	478,573
Bonds			0.6%	263,911
GC Home Office Overhead			6.0%	2,654,949
GC Profit			8.0%	3,752,328
Total Contractor Indirect Markups				12,988,319
TOTAL DIRECT COST BEFORE CONTINGENCIES				**50,656,429**
Contingencies				
Design Contingencies			10.0%	5,065,643
Construction Contingencies			15.0%	8,358,311
Total Contingency Allowance				13,423,954
TOTAL DIRECT COST BEFORE ESCALATION				**64,080,383**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	625,766
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**64,706,149**

24. Cost Work Sheet Summary: Saddle Dam 5

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	34	ACRE	$ 3,094.87	$ 5,401.49	$ -	$ -	$ 8,496.36	$ 288,876	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	34	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 127,857	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	99,000	Tons					$ 37.06	$ 3,668,615	
	2.002	*Purchase processed material from quarry*	*99,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,197,454*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*66,971*	*LCY*	*$ 10.50*	*$ 11.47*	*$ -*	*$ -*	*$ 21.97*	*$ 1,471,162*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	104,500	Tons					$ 37.15	$ 3,882,644	
	2.005	*Purchase processed material from quarry*	*104,500*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,319,534*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*70,691*	*LCY*	*$ 10.56*	*$ 11.55*	*$ -*	*$ -*	*$ 22.11*	*$ 1,563,109*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	29,700	Tons					$ 37.06	$ 1,100,585	
	2.008	*Purchase processed material from quarry*	*29,700*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 659,236*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*20,091*	*LCY*	*$ 10.50*	*$ 11.47*	*$ -*	*$ -*	*$ 21.97*	*$ 441,349*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Haul material from quarry to site stockpile/fill location, 40 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.015	*Haul material from quarry to site stockpile/fill location, 40 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	43,200	BCY					$ 8.83	$ 381,469	
	3.002	*Excavations - remove top soil layer*	*47,520*	*LCY*	*$ 1.49*	*$ 2.32*	*$ -*	*$ -*	*$ 3.81*	*$ 181,160*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*47,520*	*LCY*	*$ 1.17*	*$ 3.04*	*$ -*	*$ -*	*$ 4.22*	*$ 200,309*	
	3.004	Dam Foundation Excavation - Common	57,700	BCY					$ 8.85	$ 510,747	
	3.005	*Excavations - remove top soil layer*	*63,470*	*LCY*	*$ 1.61*	*$ 2.29*	*$ -*	*$ -*	*$ 3.89*	*$ 247,182*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*63,470*	*LCY*	*$ 1.16*	*$ 3.00*	*$ -*	*$ -*	*$ 4.15*	*$ 263,565*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	112,000	BCY					$ 11.82	$ 1,323,482	
	3.008	*Rock excavations, no blasting*	*128,800*	*LCY*	*$ 2.54*	*$ 3.72*	*$ -*	*$ -*	*$ 6.26*	*$ 806,895*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*128,800*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 516,587*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	-	BCY					$ -	$ -	
	3.011	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	19,000	SY					$ 19.47	$ 369,937	
	4.002	*Initial foundation core cleanup*	*19,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 326,399*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*5,225*	*CY*	*$ 2.79*	*$ 5.54*	*$ -*	*$ -*	*$ 8.33*	*$ 43,538*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	19,900	SY					$ 16.98	$ 337,852	
	4.005	*Final foundation core cleanup*	*19,900*	*SY*	*$ 11.47*	*$ 5.51*	*$ -*	*$ -*	*$ 16.98*	*$ 337,852*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	1,200	CY					$ 126.06	$ 151,267	
	4.008	*Dental excavations*	*1,320*	*LCY*	*$ 69.06*	*$ 31.24*	*$ -*	*$ -*	*$ 100.30*	*$ 132,399*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*1,320*	*LCY*	*$ 5.25*	*$ 9.04*	*$ -*	*$ -*	*$ 14.29*	*$ 18,869*	
	4.010	Dental Concrete	1,200	CY	$ 44.52	$ 20.23	$ 183.12	$ -	$ 247.87	$ 297,443	
	4.011	Grout Cap with Anchors	3,900	CY	$ 79.63	$ 23.04	$ 519.68	$ 10.32	$ 632.67	$ 2,467,417	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	10,500	LF					$ 79.21	$ 831,664	
	4.013	*Drill setup for all holes*	*140*	*ea.*	*$ 194.34*	*$ 325.21*	*$ -*	*$ -*	*$ 519.56*	*$ 72,738*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*10,500*	*lft*	*$ 10.34*	*$ 11.14*	*$ -*	*$ -*	*$ 21.48*	*$ 225,520*	
	4.015	*Redrill grout holes*	*1,050*	*lft*	*$ 11.93*	*$ 12.86*	*$ -*	*$ -*	*$ 24.78*	*$ 26,022*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*525*	*ea.*	*$ 91.43*	*$ -*	*$ -*	*$ -*	*$ 91.43*	*$ 48,003*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*700*	*hr*	*$ 486.51*	*$ 100.29*	*$ -*	*$ -*	*$ 586.80*	*$ 410,759*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*140*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 48,622*	
	4.019	Consolidation Grouting	-	LF					$ -	$ -	Not required
	4.020	*Drill setup for all holes*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.021	*Drill curtain grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Redrill grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Hookup to grout holes and grout nipples*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	*Inject portland cement grout*	*-*	*hr*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.025	*Perform hydraulic conductivity tests*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	Type III Cement	370	Tons	$ 179.50	$ 74.14	$ 113.14	$ -	$ 366.78	$ 135,709	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	

24. Cost Work Sheet Summary: Saddle Dam 5

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	59,900	SY					$ 4.82	$ 288,689	
	5.002	Initial dam shell cleanup	59,900	SY	$ 1.34	$ 0.41	$ -	$ -	$ 1.75	$ 104,720	
	5.003	Load and haul to disposal area, 0.5 mile haul	16,473	LCY	$ 4.10	$ 7.06	$ -	$ -	$ 11.17	$ 183,969	Assume removal of top layer, 0.75' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	300	LF	$ 50.59	$ 31.40	$ 35.56	$ -	$ 117.54	$ 35,262	
	6.002	Furnish and Install Foundation Drain Manholes	2	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 11,516	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	148,000	BCY					$ 7.58	$ 1,122,401	Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	162,800	LCY	$ 0.99	$ 2.72	$ -	$ -	$ 3.70	$ 603,012	Include 10% swell factor
	7.004	Load and haul to site stockpile, 0.25 mile haul	162,800	LCY	$ 0.85	$ 2.34	$ -	$ -	$ 3.19	$ 519,389	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	106,000	BCY					$ 9.15	$ 970,274	
	7.006	Embankment excavations	116,600	LCY	$ 1.45	$ 3.07	$ -	$ -	$ 4.52	$ 527,485	Include 10% swell factor
	7.007	Load and haul to site stockpile, 0.25 mile haul	116,600	LCY	$ 1.06	$ 2.74	$ -	$ -	$ 3.80	$ 442,789	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	Not required
	7.009	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.010	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	Not required
	7.012	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	63,500	ECY					$ 6.14	$ 389,908	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	Load and haul to site stockpile, 0.25 mile haul	69,850	LCY	$ 1.00	$ 2.45	$ -	$ -	$ 3.45	$ 241,247	
	7.016	Spread and compact	69,850	LCY	$ 1.17	$ 0.95	$ -	$ -	$ 2.13	$ 148,661	
	7.017	Topsoil Replacement	47,000	ECY					$ 10.00	$ 470,062	Backfill burrow area using material from stockpile
	7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	51,700	LCY	$ 1.80	$ 5.17	$ -	$ -	$ 6.96	$ 359,943	
	7.019	Spread and compact	51,700	LCY	$ 1.18	$ 0.95	$ -	$ -	$ 2.13	$ 110,120	
	7.020	Furnish and Install Zone 1 - Core	250,000	ECY					$ 14.95	$ 3,737,971	
	7.021	Excavate from burrow area	275,000	LCY	$ 1.44	$ 3.04	$ -	$ -	$ 4.48	$ 1,230,799	Include 10% swell factor
	7.022	Load and haul to zone-1 fill location, 1.5 mile haul	275,000	LCY	$ 1.36	$ 4.01	$ -	$ -	$ 5.38	$ 1,478,328	No stockpiling required
	7.023	Spread and compact	275,000	LCY	$ 1.51	$ 2.23	$ -	$ -	$ 3.74	$ 1,028,844	
	7.024	Load, Haul and Place - Zone 2A - Filter	99,000	Tons					$ 3.35	$ 331,577	
	7.025	Load at stockpile and haul to fill location, 0.5 mile haul	20,091	LCY	$ 0.87	$ 2.77	$ -	$ -	$ 3.64	$ 73,104	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	Direct hauling from quarry	46,879	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	Spread and compact	66,971	LCY	$ 1.52	$ 2.34	$ -	$ -	$ 3.86	$ 258,473	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	104,500	Tons					$ 3.30	$ 345,181	
	7.028	Load at stockpile and haul to fill location, 0.5 mile haul	21,207	LCY	$ 0.82	$ 2.63	$ -	$ -	$ 3.45	$ 73,104	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	Direct hauling from quarry	49,484	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	Spread and compact	70,691	LCY	$ 1.52	$ 2.33	$ -	$ -	$ 3.85	$ 272,077	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	29,700	Tons					$ 3.60	$ 106,989	
	7.031	Load at stockpile and haul to fill location, 0.5 mile haul	6,027	LCY	$ 1.13	$ 3.08	$ -	$ -	$ 4.21	$ 25,366	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	Direct hauling from quarry	14,064	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	Spread and compact	20,091	LCY	$ 1.60	$ 2.46	$ -	$ -	$ 4.06	$ 81,623	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	7.034	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0341	Direct hauling from quarry	-	LCY						Elsewhere	
	7.035	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	7.037	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0371	Direct hauling from quarry	-	LCY						Elsewhere	
	7.038	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.039	Furnish and Install Zone 3 - Rockfill	155,000	ECY					$ 27.53	$ 4,267,353	
	7.040	Blasting operations	186,000	LCY	$ 4.28	$ 5.73	$ 4.85	$ -	$ 14.86	$ 2,764,151	Include 20% swell factor
	7.041	Excavate, load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	Crush and screen material	186,000	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	Load and haul to zone-3, 1 mile haul	186,000	LCY	$ 0.99	$ 3.36	$ -	$ -	$ 4.35	$ 809,407	No stockpiling required, direct haul
	7.044	Spread and compact	186,000	LCY	$ 1.47	$ 2.26	$ -	$ -	$ 3.73	$ 693,796	
	7.045	Furnish and Install Zone 4 - Random	380,000	ECY					$ 12.14	$ 4,612,916	
	7.046	Excavations in common soil	308,200	LCY	$ 1.42	$ 2.20	$ -	$ -	$ 3.62	$ 1,115,564	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	308,200	LCY	$ 1.25	$ 3.48	$ -	$ -	$ 4.73	$ 1,456,374	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	128,800	LCY	$ 0.79	$ 2.49	$ -	$ -	$ 3.28	$ 422,122	Include 15% swell factor
	7.050	Spread and compact	437,000	LCY	$ 1.46	$ 2.24	$ -	$ -	$ 3.70	$ 1,618,856	

24. Cost Work Sheet Summary: Saddle Dam 5

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.051	Furnish and Install Riprap	38,000	ECY					$ 40.35	$ 1,533,409	
	7.052	*Blasting operations*	*45,600*	*LCY*	*$ 4.37*	*$ 5.84*	*$ 4.85*	*$ -*	*$ 15.06*	*$ 686,674*	*Include 20% swell factor*
	7.053	*Load and haul to processing area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.054	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
	7.055	*Load and haul to fill location, 0.5 mile haul*	*45,600*	*LCY*	*$ 0.83*	*$ 2.61*	*$ -*	*$ -*	*$ 3.44*	*$ 156,788*	
	7.056	*Riprap placement*	*45,600*	*LCY*	*$ 6.02*	*$ 9.11*	*$ -*	*$ -*	*$ 15.13*	*$ 689,947*	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 348,833.33	$ 348,833.33	$ 348,833	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	1,700	CY					$ 87.40	$ 148,582	
	8.006	*Purchase and Import gravel to fill location and stockpile, 35 mi haul*	*1,955*	*LCY*	*$ 10.24*	*$ 11.01*	*$ 37.73*	*$ -*	*$ 58.98*	*$ 115,310*	*Include 15% swell factor*
	8.007	*Place and compact*	*1,955*	*LCY*	*$ 5.55*	*$ 11.47*	*$ -*	*$ -*	*$ 17.02*	*$ 33,272*	
	8.008	Developing haul routes - Haul routes inside reservoir	32	ACRES					$ 28,033.64	$ 897,076	Clear, grade, provide gravel fill layer and compact
	8.009	*Clear and grub*	*1,393,920*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 261,624*	
	8.0091	*Load and haul earth fill, 0.5 mile haul*	*25,813*	*CY*	*$ 2.14*	*$ 5.85*	*$ -*	*$ -*	*$ 7.99*	*$ 206,319*	*Use existing earth fill material from stockpile*
	8.010	*Grade and Compact surface for earthen road*	*1,393,920*	*SF*	*$ 0.13*	*$ 0.17*	*$ -*	*$ -*	*$ 0.31*	*$ 429,133*	
	8.011	Developing haul routes - Haul routes outside reservoir	21	ACRES					$ 28,490.25	$ 598,295	Clear, grade, provide gravel fill layer and compact
	8.012	*Clear and grub*	*914,760*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 170,056*	
	8.0121	*Load and haul earth fill, 0.5 mile haul*	*16,940*	*CY*	*$ 2.20*	*$ 6.01*	*$ -*	*$ -*	*$ 8.21*	*$ 139,041*	*Use existing earth fill material from stockpile*
	8.013	*Grade and Compact surface for earthen road*	*914,760*	*SF*	*$ 0.14*	*$ 0.18*	*$ -*	*$ -*	*$ 0.32*	*$ 289,199*	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	2,500	CY	$ 96.98	$ 51.61	$ 233.06	$ -	$ 381.65	$ 954,132	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	*Clay excavations from burrow area*	*-*	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.02	*Load and haul from stockpile to fill location, 0.5 mile haul*	*-*	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	*Place clay backfill material*	*-*	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.024	*Load and haul to processing area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.025	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.026	*Load and haul from stockpile to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.027	*Spread riprap*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 249,166.67	$ 249,166.67	$ 249,167	
9		Misc allowance for small items, allow 1%	1.0%	%				37,295,159	$ 37,295,159	$ 372,952	
		Total Direct Cost	42	Acre	$ 256,496.47	$ 391,590.36	$ 220,494.83	$ 28,278.11	$ 896,859.77	$ 37,668,110	

Sites Reservoir (Alt 2): Other Saddle Dams | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

25. Construction Cost Summary: Other Saddle Dams/Dikes

				Total Cost
Total Direct Cost				39,370,315
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				39,370,315
General Conditions				
Mobilization			5.0%	1,968,516
Site General Conditions & Requirements			10.0%	4,133,883
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	500,200
Bonds			0.6%	275,837
GC Home Office Overhead			6.0%	2,774,925
GC Profit			8.0%	3,921,894
Total Contractor Indirect Markups				13,575,255
TOTAL DIRECT COST BEFORE CONTINGENCIES				**52,945,570**
Contingencies				
Design Contingencies			10.0%	5,294,557
Construction Contingencies			15.0%	8,736,019
Total Contingency Allowance				14,030,576
TOTAL DIRECT COST BEFORE ESCALATION				**66,976,146**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	654,045
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**67,630,191**

25. Cost Work Sheet Summary: Other Saddle Dams/Dikes

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	26	ACRE	$ 3,195.11	$ 5,576.43	$ -	$ -	$ 8,771.55	$ 228,060	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	26	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 97,773	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	76,450	Tons					$ 37.35	$ 2,855,462	
	2.002	*Purchase processed material from quarry*	*76,450*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 1,696,922*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*51,716*	*LCY*	*$ 10.70*	*$ 11.70*	*$ -*	*$ -*	*$ 22.40*	*$ 1,158,540*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	80,100	Tons					$ 37.12	$ 2,973,259	
	2.005	*Purchase processed material from quarry*	*80,100*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 1,777,940*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*54,185*	*LCY*	*$ 10.54*	*$ 11.52*	*$ -*	*$ -*	*$ 22.06*	*$ 1,195,319*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	21,560	Tons					$ 37.55	$ 809,568	
	2.008	*Purchase processed material from quarry*	*21,560*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 478,557*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*14,585*	*LCY*	*$ 10.84*	*$ 11.85*	*$ -*	*$ -*	*$ 22.70*	*$ 331,011*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	52,000	BCY					$ 8.49	$ 441,701	
	3.002	*Excavations - remove top soil layer*	*57,200*	*LCY*	*$ 1.43*	*$ 2.23*	*$ -*	*$ -*	*$ 3.67*	*$ 209,764*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*57,200*	*LCY*	*$ 1.13*	*$ 2.93*	*$ -*	*$ -*	*$ 4.05*	*$ 231,937*	
	3.004	Dam Foundation Excavation - Common	43,000	BCY					$ 8.55	$ 367,738	
	3.005	*Excavations - remove top soil layer*	*47,300*	*LCY*	*$ 1.55*	*$ 2.21*	*$ -*	*$ -*	*$ 3.76*	*$ 177,971*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*47,300*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 189,767*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	93,100	BCY					$ 11.87	$ 1,104,659	
	3.008	*Rock excavations, no blasting*	*107,065*	*LCY*	*$ 2.55*	*$ 3.73*	*$ -*	*$ -*	*$ 6.28*	*$ 672,413*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*107,065*	*LCY*	*$ 1.12*	*$ 2.91*	*$ -*	*$ -*	*$ 4.04*	*$ 432,246*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	-	BCY					$ -	$ -	Not required
	3.011	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.012	*Excavate, load and haul to stockpile, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	8,700	SY					$ 12.90	$ 112,245	
	4.002	*Initial foundation core cleanup*	*8,700*	*SY*	*$ 7.75*	*$ 2.29*	*$ -*	*$ -*	*$ 10.04*	*$ 87,366*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*2,393*	*CY*	*$ 3.49*	*$ 6.91*	*$ -*	*$ -*	*$ 10.40*	*$ 24,879*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	8,700	SY					$ 10.04	$ 87,366	
	4.005	*Final foundation core cleanup*	*8,700*	*SY*	*$ 7.75*	*$ 2.29*	*$ -*	*$ -*	*$ 10.04*	*$ 87,366*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	760	CY					$ 122.75	$ 93,287	
	4.008	*Dental excavations*	*836*	*LCY*	*$ 69.06*	*$ 31.24*	*$ -*	*$ -*	*$ 100.30*	*$ 83,852*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*836*	*LCY*	*$ 4.15*	*$ 7.14*	*$ -*	*$ -*	*$ 11.29*	*$ 9,434*	
	4.010	Dental Concrete	760	CY	$ 44.26	$ 20.11	$ 183.12	$ -	$ 247.49	$ 188,093	
	4.011	Grout Cap with Anchors	2,500	CY	$ 79.05	$ 22.87	$ 519.68	$ 16.10	$ 637.70	$ 1,594,259	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	7,000	LF					$ 81.07	$ 567,517	
	4.013	*Drill setup for all holes*	*93*	*ea.*	*$ 218.64*	*$ 365.87*	*$ -*	*$ -*	*$ 584.50*	*$ 54,553*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*7,000*	*lft*	*$ 10.73*	*$ 11.57*	*$ -*	*$ -*	*$ 22.30*	*$ 156,129*	
	4.015	*Redrill grout holes*	*700*	*lft*	*$ 11.93*	*$ 12.86*	*$ -*	*$ -*	*$ 24.78*	*$ 17,348*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*350*	*ea.*	*$ 94.95*	*$ -*	*$ -*	*$ -*	*$ 94.95*	*$ 33,233*	
	4.017	*Inject portland cement grout*	*467*	*hr*	*$ 486.51*	*$ 100.29*	*$ -*	*$ -*	*$ 586.80*	*$ 273,840*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*93*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 32,415*	
	4.019	Consolidation Grouting	-	LF					$ -	$ -	Not required
	4.020	*Drill setup for all holes*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.021	*Drill curtain grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Redrill grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Hookup to grout holes and grout nipples*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	*Inject portland cement grout*	*-*	*hr*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.025	*Perform hydraulic conductivity tests*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	Type III Cement	250	Tons	$ 181.13	$ 74.82	$ 113.14	$ -	$ 369.09	$ 92,272	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	

25. Cost Work Sheet Summary: Other Saddle Dams/Dikes

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	20,400	SY					$ 3.89	$ 79,414	
	5.002	*Initial dam shell cleanup*	*20,400*	*SY*	*$ 1.39*	*$ 0.42*	*$ -*	*$ -*	*$ 1.81*	*$ 36,960*	
	5.003	*Load and haul to disposal area, 0.5 mile haul*	*3,740*	*LCY*	*$ 4.17*	*$ 7.18*	*$ -*	*$ -*	*$ 11.35*	*$ 42,454*	*Assume removal of top layer, 0.5' thick*
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	1,056	LF	$ 45.17	$ 28.03	$ 35.56	$ -	$ 108.76	$ 114,847	
	6.002	Furnish and Install Foundation Drain Manholes	4	EA	$ 1,252.73	$ 762.78	$ 3,070.88	$ -	$ 5,086.39	$ 20,346	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	112,400	BCY					$ 7.66	$ 860,507	Assumed common earth, 3000' haul w/ scraper
	7.003	*Embankment excavations*	*123,640*	*LCY*	*$ 1.00*	*$ 2.74*	*$ -*	*$ -*	*$ 3.74*	*$ 462,309*	*Include 10% swell factor*
	7.004	*Load and haul to site stockpile, 0.25 mile haul*	*123,640*	*LCY*	*$ 0.86*	*$ 2.36*	*$ -*	*$ -*	*$ 3.22*	*$ 398,198*	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	92,200	BCY					$ 9.02	$ 831,664	
	7.006	*Embankment excavations*	*101,420*	*LCY*	*$ 1.43*	*$ 3.03*	*$ -*	*$ -*	*$ 4.46*	*$ 452,130*	*Include 10% swell factor*
	7.007	*Load and haul to site stockpile, 0.25 mile haul*	*101,420*	*LCY*	*$ 1.04*	*$ 2.70*	*$ -*	*$ -*	*$ 3.74*	*$ 379,533*	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	Not required
	7.009	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.010	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	Not required
	7.012	*Embankment excavations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.013	*Load and haul to site stockpile, 0.25 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	51,150	ECY					$ 7.30	$ 373,307	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	*Load and haul to site stockpile, 0.25 mile haul*	*56,265*	*LCY*	*$ 1.34*	*$ 3.14*	*$ -*	*$ -*	*$ 4.48*	*$ 252,175*	
	7.016	*Spread and compact*	*56,265*	*LCY*	*$ 1.19*	*$ 0.96*	*$ -*	*$ -*	*$ 2.15*	*$ 121,132*	
	7.017	Topsoil Replacement	42,225	ECY					$ 10.02	$ 423,056	Backfill burrow area using material from stockpile
	7.018	*Excavate, Load and haul excavated backfill material to fill location, 1 mile haul*	*46,448*	*LCY*	*$ 1.80*	*$ 5.18*	*$ -*	*$ -*	*$ 6.97*	*$ 323,948*	
	7.019	*Spread and compact*	*46,448*	*LCY*	*$ 1.18*	*$ 0.96*	*$ -*	*$ -*	*$ 2.13*	*$ 99,108*	
	7.020	Furnish and Install Zone 1 - Core	190,000	ECY					$ 13.17	$ 2,502,610	
	7.021	*Excavate from burrow area*	*209,000*	*LCY*	*$ 1.45*	*$ 3.06*	*$ -*	*$ -*	*$ 4.51*	*$ 941,938*	*Include 10% swell factor*
	7.022	*Load and haul to zone-1 fill location, 0.25 mile haul*	*209,000*	*LCY*	*$ 1.15*	*$ 2.59*	*$ -*	*$ -*	*$ 3.74*	*$ 781,547*	*No stockpiling required*
	7.023	*Spread and compact*	*209,000*	*LCY*	*$ 1.51*	*$ 2.22*	*$ -*	*$ -*	*$ 3.73*	*$ 779,125*	
	7.024	Load, Haul and Place - Zone 2A - Filter	76,450	Tons					$ 3.32	$ 253,869	
	7.025	*Load at stockpile and haul to fill location, 0.5 mile haul*	*15,515*	*LCY*	*$ 1.10*	*$ 2.99*	*$ -*	*$ -*	*$ 4.09*	*$ 63,415*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0251	*Direct hauling from quarry*	*36,201*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.026	*Spread and compact*	*51,716*	*LCY*	*$ 1.45*	*$ 2.23*	*$ -*	*$ -*	*$ 3.68*	*$ 190,454*	*Include 15% swell factor*
	7.027	Load, Haul and Place - Zone 2A - Drain	80,100	Tons					$ 3.34	$ 267,472	
	7.028	*Load at stockpile and haul to fill location, 0.5 mile haul*	*16,256*	*LCY*	*$ 1.05*	*$ 2.85*	*$ -*	*$ -*	*$ 3.90*	*$ 63,415*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0281	*Direct hauling from quarry*	*37,930*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.029	*Spread and compact*	*54,185*	*LCY*	*$ 1.49*	*$ 2.28*	*$ -*	*$ -*	*$ 3.77*	*$ 204,058*	*Include 15% swell factor*
	7.030	Load, Haul and Place - Zone 2A - Transition	21,560	Tons					$ 3.70	$ 79,781	
	7.031	*Load at stockpile and haul to fill location, 0.5 mile haul*	*4,375*	*LCY*	*$ 1.56*	*$ 4.24*	*$ -*	*$ -*	*$ 5.80*	*$ 25,366*	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0311	*Direct hauling from quarry*	*10,209*	*LCY*						*Elsewhere*	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.032	*Spread and compact*	*14,585*	*LCY*	*$ 1.47*	*$ 2.26*	*$ -*	*$ -*	*$ 3.73*	*$ 54,415*	*Include 15% swell factor*
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	7.034	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.0341	*Direct hauling from quarry*	*-*	*LCY*						*Elsewhere*	
	7.035	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	7.037	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.0371	*Direct hauling from quarry*	*-*	*LCY*						*Elsewhere*	
	7.038	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	7.039	Furnish and Install Zone 3 - Rockfill	92,000	ECY					$ 28.78	$ 2,647,751	
	7.040	*Blasting operations*	*110,400*	*LCY*	*$ 4.30*	*$ 5.75*	*$ 4.85*	*$ -*	*$ 14.90*	*$ 1,645,509*	*Include 20% swell factor*
	7.041	*Excavate, load and haul to stockpile, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling required, material to be hauled to fill location directly*
	7.042	*Crush and screen material*	*110,400*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
	7.043	*Load and haul to zone-3, 2 mile haul*	*110,400*	*LCY*	*$ 1.17*	*$ 4.21*	*$ -*	*$ -*	*$ 5.38*	*$ 594,127*	*No stockpiling required, direct haul*
	7.044	*Spread and compact*	*110,400*	*LCY*	*$ 1.46*	*$ 2.24*	*$ -*	*$ -*	*$ 3.70*	*$ 408,115*	
	7.045	Furnish and Install Zone 4 - Random	306,000	ECY					$ 14.16	$ 4,332,307	
	7.046	*Excavations in common soil*	*430,100*	*LCY*	*$ 1.42*	*$ 2.21*	*$ -*	*$ -*	*$ 3.64*	*$ 1,563,697*	*No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor*
	7.047	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	7.048	*Direct hauling from quarry excavation, 1 mile haul*	*430,100*	*LCY*	*$ 1.12*	*$ 2.90*	*$ -*	*$ -*	*$ 4.02*	*$ 1,728,985*	*Include 15% swell factor, no stockpiling required, direct haul*
	7.049	*Load at stockpile and haul to fill location, 0.5 mile haul*	*(78,200)*	*LCY*	*$ 0.91*	*$ 2.49*	*$ -*	*$ -*	*$ 3.41*	*$ (266,343)*	*Include 15% swell factor*
	7.050	*Spread and compact*	*351,900*	*LCY*	*$ 1.46*	*$ 2.25*	*$ -*	*$ -*	*$ 3.71*	*$ 1,305,968*	

25. Cost Work Sheet Summary: Other Saddle Dams/Dikes

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.051	Furnish and Install Riprap	24,400	ECY					$ 40.75	$ 994,283	
	7.052	Blasting operations	29,280	LCY	$ 4.45	$ 5.95	$ 4.85	$ -	$ 15.25	$ 446,383	Include 20% swell factor
	7.053	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	29,280	LCY	$ 0.93	$ 2.54	$ -	$ -	$ 3.47	$ 101,464	
	7.056	Riprap placement	29,280	LCY	$ 6.06	$ 9.18	$ -	$ -	$ 15.25	$ 446,436	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 448,500.00	$ 448,500.00	$ 448,500	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	1,800	CY					$ 92.65	$ 166,768	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	2,070	LCY	$ 12.89	$ 13.87	$ 37.73	$ -	$ 64.49	$ 133,496	Include 15% swell factor
	8.007	Place and compact	2,070	LCY	$ 5.24	$ 10.83	$ -	$ -	$ 16.07	$ 33,272	
	8.008	Developing haul routes - Haul routes inside reservoir	48	ACRES					$ 28,033.64	$ 1,345,615	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	2,090,880	SF	$ 0.07	$ 0.11	$ -	$ -	$ 0.19	$ 392,436	
	8.0091	Load and haul earth fill	38,720	CY	$ 2.14	$ 5.85	$ -	$ -	$ 7.99	$ 309,478	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	2,090,880	SF	$ 0.13	$ 0.17	$ -	$ -	$ 0.31	$ 643,700	
	8.011	Developing haul routes - Haul routes outside reservoir	32	ACRES					$ 30,193.52	$ 966,193	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	1,393,920	SF	$ 0.07	$ 0.11	$ -	$ -	$ 0.19	$ 261,624	
	8.0121	Load and haul earth fill	25,813	CY	$ 2.77	$ 7.90	$ -	$ -	$ 10.67	$ 275,435	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	1,393,920	SF	$ 0.13	$ 0.17	$ -	$ -	$ 0.31	$ 429,133	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	550	CY	$ 92.81	$ 49.38	$ 174.80	$ -	$ 316.99	$ 174,344	
	8.016	Concrete for spillway	10,000	CY							
	8.017	Spillway walls, reinforced concrete	273	CY					$ 1,256.19	$ 342,940	
	8.018	Formwork	2,600	SF	$ 19.82	$ 0.38	$ 5.24	$ -	$ 25.44	$ 66,152	
	8.019	Concrete	420	CY	$ 43.86	$ 10.55	$ 233.06	$ -	$ 287.47	$ 120,739	
	8.02	Reinforcement	52.50	TON	$ 59.07	$ -	$ 2,913.29	$ -	$ 2,972.36	$ 156,049	Allow reinforcement of 250 lbs/cy
	8.021	Spillway slab concrete, reinforced concrete	500	CY					$ 642.34	$ 321,170	
	8.022	Formwork	2,500	SF	$ 20.61	$ 0.39	$ 5.24	$ -	$ 26.25	$ 65,628	Allow formwork of 5SF/CY
	8.023	Concrete	500	CY	$ 42.99	$ 10.34	$ 233.06	$ -	$ 286.39	$ 143,193	
	8.024	Reinforcement	37.50	TON	$ 82.70	$ -	$ 2,913.29	$ -	$ 2,995.99	$ 112,350	Allow reinforcement of 150 lbs/cy
	8.025	Spillway mass concrete	9,227	CY					$ 311.47	$ 2,873,912	
	8.026	Formwork	-	SF						Not required	
	8.027	Concrete	9,227	CY	$ 89.20	$ 47.47	$ 174.80	$ -	$ 311.47	$ 2,873,912	
	8.028	Reinforcement	-	TON						Not required	
	8.029	Bridge	550	SF	$ -	$ -	$ -	$ 492.86	$ 492.86	$ 271,071	
	8.030	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.031	Clay Backfill	11,000	CY					$ 21.08	$ 231,883	
	8.032	Clay excavations from burrow area	13,200	LCY	$ 1.86	$ 2.64	$ -	$ -	$ 4.49	$ 59,324	
	8.033	Load and haul from stockpile to fill location, 1 mile haul	13,200	LCY	$ 1.33	$ 3.46	$ -	$ -	$ 4.79	$ 63,256	
	8.034	Place clay backfill material	13,200	LCY	$ 3.32	$ 4.96	$ -	$ -	$ 8.28	$ 109,304	
	8.035	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.036	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.037	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.038	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.039	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.040	Rip rap placement	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.041	Rim Grouting	51,300	LF	$ -	$ -	$ -	$ 120.75	$ 120.75	$ 6,194,475	Includes clearing & grubbing, furnishing cement material, drill setup for holes, soil drilling to rock, drill curtain holes in rock, grout backfill, hydroseed area.
	8.042	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 249,166.67	$ 249,166.67	$ 249,167	Allowance
9		Misc allowance for small items, allow 1%	1.0%	%				38,980,510	$ 38,980,510	$ 389,805	
		Total Direct Cost	49	Acre	$ 193,212.28	$ 280,445.28	$ 172,196.71	$ 157,621.55	$ 803,475.82	$ 39,370,315	

Sites Reservoir (Alt 2): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

26. Construction Cost Summary: Inlet/Outlet & Diversion Works

				Total Cost
Total Direct Cost				167,233,813
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				167,233,813
General Conditions				
Mobilization			5.0%	8,361,691
Site General Conditions & Requirements			10.0%	17,559,550
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	2,124,706
Bonds			0.6%	1,171,679
GC Home Office Overhead			6.0%	11,787,086
GC Profit			8.0%	16,659,082
Total Contractor Indirect Markups				57,663,794
TOTAL DIRECT COST BEFORE CONTINGENCIES				**224,897,607**
Contingencies				
Design Contingencies			10.0%	22,489,761
Construction Contingencies			15.0%	37,108,105
Total Contingency Allowance				59,597,866
TOTAL DIRECT COST BEFORE ESCALATION				**284,495,473**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2,778,194
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST				**287,273,667**

26. Cost Work Sheet Summary: Inlet/Outlet & Diversion Works

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ -**	Included within Sites Dam Estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.023	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.024	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.025	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.027	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*BCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.030	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.040	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
11		**ERS Facility 1**								**$ -**	Not required
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.003	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.004	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.005	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.007	*3.5" diam grouted hole with #8 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 0.5 mi assumed*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.010	*Backfill: Compact and grade*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	11.012	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	

26. Cost Work Sheet Summary: Inlet/Outlet & Diversion Works

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		**ERS Facility 2**								**$ -**	Not required
	12.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.003	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.007	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	12.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	12.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	12.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
13		**IO Facility**								**$ 165,578,032**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	9	ACRE	$ 1,230.71	$ 2,147.96	$ -	$ -	$ 3,379	$ 30,408	Light vegetation removal
	13.003	Erosion and Sediment Control	9	ACRE	$ -	$ -	$ -	$ 3,761	$ 3,761	$ 33,845	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	540.00	LF					$ 450.72	$ 243,388	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	2.00	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ 50,000	
	13.007	Foundation piles - drilled piers	540.00	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ 89,100	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	41	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ 104,288	Allow 150lbs/cy
	13.010	Pile testing allowance	15.0%	%	$ -	$ -	$ -	$ 243,387.50	$ 243,387.50	$ 36,508	
	13.011	Pile cap / base slab	489	CY					$ 652.70	$ 319,186	5' thick base slab
	13.012	Cast in place concrete	489	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 159,828	36" thick slab
	13.013	Formwork	911	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 23,106	Formwork to sides
	13.014	Concrete reinforcement	37	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 136,251	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	7,936	CY							246' height tower for Alt 2
	13.016	Walls	7,102	CY					$ 1,133.76	$ 8,051,876	
	13.017	Cast in place concrete	7,102	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 2,321,132	Average 4' thick
	13.018	Formwork	95,876	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 2,432,863	
	13.019	Concrete reinforcement	888	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 3,297,881	Allow 250lbs/cy
	13.020	Slabs - elevated decks	722	CY					$ 833.82	$ 602,020	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	Cast in place concrete	722	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 235,971	36" thick slab
	13.022	Formwork	6,498	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 164,887	
	13.023	Concrete reinforcement	54	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 201,162	Allow 150lbs/cy

26. Cost Work Sheet Summary: Inlet/Outlet & Diversion Works

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.026	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Allow 30sf/cy
	13.027	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Allow 200lbs/cy
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.030	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	13.031	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	13.032	Bridge Piers	112	CY					$ 1,459.57	$ 163,472	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	Cast in place concrete	112	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 36,605	
	13.034	Formwork	3,360	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 85,260	Allow 30sf/cy
	13.035	Concrete reinforcement	11	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 41,607	Allow 200lbs/cy
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	1	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	1	LS						Included below	
	13.038	Metal ladders	254	LF	$ -	$ -	$ -	$ 3,552.50	$ 3,552.50	$ 904,050	As per May 2020 NODOS Estimate
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 507.50	$ 507.50	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	18	EA	$ -	$ -	$ -	$ 384,583.50	$ 384,583.50	$ 6,922,503	As per May 2020 NODOS Estimate
	13.041	Moveable screens and hoists	6	EA	$ -	$ -	$ -	$ 76,125.00	$ 76,125.00	$ 456,750	As per May 2020 NODOS Estimate
	13.042	Sliding steel plates and hoists	6	EA	$ -	$ -	$ -	$ 101,500.00	$ 101,500.00	$ 609,000	As per May 2020 NODOS Estimate
	13.043	8 ton jib crane	1	EA	$ -	$ -	$ -	$ 121,800.00	$ 121,800.00	$ 121,800	As per May 2020 NODOS Estimate
	13.044	12 ft x 30 ft inlet tunnel roller gate	2	EA	$ -	$ -	$ -	$ 1,888,915.00	$ 1,888,915.00	$ 3,777,830	As per May 2020 NODOS Estimate
	13.045	12 ft x 25 ft outlet tunnel roller gates	4	EA	$ -	$ -	$ -	$ 1,609,790.00	$ 1,609,790.00	$ 6,439,160	As per May 2020 NODOS Estimate
	13.046	Other Metals Intake Tower	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
	13.047	Painting	1	LS	$ -	$ -	$ -	$ 50,750.00	$ 50,750.00	$ 50,750	As per May 2020 NODOS Estimate
		Access bridge									
	13.048	Access bridge	10,000	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ 5,000,000	Assume 500' x 20' wide bridge
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	6,222	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ 52,834,051	As per May 2020 NODOS Estimate
	13.051	Concrete Liner	5,712	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ 51,883,438	As per May 2020 NODOS Estimate
	13.052	Steel Liner	510	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ 5,267,089	As per May 2020 NODOS Estimate
	13.053	**Lower Intake Channel**	475,000	CY					$ 38.28	$ 18,180,797	
	13.054	Excavations in common material	432,250	LCY	$ 6.00	$ 9.00	$ -	$ -	$ 15.00	$ 6,483,750	Assume 70% in common earth and 30% rock; include a 30% swell factor
	13.055	Excavations in rock	185,250	LCY	$ 10.50	$ 24.50	$ -	$ -	$ 35.00	$ 6,483,750	
	13.056	Haul to disposal site, 0.5 mile haul	617,500	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 4,322,500	
	13.057	Shotcrete portal face	1,387	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 443,769	
	13.058	Steel fiber for shotcrete	21	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 27,042	
	13.059	20 ft rock bolts, 8 ft on center - Drilling	880	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 220,000	
	13.060	3.5" diam grouted hole with #8 bar	40	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 199,986	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	63,000	CY					$ 49.88	$ 3,142,613	
	13.062	Excavate and load material	81,900	LCY	$ 10.00	$ 15.00	$ -	$ -	$ 25.00	$ 2,047,500	
	13.063	Haul to disposal site, 0.5 mile haul	81,900	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 573,300	
	13.064	Shotcrete portal face	813	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 260,172	
	13.065	Steel fiber for shotcrete	12	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 15,854	
	13.066	20 ft rock bolts, 8 ft on center - Drilling	515	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 128,750	
	13.067	3.5" diam grouted hole with #8 bar	23	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 117,037	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
14		Misc allowance for small items, allow 1%	1.0%	%				165,578,032	$ 165,578,032	$ 1,655,780	
		Total Direct Cost	42	Acre	$ 239,637.13	$ 345,338.09	$ 146,780.95	$ 3,250,001.28	$ 3,981,757.45	$ 167,233,813	

Sites Reservoir (Alt 2): South Road | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.01. Construction Cost Summary: South Road

				Unit Cost Rate ($/LF)	Total Cost
			LF:	103,512	
Total Direct Cost				2,347.89	243,034,541
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				2,347.89	243,034,541
General Conditions					
Mobilization			3.0%	70.44	7,291,036
Site General Conditions & Requirements			10.0%	241.83	25,032,558
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	29.26	3,028,939
Bonds			0.6%	16.14	1,670,322
GC Field and Home Office Overhead			5.0%	135.28	14,002,870
GC Profit			5.0%	142.04	14,703,013
Total Contractor Indirect Markups				634.99	65,728,738
TOTAL DIRECT COST BEFORE CONTINGENCIES				**2,982.87**	**308,763,279**
Contingencies					
Design Contingencies			25.0%	745.72	77,190,820
Construction Contingencies			15.0%	559.29	57,893,115
Total Contingency Allowance				1,305.01	135,083,935
TOTAL DIRECT COST BEFORE ESCALATION				**4,287.88**	**443,847,214**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	41.87	4,334,317
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**4,329.75**	**448,181,531**

27.01. Cost Work Sheet Summary: Sites Lodoga Road Realignment

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		South Road									
		Road length (LF)	103,512	LF							
		Road length (Miles)	20	MILES							
		Road Area (SF)	3,519,408	SF							
		Road Area (SY)	391,045	SY							
		Road Area (Acre)	81	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Elsewhere	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	*Included elsewhere*
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	153	ACRE	$ 1,084.36	$ 1,784.56	$ -	$ -	$ 2,868.92	$ 438,945	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	86,400	LF					$ 3.90	$ 336,666	
	2.002	*Setup temporary silt fence*	*86,400*	*LF*	*$ 1.77*	*$ 0.72*	*$ 0.44*	*$ -*	*$ 2.94*	*$ 254,034*	
	2.003	*Silt fence removal*	*86,400*	*LF*	*$ 0.62*	*$ 0.27*	*$ -*	*$ 0.07*	*$ 0.96*	*$ 82,632*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	8,891,000	CY					$ 10.15	$ 90,247,945	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*10,224,650*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.26*	*$ 43,577,109*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*10,224,650*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.56*	*$ 46,670,836*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	1,413,600	CY					$ 10.72	$ 15,157,804	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*1,625,640*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.26*	*$ 6,929,496*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*1,625,640*	*LCY*	*$ 1.48*	*$ 3.58*	*$ -*	*$ -*	*$ 5.06*	*$ 8,228,308*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	1,383,200	CY					$ 20.02	$ 27,688,273	Excavated material to be stockpiled for re-use, average 2 mile haul
	2.017	*Blasting operations*	*497,952*	*LCY*	*$ 4.26*	*$ 4.07*	*$ 4.85*	*$ -*	*$ 13.19*	*$ 6,566,053*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*1,161,888*	*LCY*	*$ 2.88*	*$ 3.71*	*$ -*	*$ -*	*$ 6.59*	*$ 7,653,184*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 2 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 2 mile haul*	*1,659,840*	*LCY*	*$ 2.23*	*$ 5.88*	*$ -*	*$ -*	*$ 8.11*	*$ 13,469,036*	*Haul to stockpile location, 2 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	3,831,400	CY					$ 9.71	$ 37,200,219	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*4,214,540*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.26*	*$ 17,962,492*	*Include 10% swell factor*
	2.025	*Load and haul to fill location, 0.25 mile haul*	*4,214,540*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.56*	*$ 19,237,727*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	3,831,300	CY					$ 6.49	$ 24,881,785	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*3,831,300*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*3,831,300*	*LCY*	*$ 3.32*	*$ 3.17*	*$ -*	*$ -*	*$ 6.49*	*$ 24,881,785*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	65,100	CY					$ 60.80	$ 3,957,844	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*110,670*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 1,676,552*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*74,865*	*LCY*	*$ 10.29*	*$ 12.07*	*$ -*	*$ -*	*$ 22.36*	*$ 1,673,953*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*74,865*	*LCY*	*$ 4.17*	*$ 3.94*	*$ -*	*$ -*	*$ 8.11*	*$ 607,339*	
	3.013	Class 2 Aggregate base	65,100	CY					$ 60.80	$ 3,957,844	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*110,670*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 1,676,552*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*74,865*	*LCY*	*$ 10.29*	*$ 12.07*	*$ -*	*$ -*	*$ 22.36*	*$ 1,673,953*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*74,865*	*LCY*	*$ 4.17*	*$ 3.94*	*$ -*	*$ -*	*$ 8.11*	*$ 607,339*	
	3.018	Asphalt concrete	88,000	TON	$ 8.63	$ 4.76	$ 102.88	$ -	$ 116.27	$ 10,231,320	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	65	TON	$ 915.63	$ 459.29	$ 2,500.93	$ -	$ 3,875.84	$ 252,317	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton

27.01. Cost Work Sheet Summary: Sites Lodoga Road Realignment

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	10,351	LF	$ 5.38	$ 2.39	$ 43.53	$ -	$ 51.29	$ 530,960	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	12,180	LF					$ 95.96	$ 1,168,831	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*9,079*	*LCY*	*$ 4.23*	*$ 4.11*	*$ -*	*$ -*	*$ 8.35*	*$ 75,765*	
	4.007	*Load and haul material to disposal site, 0.5 mile haul*	*9,079*	*LCY*	*$ 3.63*	*$ 6.56*	*$ -*	*$ -*	*$ 10.19*	*$ 92,490*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*12,180*	*LF*	*$ 35.99*	*$ 6.94*	*$ 32.10*	*$ -*	*$ 75.03*	*$ 913,856*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*9,079*	*LCY*	*$ 1.32*	*$ 3.93*	*$ -*	*$ -*	*$ 5.25*	*$ 47,682*	
	4.010	*Sand Bedding*	*789*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 39,038*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	207,024	LF	$ 0.24	$ 0.15	$ 0.70	$ -	$ 1.09	$ 225,381	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	207,024	LF	$ 0.24	$ 0.15	$ 0.70	$ -	$ 1.09	$ 225,381	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	104	EA	$ 247.10	$ 105.52	$ 562.46	$ -	$ 915.07	$ 95,167	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	1,143,000	SF	$ 0.05	$ 0.02	$ 0.07	$ -	$ 0.14	$ 160,930	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	144.00	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 30,357	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	432	EA	$ 38.43	$ 14.94	$ 71.96	$ -	$ 125.33	$ 54,144	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.020	Retaining walls (Allowance)	327,000	SF					$ 72.74	$ 23,786,145	
	4.021	*Setting and removing formwork*	*654,000*	*SF*	*$ 9.54*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.01*	*$ 7,856,463*	
	4.022	*Concrete fill work*	*24,222*	*CY*	*$ 30.42*	*$ 7.31*	*$ 224.18*	*$ -*	*$ 261.92*	*$ 6,344,338*	*Assume wall 24" thick, 5000psi concrete*
	4.023	*Provide/Install Reinforcing*	*2,422*	*TON*	*$ 1,093.97*	*$ 60.98*	*$ 2,802.31*	*$ -*	*$ 3,957.25*	*$ 9,585,344*	*Allow 200lbs/cy*
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	Not required
	4.028	*Load and haul to stockpile location, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	Assume 40% of material to be stockpiled (double handling allowance)
	4.029	*Load and haul from stockpile to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	40% of material to be double handled
	4.030	*Load and direct haul from excavations to fill location, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	Direct haul to fill location, 60% of material to be hauled directly
	4.031	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	RSP backing	-	CY					$ -	$ -	
	4.033	*Load and haul material from stockpile to fill location, 2 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.034	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.035	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	
	4.036	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	-	MILE	$ -	$ -	$ -	$ -	$ -	$ -	Not required
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1%	1.0%	%				$ 240,628,258	$ 240,628,258	$ 2,406,283	
		Total Direct Cost	103,512	LF	$ 883.28	$ 1,150.46	$ 290.47	$ 23.68	$ 2,347.89	$ 243,034,541	

Sites Reservoir (Alt 2): North Access Road 69 and Saddle Dam Roads | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.03. Construction Cost Summary: North Access Road 69 and Saddle Dam Roads

				Unit Cost Rate ($/LF)	Total Cost
			LF:	56,623	
Total Direct Cost				271.43	15,369,166
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				271.43	15,369,166
General Conditions					
Mobilization			5.0%	13.57	768,458
Site General Conditions & Requirements			10.0%	28.50	1,613,762
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	3.45	195,265
Bonds			0.6%	1.90	107,680
GC Field and Home Office Overhead			5.0%	15.94	902,717
GC Profit			5.0%	16.74	947,852
Total Contractor Indirect Markups				80.10	4,535,734
TOTAL DIRECT COST BEFORE CONTINGENCIES				**351.53**	**19,904,900**
Contingencies					
Design Contingencies			10.0%	35.15	1,990,490
Construction Contingencies			15.0%	58.00	3,284,309
Bidding Contingencies / Alternative Procurement Strategy (APS)			0.0%	-	-
Total Contingency Allowance				93.16	5,274,799
TOTAL DIRECT COST BEFORE ESCALATION				**444.69**	**25,179,699**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	4.34	245,888
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**449.03**	**25,425,587**

27.03. Cost Work Sheet Summary: North Access Road 69 and Saddle Dam Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		North Access Road 69 and Saddle Dam Roads									
		Road length (LF)	56,623	LF							
		Road length (Miles)	11	MILES							
		Road Area (SF)	1,019,214	SF							
		Road Area (SY)	113,246	SY							
		Road Area (Acre)	24	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	76	ACRE	$ 1,091.50	$ 1,796.30	$ -	$ -	$ 2,887.80	$ 219,472	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	14,000	LF					$ 4.52	$ 63,288	
	2.002	*Setup temporary silt fence*	*14,000*	*LF*	*$ 1.83*	*$ 0.74*	*$ 0.44*	*$ -*	*$ 3.01*	*$ 42,161*	
	2.003	*Silt fence removal*	*14,000*	*LF*	*$ 0.77*	*$ 0.33*	*$ -*	*$ 0.41*	*$ 1.51*	*$ 21,126*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	383,400	CY					$ 10.18	$ 3,901,747	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*440,910*	*LCY*	*$ 2.10*	*$ 2.18*	*$ -*	*$ -*	*$ 4.27*	*$ 1,883,997*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*440,910*	*LCY*	*$ 1.37*	*$ 3.21*	*$ -*	*$ -*	*$ 4.58*	*$ 2,017,750*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	72,200	CY					$ 10.95	$ 790,351	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*83,030*	*LCY*	*$ 2.14*	*$ 2.22*	*$ -*	*$ -*	*$ 4.35*	*$ 361,314*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*83,030*	*LCY*	*$ 1.51*	*$ 3.65*	*$ -*	*$ -*	*$ 5.17*	*$ 429,037*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	35,400	CY					$ 21.59	$ 764,203	Excavated material to be stockpiled for re-use, average 2 mile haul
	2.017	*Blasting operations*	*12,744*	*LCY*	*$ 4.81*	*$ 4.60*	*$ 4.85*	*$ -*	*$ 14.26*	*$ 181,695*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*29,736*	*LCY*	*$ 2.90*	*$ 3.73*	*$ -*	*$ -*	*$ 6.63*	*$ 197,155*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 2 mile haul*	*42,480*	*LCY*	*$ 2.50*	*$ 6.57*	*$ -*	*$ -*	*$ 9.07*	*$ 385,354*	*Haul to stockpile location, 2 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	266,000	CY					$ 9.75	$ 2,592,257	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*292,600*	*LCY*	*$ 2.10*	*$ 2.18*	*$ -*	*$ -*	*$ 4.28*	*$ 1,251,697*	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*292,600*	*LCY*	*$ 1.37*	*$ 3.21*	*$ -*	*$ -*	*$ 4.58*	*$ 1,340,560*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	266,000	CY					$ 6.91	$ 1,837,417	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*266,000*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*266,000*	*LCY*	*$ 3.66*	*$ 3.25*	*$ -*	*$ -*	*$ 6.91*	*$ 1,837,417*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	12,100	CY					$ 63.28	$ 765,707	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*20,570*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 311,617*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*13,915*	*LCY*	*$ 11.08*	*$ 12.98*	*$ -*	*$ -*	*$ 24.06*	*$ 334,791*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*13,915*	*LCY*	*$ 4.41*	*$ 4.16*	*$ -*	*$ -*	*$ 8.57*	*$ 119,299*	
	3.013	Class 2 Aggregate base	48,700	CY					$ 60.73	$ 2,957,555	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*82,790*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 1,254,195*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*56,005*	*LCY*	*$ 10.26*	*$ 12.02*	*$ -*	*$ -*	*$ 22.28*	*$ 1,247,856*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*56,005*	*LCY*	*$ 4.18*	*$ 3.95*	*$ -*	*$ -*	*$ 8.13*	*$ 455,505*	
	3.018	Asphalt concrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	3.019	Tack Coat	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	5,662	LF	$ 5.36	$ 2.38	$ 43.53	$ -	$ 51.27	$ 290,316	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'

27.03. Cost Work Sheet Summary: North Access Road 69 and Saddle Dam Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.003	Transition Railing (Type WB-31)	8	EA	$ 1,260.28	$ 1,121.83	$ 2,693.75	$ -	$ 5,075.86	$ 40,607	Assume 4 at each culvert crossing, assume wood posts
	4.004	End Anchor Assembly (Type SFT)	8	EA	$ 1,260.28	$ 1,121.83	$ 592.63	$ -	$ 2,974.73	$ 23,798	Assume 4 at each culvert crossing, assume wood posts
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	2,080	LF					$ 104.52	$ 217,411	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*1,550*	*LCY*	*$ 5.22*	*$ 5.07*	*$ -*	*$ -*	*$ 10.29*	*$ 15,950*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*1,550*	*LCY*	*$ 5.38*	*$ 11.42*	*$ -*	*$ -*	*$ 16.80*	*$ 26,048*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*2,080*	*LF*	*$ 36.06*	*$ 6.95*	*$ 32.11*	*$ -*	*$ 75.12*	*$ 156,250*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*1,550*	*LCY*	*$ 2.19*	*$ 5.87*	*$ -*	*$ -*	*$ 8.06*	*$ 12,497*	
	4.010	*Sand Bedding*	*135*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 6,667*	
	4.011	Box culvert single cell	2	EA	$ 1,241.68	$ 489.20	$ 10,020.75	$ -	$ 11,751.62	$ 23,503	Assume 8' long, 12' x 8'
	4.012	Paint Traffic Stripe - 6" Yellow	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.013	Paint Traffic Stripe - 6" White	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.014	Roadside Signs	57	EA	$ 300.56	$ 128.35	$ 562.46	$ -	$ 991.37	$ 56,508	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	172,800	SF	$ 0.06	$ 0.03	$ 0.07	$ -	$ 0.16	$ 27,508	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	29.33	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 6,184	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	110	EA	$ 41.17	$ 16.01	$ 71.96	$ -	$ 129.13	$ 14,204	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.020	Retaining walls (Allowance)	-	SF					$ -	$ -	Not required
	4.021	*Setting and removing formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Concrete fill work*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Provide/Install Reinforcing*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	11	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 550,000	Not required
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 15,142,036	$ 15,142,036	$ 227,131	
		Total Direct Cost	56,623	LF	$ 95.35	$ 125.90	$ 36.23	$ 13.94	$ 271.43	$ 15,369,166	

Sites Reservoir (Alt 2): County, Delevan & Maxwell Roads | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.04. Construction Cost Summary: County, Delevan & Maxwell Roads

				Unit Cost Rate ($/LF)	Total Cost
			LF:	112,356	
Total Direct Cost				155.28	17,447,045
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				155.28	17,447,045
General Conditions					
Mobilization			5.0%	7.76	872,352
Site General Conditions & Requirements			10.0%	16.30	1,831,940
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	1.97	221,665
Bonds			0.6%	1.09	122,238
GC Field and Home Office Overhead			5.0%	9.12	1,024,762
GC Profit			5.0%	9.58	1,076,000
Total Contractor Indirect Markups				45.83	5,148,957
TOTAL DIRECT COST BEFORE CONTINGENCIES				**201.11**	**22,596,002**
Contingencies					
Design Contingencies			10.0%	20.11	2,259,600
Construction Contingencies			15.0%	33.18	3,728,340
Total Contingency Allowance				53.29	5,987,940
TOTAL DIRECT COST BEFORE ESCALATION				**254.41**	**28,583,942**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2.48	279,132
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**256.89**	**28,863,074**

27.04. Cost Work Sheet Summary: County, Delevan & Maxwell Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		County, Delevan & Maxwell Roads									
		Road length (LF)	112,356	LF							
		Road length (Miles)	22	MILES							
		Road Area (SF)	3,145,968	SF							
		Road Area (SY)	349,552	SY							
		Road Area (Acre)	73	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	38	ACRE	$ 1,155.70	$ 1,901.97	$ -	$ -	$ 3,057.67	$ 116,191	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	18,310	LF					$ 4.51	$ 82,525	
	2.002	*Setup temporary silt fence*	*18,310*	*LF*	*$ 1.92*	*$ 0.78*	*$ 0.44*	*$ -*	*$ 3.14*	*$ 57,555*	
	2.003	*Silt fence removal*	*18,310*	*LF*	*$ 0.74*	*$ 0.31*	*$ -*	*$ 0.31*	*$ 1.36*	*$ 24,970*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Includes AB & AC material which needs to be crushed and screened for potential re-use, includes hauling to stockpile/direct fill location within 0.5 miles, assume 90% of total roadway excavations include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Includes removal of asphalt top layer; include a 15% swell factor*
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Haul to stockpile location, 0.25 mile hauling distance assumed*
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	-	CY					$ -	$ -	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 10% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	1,720	CY					$ 25.15	$ 43,252	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 3 mile haul
	2.014	*Roadway excavations*	*1,978*	*LCY*	*$ 3.20*	*$ 3.32*	*$ -*	*$ -*	*$ 6.52*	*$ 12,904*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 3 mile haul*	*1,978*	*LCY*	*$ 4.05*	*$ 11.29*	*$ -*	*$ -*	*$ 15.34*	*$ 30,348*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 3 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	-	CY					$ -	$ -	Not required
	2.017	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.018	*Rock breaking operation*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.022	*Load and haul to stockpile location, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	15,690	CY					$ 10.22	$ 160,346	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*17,259*	*LCY*	*$ 2.20*	*$ 2.28*	*$ -*	*$ -*	*$ 4.49*	*$ 77,425*	*Include 10% swell factor*
	2.025	*Load and haul to stockpile/fill location, 0.25 mile haul*	*17,259*	*LCY*	*$ 1.44*	*$ 3.37*	*$ -*	*$ -*	*$ 4.80*	*$ 82,921*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	15,690	CY					$ 7.10	$ 111,359	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*15,690*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*15,690*	*LCY*	*$ 3.76*	*$ 3.34*	*$ -*	*$ -*	*$ 7.10*	*$ 111,359*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	-	CY					$ -	$ -	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	Class 2 Aggregate base	-	CY					$ -	$ -	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.018	Asphalt concrete	39,330	TON	$ 8.55	$ 4.71	$ 102.88	$ -	$ 116.15	$ 4,568,126	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	58	TON	$ 921.76	$ 462.37	$ 2,500.59	$ -	$ 3,884.73	$ 226,091	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
	3.020	FDR-C	349,190	SQYD	$ 3.48	$ 2.60	$ -	$ -	$ 6.08	$ 2,123,975	Full Depth Reclamation
	3.021	Cement	17,470	TON	$ -	$ -	$ 169.71	$ -	$ 169.71	$ 2,964,849	
4		**Other Roadwork**									

27.04. Cost Work Sheet Summary: County, Delevan & Maxwell Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.001	Allowance for Temporary Bridges / Modification of Existing Bridges	10,705	SF	$ -	$ -	$ -	$ 368.00	$ 368.00	$ 3,939,440	Includes provision for temporary Bridges / Modification of Existing Bridges
	4.002	Midwest Guardrail System	11,236	LF	$ 5.40	$ 2.40	$ 43.53	$ -	$ 51.33	$ 576,753	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	28	EA	$ 1,170.26	$ 1,041.70	$ 2,693.75	$ -	$ 4,905.71	$ 137,360	Assume 4 at each culvert crossing, assume wood posts
	4.004	End Anchor Assembly (Type SFT)	28	EA	$ 1,170.26	$ 1,041.70	$ 592.63	$ -	$ 2,804.58	$ 78,528	Assume 4 at each culvert crossing, assume wood posts
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	1,384	LF					$ 109.29	$ 151,253	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*1,032*	*LCY*	*$ 5.88*	*$ 5.71*	*$ -*	*$ -*	*$ 11.60*	*$ 11,963*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*1,032*	*LCY*	*$ 6.07*	*$ 12.87*	*$ -*	*$ -*	*$ 18.94*	*$ 19,536*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*1,384*	*LF*	*$ 37.26*	*$ 7.18*	*$ 32.11*	*$ -*	*$ 76.55*	*$ 105,946*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*1,032*	*LCY*	*$ 2.47*	*$ 6.61*	*$ -*	*$ -*	*$ 9.09*	*$ 9,372*	
	4.010	*Sand Bedding*	*90*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 4,436*	
	4.011	Box culvert single cell	7	EA	$ 709.53	$ 279.54	$ 10,020.75	$ -	$ 11,009.82	$ 77,069	Assume 8' long, 12' x 8'
	4.012	Paint Traffic Stripe - 6" Yellow	224,712	LF	$ 0.24	$ 0.14	$ 0.70	$ -	$ 1.08	$ 243,723	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	224,712	LF	$ 0.24	$ 0.14	$ 0.70	$ -	$ 1.08	$ 243,723	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	113	EA	$ 265.32	$ 113.30	$ 562.46	$ -	$ 941.08	$ 106,342	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	52.00	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 10,962	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	156	EA	$ 38.70	$ 15.05	$ 71.96	$ -	$ 125.71	$ 19,610	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	374,710	SF	$ -	$ -	$ -	$ 0.29	$ 0.29	$ 107,729	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	-	SF					$ -	$ -	Not required
	4.021	*Setting and removing formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Concrete fill work*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Provide/Install Reinforcing*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	22	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 1,100,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow $50,000/mile for road patching and repair
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 17,189,207	$ 17,189,207	$ 257,838	
		Total Direct Cost	112,356	LF	$ 19.37	$ 14.19	$ 73.53	$ 48.20	$ 155.28	$ 17,447,045	

Sites Reservoir (Alt 2): Access Roads A, B, C & Comm Roads | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.05. Construction Cost Summary: Access Roads A, B, C & Comm Roads

				Unit Cost Rate ($/LF)	Total Cost
			LF:	38,036	
Total Direct Cost				526.54	20,027,385
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				526.54	20,027,385
General Conditions					
Mobilization			5.0%	26.33	1,001,369
Site General Conditions & Requirements			10.0%	55.29	2,102,875
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	6.69	254,448
Bonds			0.6%	3.69	140,316
GC Field and Home Office Overhead			5.0%	30.93	1,176,320
GC Profit			5.0%	32.47	1,235,136
Total Contractor Indirect Markups				155.39	5,910,464
TOTAL DIRECT COST BEFORE CONTINGENCIES				**681.93**	**25,937,849**
Contingencies					
Design Contingencies			10.0%	68.19	2,593,785
Construction Contingencies			15.0%	112.52	4,279,745
Total Contingency Allowance				180.71	6,873,530
TOTAL DIRECT COST BEFORE ESCALATION				**862.64**	**32,811,379**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	8.42	320,414
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**871.06**	**33,131,793**

27.05. Cost Work Sheet Summary: Access Roads A, B, C & Comm Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Access Roads A, B, C & Comm Roads									
		Road length (LF)	38,036	LF							
		Road length (Miles)	8	MILES							
		Road Area (SF)	570,540	SF							
		Road Area (SY)	63,393	SY							
		Road Area (Acre)	14	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	38	ACRE	$ 1,155.70	$ 1,901.97	$ -	$ -	$ 3,057.67	$ 116,191	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	10,400	LF					$ 4.70	$ 48,859	
	2.002	*Setup temporary silt fence*	*10,400*	*LF*	*$ 1.84*	*$ 0.75*	*$ 0.44*	*$ -*	*$ 3.04*	*$ 31,577*	
	2.003	*Silt fence removal*	*10,400*	*LF*	*$ 0.78*	*$ 0.33*	*$ -*	*$ 0.55*	*$ 1.66*	*$ 17,282*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	798,400	CY					$ 10.18	$ 8,124,186	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*918,160*	*LCY*	*$ 2.10*	*$ 2.18*	*$ -*	*$ -*	*$ 4.27*	*$ 3,922,843*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*918,160*	*LCY*	*$ 1.37*	*$ 3.21*	*$ -*	*$ -*	*$ 4.58*	*$ 4,201,343*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	118,300	CY					$ 10.74	$ 1,270,207	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*136,045*	*LCY*	*$ 2.10*	*$ 2.17*	*$ -*	*$ -*	*$ 4.27*	*$ 580,684*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*136,045*	*LCY*	*$ 1.49*	*$ 3.58*	*$ -*	*$ -*	*$ 5.07*	*$ 689,523*	*Haul to disposal area; no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	30,600	CY					$ 18.69	$ 572,021	Excavated material to be stockpiled for re-use, average 0.5 mile haul
	2.017	*Blasting operations*	*11,016*	*LCY*	*$ 4.87*	*$ 4.65*	*$ 4.85*	*$ -*	*$ 14.37*	*$ 158,328*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*25,704*	*LCY*	*$ 3.05*	*$ 3.93*	*$ -*	*$ -*	*$ 6.97*	*$ 179,231*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 0.5 mile haul*	*36,720*	*LCY*	*$ 1.88*	*$ 4.50*	*$ -*	*$ -*	*$ 6.39*	*$ 234,461*	*Haul to stockpile location, 0.5 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	265,700	CY					$ 9.76	$ 2,592,257	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*292,270*	*LCY*	*$ 2.10*	*$ 2.18*	*$ -*	*$ -*	*$ 4.28*	*$ 1,251,697*	*Include 10% swell factor*
	2.025	*Load and haul to fill location, 0.25 mile haul*	*292,270*	*LCY*	*$ 1.37*	*$ 3.21*	*$ -*	*$ -*	*$ 4.59*	*$ 1,340,560*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	265,700	CY					$ 6.92	$ 1,837,417	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*265,700*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*265,700*	*LCY*	*$ 3.66*	*$ 3.25*	*$ -*	*$ -*	*$ 6.92*	*$ 1,837,417*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	4,600	CY					$ 61.65	$ 283,589	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*7,820*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 118,466*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*5,290*	*LCY*	*$ 10.60*	*$ 12.42*	*$ -*	*$ -*	*$ 23.01*	*$ 121,742*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*5,290*	*LCY*	*$ 4.22*	*$ 3.98*	*$ -*	*$ -*	*$ 8.20*	*$ 43,381*	
	3.013	Class 2 Aggregate base	26,800	CY					$ 61.18	$ 1,639,653	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*45,560*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 690,194*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*30,820*	*LCY*	*$ 10.46*	*$ 12.26*	*$ -*	*$ -*	*$ 22.71*	*$ 700,017*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*30,820*	*LCY*	*$ 4.16*	*$ 3.93*	*$ -*	*$ -*	*$ 8.09*	*$ 249,443*	
	3.018	Asphalt concrete	6,250	TON	$ 9.23	$ 5.09	$ 102.89	$ -	$ 117.20	$ 732,509	Not required
	3.019	Tack Coat	5	TON	$ 2,174.13	$ 1,090.57	$ 5,615.67	$ -	$ 8,880.36	$ 41,738	Not required
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.002	Midwest Guardrail System	3,804	LF	$ 5.32	$ 2.36	$ 43.54	$ -	$ 51.22	$ 194,808	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'

27.05. Cost Work Sheet Summary: Access Roads A, B, C & Comm Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	2,253	LF					$ 102.94	$ 231,916	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*1,679*	*LCY*	*$ 4.82*	*$ 4.68*	*$ -*	*$ -*	*$ 9.50*	*$ 15,950*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*1,679*	*LCY*	*$ 4.97*	*$ 10.54*	*$ -*	*$ -*	*$ 15.51*	*$ 26,048*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*2,253*	*LF*	*$ 36.41*	*$ 7.02*	*$ 32.11*	*$ -*	*$ 75.54*	*$ 170,200*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*1,679*	*LCY*	*$ 2.03*	*$ 5.42*	*$ -*	*$ -*	*$ 7.44*	*$ 12,497*	
	4.010	*Sand Bedding*	*146*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 7,221*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	10,382	LF	$ 0.36	$ 0.21	$ 0.70	$ -	$ 1.27	$ 13,226	Includes 2 yellow stripes for road for C1 only
	4.013	Paint Traffic Stripe - 6" White	692	LF	$ 2.69	$ 1.61	$ 0.70	$ -	$ 5.00	$ 3,462	Assume 2 edge of traveled way stripes for road for C1 only
	4.014	Roadside Signs	39	EA	$ 329.46	$ 140.69	$ 562.46	$ -	$ 1,032.61	$ 40,272	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	210,800	SF	$ 0.05	$ 0.02	$ 0.07	$ -	$ 0.14	$ 30,169	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	34.67	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 7,308	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	80	EA	$ 37.74	$ 14.67	$ 71.96	$ -	$ 124.36	$ 9,949	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.020	Retaining walls (Allowance)	21,100	SF					$ 73.07	$ 1,541,677	
	4.021	*Setting and removing formwork*	*42,200*	*SF*	*$ 9.62*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.09*	*$ 510,060*	
	4.022	*Concrete fill work*	*1,563*	*CY*	*$ 31.43*	*$ 7.56*	*$ 224.18*	*$ -*	*$ 263.17*	*$ 411,331*	
	4.023	*Provide/Install Reinforcing*	*156*	*TON*	*$ 1,104.77*	*$ 61.58*	*$ 2,802.31*	*$ -*	*$ 3,968.65*	*$ 620,286*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	8	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 400,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow $50,000/mile for road patching and repair
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 19,731,414	$ 19,731,414	$ 295,971	
		Total Direct Cost	38,036	LF	$ 192.23	$ 244.25	$ 71.42	$ 18.64	$ 526.54	$ 20,027,385	

Sites Reservoir (Alt 2): Peninsula Hills Recreation Roads | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.06. Construction Cost Summary: Peninsula Hills Recreation Roads

				Unit Cost Rate ($/LF)	Total Cost
			LF:	10,841	
Total Direct Cost				447.65	4,852,962
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				447.65	4,852,962
General Conditions					
Mobilization			5.0%	22.38	242,648
Site General Conditions & Requirements			10.0%	47.00	509,561
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	5.69	61,657
Bonds			0.6%	3.14	34,001
GC Field and Home Office Overhead			5.0%	26.29	285,041
GC Profit			5.0%	27.61	299,294
Total Contractor Indirect Markups				132.11	1,432,202
TOTAL DIRECT COST BEFORE CONTINGENCIES				**579.76**	**6,285,164**
Contingencies					
Design Contingencies			10.0%	57.98	628,516
Construction Contingencies			15.0%	95.66	1,037,052
Total Contingency Allowance				153.64	1,665,568
TOTAL DIRECT COST BEFORE ESCALATION				**733.39**	**7,950,732**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	7.16	77,642
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**740.55**	**8,028,374**

27.06. Cost Work Sheet Summary: Peninsula Hills Recreation Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Peninsula Hills Recreation Roads									
		Road length (LF)	10,841	LF							
		Road length (Miles)	3	MILES							
		Road Area (SF)	325,232	SF							
		Road Area (SY)	36,137	SY							
		Road Area (Acre)	8	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	10	ACRE	$ 1,478.67	$ 2,433.49	$ -	$ -	$ 3,912.17	$ 38,730	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	1,760	LF					$ 8.45	$ 14,869	
	2.002	*Setup temporary silt fence*	*1,760*	*LF*	*$ 1.81*	*$ 0.74*	*$ 0.44*	*$ -*	*$ 3.00*	*$ 5,275*	
	2.003	*Silt fence removal*	*1,760*	*LF*	*$ 1.53*	*$ 0.65*	*$ -*	*$ 3.27*	*$ 5.45*	*$ 9,594*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile/fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	108,460	CY					$ 10.35	$ 1,122,420	Includes hauling to stockpile within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*124,729*	*LCY*	*$ 2.13*	*$ 2.21*	*$ -*	*$ -*	*$ 4.35*	*$ 541,972*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*124,729*	*LCY*	*$ 1.39*	*$ 3.26*	*$ -*	*$ -*	*$ 4.65*	*$ 580,449*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	19,965	CY					$ 11.31	$ 225,815	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
	2.014	*Roadway excavations*	*22,960*	*LCY*	*$ 2.21*	*$ 2.29*	*$ -*	*$ -*	*$ 4.50*	*$ 103,233*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*22,960*	*LCY*	*$ 1.57*	*$ 3.77*	*$ -*	*$ -*	*$ 5.34*	*$ 122,582*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	3,025	CY					$ 23.76	$ 71,887	Excavated material to be stockpiled for re-use, average 3 mile haul
	2.017	*Blasting operations*	*1,089*	*LCY*	*$ 7.04*	*$ 6.73*	*$ 4.85*	*$ -*	*$ 18.61*	*$ 20,268*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*2,541*	*LCY*	*$ 3.08*	*$ 3.97*	*$ -*	*$ -*	*$ 7.05*	*$ 17,923*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 1.5 mile haul*	*3,630*	*LCY*	*$ 2.59*	*$ 6.69*	*$ -*	*$ -*	*$ 9.28*	*$ 33,695*	*Haul to stockpile location, 1.5 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	71,225	CY					$ 9.76	$ 694,832	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	*78,348*	*LCY*	*$ 2.10*	*$ 2.18*	*$ -*	*$ -*	*$ 4.28*	*$ 335,506*	*Include 10% swell factor*
	2.025	*Load and haul to fill location, 0.5 mile haul*	*78,348*	*LCY*	*$ 1.37*	*$ 3.21*	*$ -*	*$ -*	*$ 4.59*	*$ 359,325*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	71,225	CY					$ 7.04	$ 501,114	From excavated suitable material, assume available on-site excavation
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No double handling and stockpiling required; all material to be hauled directly to fill location*
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	*71,225*	*LCY*						*Included above*	*Swell factor of 10% included; Direct hauling work included elsewhere*
	3.004	*Spread and compact*	*71,225*	*LCY*	*$ 3.73*	*$ 3.31*	*$ -*	*$ -*	*$ 7.04*	*$ 501,114*	*Swell factor of 10% included*
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	6,050	CY					$ 66.69	$ 403,494	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*10,285*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 155,809*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*6,958*	*LCY*	*$ 12.08*	*$ 14.16*	*$ -*	*$ -*	*$ 26.25*	*$ 182,613*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*6,958*	*LCY*	*$ 4.81*	*$ 4.54*	*$ -*	*$ -*	*$ 9.35*	*$ 65,072*	
	3.013	Class 2 Aggregate base	6,050	CY					$ 66.69	$ 403,494	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*10,285*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 155,809*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*6,958*	*LCY*	*$ 12.08*	*$ 14.16*	*$ -*	*$ -*	*$ 26.25*	*$ 182,613*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*6,958*	*LCY*	*$ 4.81*	*$ 4.54*	*$ -*	*$ -*	*$ 9.35*	*$ 65,072*	
	3.018	Asphalt concrete	8,129	TON	$ 9.46	$ 5.21	$ 102.88	$ -	$ 117.55	$ 955,603	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	6	TON	$ 985.25	$ 494.21	$ 2,486.86	$ -	$ 3,966.32	$ 23,996	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
4		**Other Roadwork**									
	4.00	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required

27.06. Cost Work Sheet Summary: Peninsula Hills Recreation Roads

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.002	Midwest Guardrail System	1,084	LF	$ 6.22	$ 2.76	$ 43.53	$ -	$ 52.52	$ 56,934	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	402	LF					$ 118.02	$ 47,387	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*299*	*LCY*	*$ 6.76*	*$ 6.57*	*$ -*	*$ -*	*$ 13.32*	*$ 3,988*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*299*	*LCY*	*$ 6.97*	*$ 14.79*	*$ -*	*$ -*	*$ 21.76*	*$ 6,512*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*402*	*LF*	*$ 40.87*	*$ 7.88*	*$ 32.14*	*$ -*	*$ 80.89*	*$ 32,476*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*299*	*LCY*	*$ 2.84*	*$ 7.60*	*$ -*	*$ -*	*$ 10.44*	*$ 3,124*	
	4.010	*Sand Bedding*	*26*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 1,287*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	21,682	LF	$ 0.26	$ 0.15	$ 0.70	$ -	$ 1.11	$ 24,117	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	21,682	LF	$ 0.26	$ 0.15	$ 0.70	$ -	$ 1.11	$ 24,117	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	11	EA	$ 389.37	$ 166.27	$ 562.46	$ -	$ 1,118.09	$ 12,299	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	33,110	SF	$ 0.08	$ 0.03	$ 0.07	$ -	$ 0.19	$ 6,170	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	5.87	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 1,237	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	9	EA	$ 171.53	$ 66.69	$ 71.96	$ -	$ 310.17	$ 2,730	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Install slope protection matting, includes steel staples and blanket fabric
	4.020	Retaining walls (Allowance)	-	SF					$ -	$ -	Not required
	4.021	*Setting and removing formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Concrete fill work*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Provide/Install Reinforcing*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	3	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 150,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow $50,000/mile for road patching and repair
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 4,781,243	$ 4,781,243	$ 71,719	
		Total Direct Cost	10,841	LF	$ 136.10	$ 173.31	$ 117.14	$ 21.10	$ 447.65	$ 4,852,962	

Sites Reservoir (Alt 2): Sites Lodoga Road Temporary Detour | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **March 1, 2021**

27.08. Construction Cost Summary: Sites Lodoga Road Temporary Detour

				Unit Cost Rate ($/LF)	Total Cost
			LF:	16,406	
Total Direct Cost				803.38	13,180,295
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				803.38	13,180,295
General Conditions					
Mobilization			5.0%	40.17	659,015
Site General Conditions & Requirements			10.0%	84.36	1,383,931
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	10.21	167,456
Bonds			0.6%	5.63	92,344
GC Field and Home Office Overhead			5.0%	47.19	774,152
GC Profit			5.0%	49.55	812,860
Total Contractor Indirect Markups				237.09	3,889,758
TOTAL DIRECT COST BEFORE CONTINGENCIES				**1,040.48**	**17,070,053**
Contingencies					
Design Contingencies			10.0%	104.05	1,707,005
Construction Contingencies			15.0%	171.68	2,816,559
Total Contingency Allowance				275.73	4,523,564
TOTAL DIRECT COST BEFORE ESCALATION				**1,316.20**	**21,593,617**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	12.85	210,869
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST				**1,329.06**	**21,804,486**

27.08. Cost Work Sheet Summary: Sites Lodoga Road Temporary Detour

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
		Sites Lodoga Road Temporary Detour									
		Road length (LF)	16,406	LF							
		Road length (Miles)	4	MILES							
		Road Area (SF)	393,744	SF							
		Road Area (SY)	43,749	SY							
		Road Area (Acre)	10	ACRE							
1		**Clearing and Demolition Work**									
	1.001	Demolition Work	-	SY						Included below	
	1.002	*Asphalt removal work*	-	*SY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.003	*Load and haul to disposal site, 3 mile haul*	-	*LCY*	$ -	$ -	$ -	$ -	$ -	$ -	
	1.004	Clearing and Grubbing	39	ACRE	$ 1,126.07	$ 1,853.20	$ -	$ -	$ 2,979.26	$ 116,191	Light vegetation clearing work
		Roads and Road Structures									
2		**Road Excavations**									
	2.001	Temporary Silt Fence	1,700	LF					$ 8.73	$ 14,842	
	2.002	*Setup temporary silt fence*	*1,700*	*LF*	*$ 1.88*	*$ 0.76*	*$ 0.44*	*$ -*	*$ 3.09*	*$ 5,248*	
	2.003	*Silt fence removal*	*1,700*	*LF*	*$ 1.59*	*$ 0.68*	*$ -*	*$ 3.38*	*$ 5.64*	*$ 9,594*	*Include allowance for dump charges*
	2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					$ -	$ -	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
	2.005	*Roadway excavations including existing asphalt layer removal*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.006	*Load and haul to processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.007	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.008	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.009	*Load and haul to stockpile, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	499,600	CY					$ 10.16	$ 5,077,616	Includes hauling to stockpile/fill locatoin within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
	2.011	*Roadway excavations, common earth*	*574,540*	*LCY*	*$ 2.09*	*$ 2.17*	*$ -*	*$ -*	*$ 4.27*	*$ 2,451,777*	*Common excavations; include a 15% swell factor*
	2.012	*Load and haul to stockpile/fill location, 0.25 mile haul*	*574,540*	*LCY*	*$ 1.37*	*$ 3.20*	*$ -*	*$ -*	*$ 4.57*	*$ 2,625,839*	*Haul to stockpile/fill location, 0.25 mile hauling distance assumed*
	2.013	Roadway Excavation (Cut to Waste Disposal Area)	135,100	CY					$ 10.86	$ 1,467,795	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, averaae 0.5 mile haul
	2.014	*Roadway excavations*	*155,365*	*LCY*	*$ 2.12*	*$ 2.20*	*$ -*	*$ -*	*$ 4.32*	*$ 671,013*	*Include a 15% swell factor*
	2.015	*Load and haul to disposal site, 0.5 mile haul*	*155,365*	*LCY*	*$ 1.50*	*$ 3.63*	*$ -*	*$ -*	*$ 5.13*	*$ 796,782*	*Haul to disposal area, no provision for processing rubble material or dumping off-site; assumed 0.5 mile hauling distance*
	2.016	Roadway Excavation (Rock Cut)	57,000	CY					$ 20.61	$ 1,174,786	Excavated material to be stockpiled for re-use, average 1.5 mile haul
	2.017	*Blasting operations*	*20,520*	*LCY*	*$ 4.48*	*$ 4.28*	*$ 4.85*	*$ -*	*$ 13.61*	*$ 279,349*	*Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr*
	2.018	*Rock breaking operation*	*47,880*	*LCY*	*$ 2.94*	*$ 3.80*	*$ -*	*$ -*	*$ 6.74*	*$ 322,617*	*Assume 70% of volume will be excavated with ripper*
	2.019	*Load and haul to processing area, 3 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing and screening required*
	2.020	*Crushing Operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No crushing required*
	2.021	*Screening Operations (Post-crushing)*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No screening required*
	2.022	*Load and haul to stockpile location, 1.5 mile haul*	*68,400*	*LCY*	*$ 2.34*	*$ 6.04*	*$ -*	*$ -*	*$ 8.37*	*$ 572,820*	*Haul to stockpile location, 1.5 mile hauling distance assumed*
	2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	-	CY					$ -	$ -	Excavate common earth and direct haul to fill location
	2.024	*Roadway excavations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% swell factor*
	2.025	*Load and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Assumed 0.25 mile hauling distance*
	2.026	Crushing operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
	2.027	Screening operations	-	CY	$ -	$ -	$ -	$ -		Not required	No crushing work required
3		**Road Fill and Layer Work**									
	3.001	Roadway Embankment (from on-site excavation sources)	-	CY					$ -	$ -	Not required
	3.002	*Load at stockpile and haul to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.003	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*						*Included above*	
	3.004	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.005	Roadway Embankment (imported from other excavation sources)	-	CY						Not required	Backfill material to be sourced from road excavations cut
	3.006	*Load and haul from excavation site to fill location, 0.25 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.007	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.008	Class 4 Aggregate subbase	11,120	CY					$ 62.88	$ 699,187	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*18,904*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 286,379*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*12,788*	*LCY*	*$ 10.96*	*$ 12.84*	*$ -*	*$ -*	*$ 23.80*	*$ 304,355*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*12,788*	*LCY*	*$ 4.36*	*$ 4.12*	*$ -*	*$ -*	*$ 8.48*	*$ 108,453*	
	3.013	Class 2 Aggregate base	11,120	CY					$ 62.88	$ 699,187	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*18,904*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ 286,379*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*12,788*	*LCY*	*$ 10.96*	*$ 12.84*	*$ -*	*$ -*	*$ 23.80*	*$ 304,355*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*12,788*	*LCY*	*$ 4.36*	*$ 4.12*	*$ -*	*$ -*	*$ 8.48*	*$ 108,453*	
	3.018	Asphalt concrete	15,010	TON	$ 8.96	$ 4.94	$ 102.89	$ -	$ 116.79	$ 1,753,037	Assume HMA (Type A), 150lbs/cy
	3.019	Tack Coat	11	TON	$ 613.72	$ 307.85	$ 1,640.98	$ -	$ 2,562.55	$ 28,444	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 eal/ton
4		**Other Roadwork**									
	4.001	Bridge Replacement	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required

27.08. Cost Work Sheet Summary: Sites Lodoga Road Temporary Detour

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.002	Midwest Guardrail System	1,641	LF	$ 6.17	$ 2.74	$ 43.56	$ -	$ 52.46	$ 86,069	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
	4.003	Transition Railing (Type WB-31)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.004	End Anchor Assembly (Type SFT)	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	1,240	LF					$ 107.64	$ 133,479	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
	4.006	*Culvert pipe excavations*	*924*	*LCY*	*$ 4.38*	*$ 4.25*	*$ -*	*$ -*	*$ 8.63*	*$ 7,975*	
	4.007	*Load and haul material to disposal site, 3 mile haul*	*924*	*LCY*	*$ 6.77*	*$ 14.36*	*$ -*	*$ -*	*$ 21.14*	*$ 19,536*	
	4.008	*24" Dia pipe, galvanized corrugated metal*	*1,240*	*LF*	*$ 37.81*	*$ 7.29*	*$ 32.12*	*$ -*	*$ 77.21*	*$ 95,745*	
	4.009	*Load at stockpile and haul to fill location, 0.5 mile haul*	*924*	*LCY*	*$ 1.84*	*$ 4.92*	*$ -*	*$ -*	*$ 6.76*	*$ 6,248*	
	4.010	*Sand Bedding*	*80*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 49.45*	*$ 49.45*	*$ 3,974*	
	4.011	Box culvert single cell	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.012	Paint Traffic Stripe - 6" Yellow	32,812	LF	$ 0.28	$ 0.17	$ 0.70	$ -	$ 1.15	$ 37,867	Includes 2 yellow stripes
	4.013	Paint Traffic Stripe - 6" White	32,812	LF	$ 0.28	$ 0.17	$ 0.70	$ -	$ 1.15	$ 37,867	Assume 2 edge of traveled way stripes
	4.014	Roadside Signs	17	EA	$ 251.94	$ 107.59	$ 562.46	$ -	$ 921.99	$ 15,674	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
	4.015	Permanent Erosion Control (Hydroseed)	72,200	SF	$ 0.08	$ 0.03	$ 0.07	$ -	$ 0.18	$ 12,759	Includes seed mix, wood fiber
	4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	11.33	CY	$ -	$ -	$ 210.81	$ -	$ 210.81	$ 2,389	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
	4.017	Temporary Inlet/Outlet Protection	32	EA	$ 47.17	$ 18.34	$ 71.96	$ -	$ 137.47	$ 4,399	Includes install and removal, sandbag barriers, fiber rolls and stakes
	4.018	Rock Anchor Assembly		LF						Not required	
	4.019	Erosion Control (Blanket) / Fiber roll	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.020	Retaining walls (Allowance)	19,500	SF					$ 73.02	$ 1,423,923	
	4.021	*Setting and removing formwork*	*39,000*	*SF*	*$ 9.58*	*$ 0.18*	*$ 2.29*	*$ -*	*$ 12.05*	*$ 469,920*	
	4.022	*Concrete fill work*	*1,444*	*CY*	*$ 31.89*	*$ 7.67*	*$ 224.18*	*$ -*	*$ 263.74*	*$ 380,953*	
	4.023	*Provide/Install Reinforcing*	*144*	*TON*	*$ 1,103.46*	*$ 61.51*	*$ 2,802.31*	*$ -*	*$ 3,967.27*	*$ 573,050*	
	4.024	Rock Slope Protection using rip rap	-	CY					$ -	$ -	Not required
	4.025	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	*Load and haul to processing area, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.027	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.028	*Load and haul to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.029	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.030	RSP backing	-	CY					$ -	$ -	Not required
	4.031	*Load and haul material from stockpile to fill location, 3 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.032	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.033	RSP Fabric backing material	-	SY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	4.034	Road piling work								Not required	
5		**Maintenance Work**									
	5.001	Public Road Maintenance Work (Roads identified within project boundary)	4	MILE	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 200,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow $50,000/mile for road patching and repair
6		**Temporary Work**									
	6.001	General traffic management		MO	$ -	$ -	$ -	$ -		Elsewhere	Included within general conditions and requirements
	6.002	Temporary road surfaces including removal work								Not required	
	6.003	Temporary Traffic Handling	-	DAYS	$ -	$ -	$ -	$ -		Not required	
		Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions.									
		Bidirectional sand-filled module									
		Temporary K-railing pinned to pavement									
		Temporary traffic striping									
7		**Highway and Other Road Connection Work**									
	7.001	Highway and other road connections			$ -	$ -	$ -	$ -		Not required	
8		**Misc Allowance**									
	8.001	Misc allowance for small items, allow 1.5%	1.5%	%				$ 12,985,512	$ 12,985,512	$ 194,783	
		Total Direct Cost	16,406	LF	$ 256.41	$ 325.45	$ 196.87	$ 24.66	$ 803.38	$ 13,180,295	

VE Alternative 2

Sites Reservoir (Alt 2): Dam VE Review | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

1. Construction Cost Summary: Produce embankment materials from on-site materials

				Total Cost
Total Direct Cost Effect				(7,978,548)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(7,978,548)
General Conditions				
Mobilization			5.0%	(398,927)
Site General Conditions & Requirements			10.0%	(837,747)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(101,367)
Bonds			0.6%	(55,900)
GC Home Office Overhead			6.0%	(562,349)
GC Profit			8.0%	(794,787)
Total Contractor Indirect Markups				(2,751,077)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(10,729,625)**
Contingencies				
Design Contingencies			10.0%	(1,072,962)
Construction Contingencies			15.0%	(1,770,388)
Total Contingency Allowance				(2,843,350)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION				**(13,572,975)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(132,545)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(13,705,520)**

1 Cost Work Sheet Summary: Produce embankment materials from on-site materials

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
2		**Process and Haul Filter Materials to Project**									
	2.016	Purchase and Stockpile Filter, Drain and Transition Material	(1,296,500)	Tons					$ 37.16	$ (48,184,055)	
	2.017	*Purchase processed material from quarry*	*(1,296,500)*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ (28,777,762)*	
	2.018	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*(877,044)*	*LCY*	*$ 10.57*	*$ 11.56*	*$ -*	*$ -*	*$ 22.13*	*$ (19,406,293)*	
	2.019	Produce aggregate base materials from on-site materials	1,296,500	Tons					$ 31.01	$ 40,205,507	
	2.020	*Excavate material*	*877,044*	*Tons*	*$ -*	*$ -*	*$ -*	*$ 15.00*	*$ 15.00*	*$ 13,155,662*	
	2.021	*Haul excavated material to processed yard, 1 mile haul*	*877,044*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 4.50*	*$ 4.50*	*$ 3,946,699*	
	2.022	*Crush material*	*877,044*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 5.50*	*$ 5.50*	*$ 4,823,743*	
	2.023	*Screen material*	*877,044*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 2.50*	*$ 2.50*	*$ 2,192,610*	
	2.024	*Washing allowance*	*877,044*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 13.50*	*$ 13.50*	*$ 11,840,096*	
	2.025	*Haul to stockpile/fill location, 1 mile haul*	*877,044*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 4.50*	*$ 4.50*	*$ 3,946,699*	
	2.026	*Provision for soil testing*	*1*	*LS*	*$ -*	*$ -*	*$ -*	*$ 300,000.00*	*$ 300,000.00*	*$ 300,000*	
		Total Direct Cost Effect	1,296,500	TON	$ (7)	$ (8)	$ (22)	$ 31	$ (6)	$ (7,978,548)	

Sites Reservoir (Alt 2): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

2. Construction Cost Summary: Use single tunnel

				Total Cost
Total Direct Cost Effect				(24,378,541)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(24,378,541)
General Conditions				
Mobilization			5.0%	(1,218,927)
Site General Conditions & Requirements			10.0%	(2,559,747)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(309,729)
Bonds			0.6%	(170,802)
GC Home Office Overhead			6.0%	(1,718,265)
GC Profit			8.0%	(2,428,481)
Total Contractor Indirect Markups				(8,405,951)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(32,784,492)**
Contingencies				
Design Contingencies			10.0%	(3,278,449)
Construction Contingencies			15.0%	(5,409,441)
Total Contingency Allowance				(8,687,890)
TOTAL DIRECT COST BEFORE ESCALATION				**(41,472,382)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(404,992)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(41,877,374)**

2. Cost Work Sheet Summary: Use single tunnel

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 167,233,813	$ 167,233,813	$ (167,233,813)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ -**	Included within Sites Dam Estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.023	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.024	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.025	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.027	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*BCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.030	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.040	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
11		**ERS Facility 1**								**$ -**	Not required
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.003	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.004	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.005	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.007	*3.5" diam grouted hole with #8 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 0.5 mi assumed*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.010	*Backfill: Compact and grade*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	

2. Cost Work Sheet Summary: Use single tunnel

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		**ERS Facility 2**								**$ -**	Not required
	12.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.003	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.007	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	12.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	12.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	12.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
13		**IO Facility**								**$ 141,440,863**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	9	ACRE	$ 1,230.71	$ 2,147.96	$ -	$ -	$ 3,379	$ 30,408	Light vegetation removal
	13.003	Erosion and Sediment Control	9	ACRE	$ -	$ -	$ -	$ 3,761	$ 3,761	$ 33,845	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	540.00	LF					$ 450.72	$ 243,388	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	2.00	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ 50,000	
	13.007	Foundation piles - drilled piers	540.00	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ 89,100	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	41	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ 104,288	Allow 150lbs/cy
	13.010	Pile testing allowance	15.0%	%	$ -	$ -	$ -	$ 243,387.50	$ 243,387.50	$ 36,508	
	13.011	Pile cap / base slab	489	CY					$ 652.70	$ 319,186	5' thick base slab
	13.012	Cast in place concrete	489	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 159,828	36" thick slab
	13.013	Formwork	911	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 23,106	Formwork to sides
	13.014	Concrete reinforcement	37	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 136,251	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	7,936	CY							246' height tower for Alt 2
	13.016	Walls	7,102	CY					$ 1,133.76	$ 8,051,876	
	13.017	Cast in place concrete	7,102	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 2,321,132	Average 4' thick
	13.018	Formwork	95,876	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 2,432,863	
	13.019	Concrete reinforcement	888	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 3,297,881	Allow 250lbs/cy
	13.020	Slabs - elevated decks	722	CY					$ 833.82	$ 602,020	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	Cast in place concrete	722	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 235,971	36" thick slab

2. Cost Work Sheet Summary: Use single tunnel

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.022	Formwork	6,498	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 164,887	
	13.023	Concrete reinforcement	54	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 201,162	Allow 150lbs/cy
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.026	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Allow 30sf/cy
	13.027	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Allow 200lbs/cy
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.030	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	13.031	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	13.032	Bridge Piers	112	CY					$ 1,459.57	$ 163,472	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	Cast in place concrete	112	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 36,605	
	13.034	Formwork	3,360	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 85,260	Allow 30sf/cy
	13.035	Concrete reinforcement	11	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 41,607	Allow 200lbs/cy
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	1	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	1	LS						Included below	
	13.038	Metal ladders	254	LF	$ -	$ -	$ -	$ 3,552.50	$ 3,552.50	$ 904,050	As per May 2020 NODOS Estimate
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 507.50	$ 507.50	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	18	EA	$ -	$ -	$ -	$ 384,583.50	$ 384,583.50	$ 6,922,503	As per May 2020 NODOS Estimate
	13.041	Moveable screens and hoists	6	EA	$ -	$ -	$ -	$ 76,125.00	$ 76,125.00	$ 456,750	As per May 2020 NODOS Estimate
	13.042	Sliding steel plates and hoists	6	EA	$ -	$ -	$ -	$ 101,500.00	$ 101,500.00	$ 609,000	As per May 2020 NODOS Estimate
	13.043	8 ton jib crane	1	EA	$ -	$ -	$ -	$ 121,800.00	$ 121,800.00	$ 121,800	As per May 2020 NODOS Estimate
	13.044	12 ft x 30 ft inlet tunnel roller gate	2	EA	$ -	$ -	$ -	$ 1,888,915.00	$ 1,888,915.00	$ 3,777,830	As per May 2020 NODOS Estimate
	13.045	12 ft x 25 ft outlet tunnel roller gates	4	EA	$ -	$ -	$ -	$ 1,609,790.00	$ 1,609,790.00	$ 6,439,160	As per May 2020 NODOS Estimate
	13.046	Other Metals Intake Tower	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
	13.047	Painting	1	LS	$ -	$ -	$ -	$ 50,750.00	$ 50,750.00	$ 50,750	As per May 2020 NODOS Estimate
		Access bridge									
	13.048	Access bridge	10,000	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ 5,000,000	Assume 500' x 20' wide bridge
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	-	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ -	23' diameter tunnel
	13.051	Concrete Liner	-	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ -	23' diameter tunnel
	13.052	Steel Liner	-	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ -	23' diameter tunnel
	13.052a	32' Diameter Tunnel excavation	3,110	LF	$ -	$ -	$ -	$ 12,832.92	$ 12,832.92	$ 39,910,393	32' diameter
	13.052b	32' Diameter Tunnel - Concrete Liner	2,856	LF	$ -	$ -	$ -	$ 14,884.96	$ 14,884.96	$ 42,511,456	32' diameter
	13.052c	32' Diameter Tunnel - Concrete Liner	255	LF	$ -	$ -	$ -	$ 17,130.76	$ 17,130.76	$ 4,368,344	32' diameter
	13.053	**Lower Intake Channel**	475,000	CY					$ 38.28	$ 18,180,797	
	13.054	Excavations in common material	432,250	LCY	$ 6.00	$ 9.00	$ -	$ -	$ 15.00	$ 6,483,750	Assume 70% in common earth and 30% rock; include a 30% swell factor
	13.055	Excavations in rock	185,250	LCY	$ 10.50	$ 24.50	$ -	$ -	$ 35.00	$ 6,483,750	
	13.056	Haul to disposal site, 0.5 mile haul	617,500	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 4,322,500	
	13.057	Shotcrete portal face	1,387	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 443,769	
	13.058	Steel fiber for shotcrete	21	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 27,042	
	13.059	20 ft rock bolts, 8 ft on center - Drilling	880	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 220,000	
	13.060	3.5" diam grouted hole with #8 bar	40	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 199,986	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	44,100	CY					$ 49.88	$ 2,199,829	
	13.062	Excavate and load material	57,330	LCY	$ 10.00	$ 15.00	$ -	$ -	$ 25.00	$ 1,433,250	
	13.063	Haul to disposal site, 0.5 mile haul	57,330	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 401,310	
	13.064	Shotcrete portal face	569	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 182,120	
	13.065	Steel fiber for shotcrete	9	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 11,098	
	13.066	20 ft rock bolts, 8 ft on center - Drilling	361	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 90,125	
	13.067	3.5" diam grouted hole with #8 bar	16	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 81,926	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
14		Misc allowance for small items, allow 1%	1.0%	%				141,440,863	$ 141,440,863	$ 1,414,409	
		Total Direct Cost Effect	42	Acre	$ 231,512.13	$ 332,992.49	$ 144,804.31	$ (1,289,750.38)	$ (580,441.45)	$ (24,378,541)	

Sites Reservoir (Alt 2): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

3. Construction Cost Summary: Use sloping intake and eliminate bridge

				Total Cost
Total Direct Cost Effect				(13,938,254)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(13,938,254)
General Conditions				
Mobilization			5.0%	(696,913)
Site General Conditions & Requirements			10.0%	(1,463,517)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(177,086)
Bonds			0.6%	(97,655)
GC Home Office Overhead			6.0%	(982,406)
GC Profit			8.0%	(1,388,467)
Total Contractor Indirect Markups				(4,806,044)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(18,744,298)**
Contingencies				
Design Contingencies			10.0%	(1,874,430)
Construction Contingencies			15.0%	(3,092,809)
Total Contingency Allowance				(4,967,239)
TOTAL DIRECT COST BEFORE ESCALATION				**(23,711,537)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(231,551)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(23,943,088)**

3. Cost Work Sheet Summary: Use sloping intake and eliminate bridge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 167,233,813	$ 167,233,813	$ (167,233,813)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ -**	Included within Sites Dam Estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.023	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.024	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.025	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.027	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*BCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.030	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.040	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
11		**ERS Facility 1**								**$ -**	Not required
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.003	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.004	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.005	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.007	*3.5" diam grouted hole with #8 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 0.5 mi assumed*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.010	*Backfill: Compact and grade*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	

3. Cost Work Sheet Summary: Use sloping intake and eliminate bridge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		**ERS Facility 2**								**$ -**	Not required
	12.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.003	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.007	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	12.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	12.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	12.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
13		**IO Facility**								**$ 151,777,781**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	9	ACRE	$ 1,230.71	$ 2,147.96	$ -	$ -	$ 3,379	$ 30,408	Light vegetation removal
	13.003	Erosion and Sediment Control	9	ACRE	$ -	$ -	$ -	$ 3,761	$ 3,761	$ 33,845	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	-	LF					$ -	$ -	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	-	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ -	
	13.007	Foundation piles - drilled piers	-	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ -	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	-	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ -	Allow 150lbs/cy
	13.010	Pile testing allowance	0.0%	%	$ -	$ -	$ -	$ -	$ -	$ -	
	13.011	Pile cap / base slab	-	CY					$ -	$ -	5' thick base slab
	13.012	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	36" thick slab
	13.013	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	Formwork to sides
	13.014	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	-	CY							246' height tower for Alt 2
	13.016	Walls	-	CY					$ -	$ -	
	13.017	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	Average 4' thick
	13.018	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	
	13.019	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 250lbs/cy
	13.020	Slabs - elevated decks	-	CY					$ -	$ -	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	36" thick slab

3. Cost Work Sheet Summary: Use sloping intake and eliminate bridge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.022	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	
	13.023	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 150lbs/cy
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.026	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Allow 30sf/cy
	13.027	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Allow 200lbs/cy
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.030	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	13.031	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	13.032	Bridge Piers	-	CY					$ -	$ -	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	Cast in place concrete	-	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ -	
	13.034	Formwork	-	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ -	Allow 30sf/cy
	13.035	Concrete reinforcement	-	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ -	Allow 200lbs/cy
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	1	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	1	LS						Included below	
	13.038	Metal ladders	254	LF	$ -	$ -	$ -	$ 2,486.75	$ 2,486.75	$ 632,835	As per May 2020 NODOS Estimate
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 355.25	$ 355.25	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	18	EA	$ -	$ -	$ -	$ 269,208.45	$ 269,208.45	$ 4,845,752	As per May 2020 NODOS Estimate
	13.041	Moveable screens and hoists	6	EA	$ -	$ -	$ -	$ 53,287.50	$ 53,287.50	$ 319,725	As per May 2020 NODOS Estimate
	13.042	Sliding steel plates and hoists	6	EA	$ -	$ -	$ -	$ 71,050.00	$ 71,050.00	$ 426,300	As per May 2020 NODOS Estimate
	13.043	8 ton jib crane	1	EA	$ -	$ -	$ -	$ 85,260.00	$ 85,260.00	$ 85,260	As per May 2020 NODOS Estimate
	13.044	12 ft x 30 ft inlet tunnel roller gate	2	EA	$ -	$ -	$ -	$ 1,322,240.50	$ 1,322,240.50	$ 2,644,481	As per May 2020 NODOS Estimate
	13.045	12 ft x 25 ft outlet tunnel roller gates	4	EA	$ -	$ -	$ -	$ 1,126,853.00	$ 1,126,853.00	$ 4,507,412	As per May 2020 NODOS Estimate
	13.046	Other Metals Intake Tower	1	LS	$ -	$ -	$ -	$ 177,625.00	$ 177,625.00	$ 177,625	As per May 2020 NODOS Estimate
	13.047	Painting	1	LS	$ -	$ -	$ -	$ 35,525.00	$ 35,525.00	$ 35,525	As per May 2020 NODOS Estimate
		Access bridge									
	13.048	Access bridge	-	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ -	Assume 500' x 20' wide bridge
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	6,222	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ 52,834,051	As per May 2020 NODOS Estimate
	13.051	Concrete Liner	5,712	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ 51,883,438	As per May 2020 NODOS Estimate
	13.052	Steel Liner	510	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ 5,267,089	As per May 2020 NODOS Estimate
	13.053	**Lower Intake Channel**	475,000	CY					$ 38.28	$ 18,180,797	
	13.054	Excavations in common material	432,250	LCY	$ 6.00	$ 9.00	$ -	$ -	$ 15.00	$ 6,483,750	Assume 70% in common earth and 30% rock; include a 30% swell factor
	13.055	Excavations in rock	185,250	LCY	$ 10.50	$ 24.50	$ -	$ -	$ 35.00	$ 6,483,750	
	13.056	Haul to disposal site, 0.5 mile haul	617,500	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 4,322,500	
	13.057	Shotcrete portal face	1,387	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 443,769	
	13.058	Steel fiber for shotcrete	21	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 27,042	
	13.059	20 ft rock bolts, 8 ft on center - Drilling	880	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 220,000	
	13.060	3.5" diam grouted hole with #8 bar	40	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 199,986	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	63,000	CY					$ 49.88	$ 3,142,613	
	13.062	Excavate and load material	81,900	LCY	$ 10.00	$ 15.00	$ -	$ -	$ 25.00	$ 2,047,500	
	13.063	Haul to disposal site, 0.5 mile haul	81,900	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 573,300	
	13.064	Shotcrete portal face	813	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 260,172	
	13.065	Steel fiber for shotcrete	12	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 15,854	
	13.066	20 ft rock bolts, 8 ft on center - Drilling	515	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 128,750	
	13.067	3.5" diam grouted hole with #8 bar	23	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 117,037	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
	13.070	**Sloping intake**	**260**	**LF**					**$ 16,854.56**	**$ 4,382,185**	**Intake tunnel**
	13.071	Excavations including blasting	3,928	LCY					$ 45.00	$ 176,746	Include 30% bulk factor
	13.072	Hauling excavated material to waste area	3,928	LCY					$ 7.00	$ 27,494	
	13.073	Anchors, includes drilling and anchor placement									
	13.074	Setup drill rig	26	EA					$ 350.00	$ 9,100	
	13.075	Drilling	1,300	LF					$ 30.00	$ 39,000	
	13.076	Install soil anchor, #18	1,430	LF					$ 75.00	$ 107,250	
	13.077	Grout, assume 5" diameter	7	CY					$ 5,000.00	$ 32,809	
	13.078	Anchor head and plate	26	EA					$ 650.00	$ 16,900	
	13.079	Testing allowance	5	EA					$ 1,500.00	$ 7,500	
	13.080	Sloping intake structure									
	13.081	Concrete	3,181	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 1,039,716	
	13.082	Formwork	31,812	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 807,233	Allow 10sf/cy
	13.083	Reinforcement	318	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 1,181,789	Allow 200lbs/cy
	13.084	Steel Lining	192	TON					$ 2,800.00	$ 538,268	
	13.085	Un-listed items allowance	10.0%	%					$ 3,983,804.39	$ 398,380	
	13.086	**Vertical shaft**	**40**	**LF**					**$ 52,367.26**	**$ 2,094,690**	**Vertical shaft**
	13.087	Soil investigation	1	LS	$ -	$ -	$ -	$ 10,000.00	$ 10,000.00	$ 10,000	
	13.088	Soil investigation	1	LS	$ -	$ -	$ -	$ 10,000.00	$ 10,000.00	$ 10,000	
	13.089	Excavations including blasting	328	LCY	$ -	$ -	$ -	$ 45.00	$ 45.00	$ 14,742	Include 30% bulk factor
	13.090	Excavations by hand	218	LCY	$ -	$ -	$ -	$ 150.00	$ 150.00	$ 32,760	Assume 40% of excavations to be done by hand
	13.091	Hauling excavated material to waste area	546	CY	$ -	$ -	$ -	$ 7.00	$ 7.00	$ 3,822	
	13.092	Temporary bracing	12,073	SF	$ -	$ -	$ -	$ 65.00	$ 65.00	$ 784,717	
	13.093	Temporary shaft support									
	13.094	Shotcrete portal face	47	CY	$ -	$ -	$ -	$ 450.00	$ 450.00	$ 20,933	Assume 0.5' thick
	13.095	Steel fiber for shotcrete	1	TON	$ -	$ -	$ -	$ 2,500.00	$ 2,500.00	$ 1,744	assume 30lb steel fibers/CY shotcrete.
	13.096	20 ft rock bolts, 8 ft on center - Drilling	39	EA	$ -	$ -	$ -	$ 500.00	$ 500.00	$ 19,625	Assume 8 x 8 spacing
	13.097	3.5" diam grouted hole with #8 bar	2	CY	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ 8,920	

3. Cost Work Sheet Summary: Use sloping intake and eliminate bridge

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.098	Shaft									
	13.099	Shaft concrete lining	158	CY	$ -	$ -	$ -	$ 1,500.00	$ 1,500.00	$ 237,000	
	13.100	Steel lining	30	TON	$ -	$ -	$ -	$ 7,000.00	$ 7,000.00	$ 210,000	
	13.101	Slope protection	1	LS	$ -	$ -	$ -	$ 50,000.00	$ 50,000.00	$ 50,000	
	13.102	Shaft monitoring	1	LS	$ -	$ -	$ -	$ 250,000.00	$ 250,000.00	$ 250,000	
	13.103	Ground water control	1	LS	$ -	$ -	$ -	$ 250,000.00	$ 250,000.00	$ 250,000	
	13.104	Un-listed items allowance	10.0%	%	$ -	$ -	$ -	$ 1,904,264.04	$ 1,904,264.04	$ 190,426	
14		Misc allowance for small items, allow 1%	1.0%	%				151,777,781	$ 151,777,781	$ 1,517,778	
		Total Direct Cost Effect	42	Acre	$ 190,372.06	$ 329,540.82	$ 60,624.16	$ (944,625.17)	$ (331,863.20)	$ (13,938,254)	

Sites Reservoir (Alt 2): Golden Gate Dam | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

11.1. Construction Cost Summary: Dam Shell Re-design

				Total Cost
Total Direct Cost Effect				(51,211,638)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(51,211,638)
General Conditions				
Mobilization			5.0%	(2,560,582)
Site General Conditions & Requirements			10.0%	(5,377,222)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(650,644)
Bonds			0.6%	(358,801)
GC Home Office Overhead			6.0%	(3,609,533)
GC Profit			8.0%	(5,101,474)
Total Contractor Indirect Markups				(17,658,256)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(68,869,894)**
Contingencies				
Design Contingencies			10.0%	(6,886,989)
Construction Contingencies			15.0%	(11,363,532)
Total Contingency Allowance				(18,250,521)
TOTAL DIRECT COST BEFORE ESCALATION				**(87,120,415)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(850,760)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(87,971,175)**

11.1. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 298,528,075	$ 298,528,075	$ (298,528,075)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	51	ACRE	$ 3,121.91	$ 5,448.67	$ -	$ -	$ 8,570.58	$ 440,916	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	51	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 193,460	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	616,000	Tons					$ 37.15	$ 22,886,195	
	2.002	*Purchase processed material from quarry*	*616,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 13,673,044*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*416,706*	*LCY*	*$ 10.56*	*$ 11.55*	*$ -*	*$ -*	*$ 22.11*	*$ 9,213,151*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	682,000	Tons					$ 37.16	$ 25,344,198	
	2.005	*Purchase processed material from quarry*	*682,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 15,138,013*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*461,353*	*LCY*	*$ 10.57*	*$ 11.55*	*$ -*	*$ -*	*$ 22.12*	*$ 10,206,185*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	91,300	Tons					$ 37.30	$ 3,405,755	
	2.008	*Purchase processed material from quarry*	*91,300*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 2,026,540*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*61,762*	*LCY*	*$ 10.67*	*$ 11.66*	*$ -*	*$ -*	*$ 22.33*	*$ 1,379,214*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% waste factor / additional material supply*
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% waste factor / additional material supply*
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	111,300	BCY					$ 8.48	$ 943,634	
	3.002	*Excavations - remove top soil layer*	*122,430*	*LCY*	*$ 1.43*	*$ 2.23*	*$ -*	*$ -*	*$ 3.66*	*$ 448,133*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*122,430*	*LCY*	*$ 1.13*	*$ 2.92*	*$ -*	*$ -*	*$ 4.05*	*$ 495,502*	
	3.004	Dam Foundation Excavation - Common	289,800	BCY					$ 8.53	$ 2,472,016	
	3.005	*Excavations - remove top soil layer*	*318,780*	*LCY*	*$ 1.55*	*$ 2.20*	*$ -*	*$ -*	*$ 3.75*	*$ 1,196,362*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*318,780*	*LCY*	*$ 1.11*	*$ 2.89*	*$ -*	*$ -*	*$ 4.00*	*$ 1,275,653*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	884,100	BCY					$ 11.71	$ 10,356,498	
	3.008	*Rock excavations, no blasting*	*1,016,715*	*LCY*	*$ 2.51*	*$ 3.68*	*$ -*	*$ -*	*$ 6.18*	*$ 6,287,058*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*1,016,715*	*LCY*	*$ 1.11*	*$ 2.89*	*$ -*	*$ -*	*$ 4.00*	*$ 4,069,440*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	141,750	BCY					$ 24.14	$ 3,421,948	
	3.011	*Blasting operations*	*170,100*	*LCY*	*$ 4.28*	*$ 5.72*	*$ 4.85*	*$ -*	*$ 14.85*	*$ 2,525,896*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 1 mile haul*	*170,100*	*LCY*	*$ 1.48*	*$ 3.78*	*$ -*	*$ -*	*$ 5.27*	*$ 896,051*	
	3.013	*Crush and screen material*	*170,100*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	55,000	SY					$ 20.02	$ 1,101,318	
	4.002	*Initial foundation core cleanup*	*55,000*	*SY*	*$ 11.46*	*$ 5.51*	*$ -*	*$ -*	*$ 16.97*	*$ 933,387*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*15,125*	*CY*	*$ 3.72*	*$ 7.38*	*$ -*	*$ -*	*$ 11.10*	*$ 167,932*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	55,000	SY					$ 16.97	$ 933,387	
	4.005	*Final foundation core cleanup*	*55,000*	*SY*	*$ 11.46*	*$ 5.51*	*$ -*	*$ -*	*$ 16.97*	*$ 933,387*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	3,200	CY					$ 120.75	$ 386,387	
	4.008	*Dental excavations*	*3,520*	*LCY*	*$ 68.20*	*$ 30.85*	*$ -*	*$ -*	*$ 99.05*	*$ 348,650*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*3,520*	*LCY*	*$ 3.94*	*$ 6.78*	*$ -*	*$ -*	*$ 10.72*	*$ 37,737*	
	4.010	Dental Concrete	3,200	CY	$ 44.52	$ 20.23	$ 183.12	$ -	$ 247.87	$ 793,183	
	4.011	Grout Cap with Anchors	9,200	CY	$ 79.02	$ 22.87	$ 519.68	$ 4.38	$ 625.94	$ 5,758,641	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	84,000	LF					$ 78.69	$ 6,610,296	
	4.013	*Drill setup for all holes*	*1,120*	*ea.*	*$ 191.31*	*$ 320.13*	*$ -*	*$ -*	*$ 511.44*	*$ 572,811*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*84,000*	*lft*	*$ 10.34*	*$ 11.14*	*$ -*	*$ -*	*$ 21.48*	*$ 1,804,161*	
	4.015	*Redrill grout holes*	*8,400*	*lft*	*$ 10.43*	*$ 11.25*	*$ -*	*$ -*	*$ 21.68*	*$ 182,151*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*4,200*	*ea.*	*$ 91.43*	*$ -*	*$ -*	*$ -*	*$ 91.43*	*$ 384,021*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*5,600*	*hr*	*$ 485.34*	*$ 100.04*	*$ -*	*$ -*	*$ 585.39*	*$ 3,278,177*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*1,120*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 388,976*	
	4.019	Consolidation Grouting	35,000	LF					$ 78.81	$ 2,758,350	
	4.020	*Drill setup for all holes*	*467*	*ea.*	*$ 189.48*	*$ 317.08*	*$ -*	*$ -*	*$ 506.57*	*$ 236,398*	*Assume 75' drilling lengths*
	4.021	*Drill curtain grout holes*	*35,000*	*lft*	*$ 10.38*	*$ 11.19*	*$ -*	*$ -*	*$ 21.56*	*$ 754,625*	
	4.022	*Redrill grout holes*	*3,500*	*lft*	*$ 10.73*	*$ 11.57*	*$ -*	*$ -*	*$ 22.30*	*$ 78,065*	*Assume 10% to be redrilled*
	4.023	*Hookup to grout holes and grout nipples*	*1,750*	*ea.*	*$ 91.79*	*$ -*	*$ -*	*$ -*	*$ 91.79*	*$ 160,624*	*1 x hookup every 20'*
	4.024	*Inject portland cement grout*	*2,333*	*hr*	*$ 485.58*	*$ 100.09*	*$ -*	*$ -*	*$ 585.67*	*$ 1,366,565*	*Allow 5 hours per hole*

11.1. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.025	*Perform hydraulic conductivity tests*	467	ea.	$ -	$ -	$ -	$ 347.30	$ 347.30	$ 162,073	
	4.026	Type III Cement	4,200	Tons	$ 176.82	$ 73.04	$ 113.14	$ -	$ 362.99	$ 1,524,570	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	145,600	SY					$ 4.49	$ 653,518	
	5.002	*Initial dam shell cleanup*	145,600	SY	$ 1.33	$ 0.40	$ -	$ -	$ 1.73	$ 252,559	
	5.003	*Load and haul to disposal area, 0.5 mile haul*	26,693	LCY	$ 5.52	$ 9.50	$ -	$ -	$ 15.02	$ 400,959	*Assume removal of top layer, 0.5' thick*
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	500	LF	$ 47.70	$ 29.60	$ 35.56	$ -	$ 112.86	$ 56,428	
	6.002	Furnish and Install Foundation Drain Manholes	3	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 17,275	
	6.003	Seepage Partition Walls	700	CY	$ 523.27	$ 116.49	$ 465.37	$ -	$ 1,105.13	$ 773,589	3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	977,000	BCY					$ 7.51	$ 7,333,019	Assumed common earth, 3000' haul w/ scraper
	7.003	*Embankment excavations*	1,074,700	LCY	$ 0.98	$ 2.69	$ -	$ -	$ 3.67	$ 3,939,677	*Include 10% swell factor*
	7.004	*Load and haul to site stockpile, 0.25 mile haul*	1,074,700	LCY	$ 0.85	$ 2.31	$ -	$ -	$ 3.16	$ 3,393,341	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	42,800	BCY					$ 9.18	$ 392,730	
	7.006	*Embankment excavations*	47,080	LCY	$ 1.46	$ 3.08	$ -	$ -	$ 4.53	$ 213,506	*Include 10% swell factor*
	7.007	*Load and haul to site stockpile, 0.25 mile haul*	47,080	LCY	$ 1.06	$ 2.75	$ -	$ -	$ 3.81	$ 179,224	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	189,000	BCY					$ 9.05	$ 1,709,531	
	7.009	*Embankment excavations*	207,900	LCY	$ 1.44	$ 3.03	$ -	$ -	$ 4.47	$ 929,379	*Include 10% swell factor*
	7.010	*Load and haul to site stockpile, 0.25 mile haul*	207,900	LCY	$ 1.05	$ 2.71	$ -	$ -	$ 3.75	$ 780,152	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	
	7.012	*Embankment excavations*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	*Load and haul to site stockpile, 0.25 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	302,200	ECY					$ 6.76	$ 2,043,264	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	*Load and haul to site stockpile, 0.25 mile haul*	332,420	LCY	$ 1.10	$ 2.97	$ -	$ -	$ 4.08	$ 1,355,016	
	7.016	*Spread and compact*	332,420	LCY	$ 1.14	$ 0.93	$ -	$ -	$ 2.07	$ 688,247	
	7.017	Topsoil Replacement	106,000	ECY					$ 9.81	$ 1,039,643	Backfill burrow area using material from stockpile
	7.018	*Excavate, Load and haul excavated backfill material to fill location, 1 mile haul*	116,600	LCY	$ 1.75	$ 5.04	$ -	$ -	$ 6.79	$ 791,874	
	7.019	*Spread and compact*	116,600	LCY	$ 1.17	$ 0.95	$ -	$ -	$ 2.12	$ 247,769	
	7.020	Furnish and Install Zone 1 - Core	2,030,000	ECY					$ 13.57	$ 27,546,777	
	7.021	*Excavate from burrow area*	2,233,000	LCY	$ 1.43	$ 3.02	$ -	$ -	$ 4.45	$ 9,946,868	*Include 10% swell factor*
	7.022	*Load and haul to zone-1 fill location, 0.5 mile haul*	2,233,000	LCY	$ 1.28	$ 2.88	$ -	$ -	$ 4.16	$ 9,289,247	*No stockpiling required*
	7.023	*Spread and compact*	2,233,000	LCY	$ 1.50	$ 2.22	$ -	$ -	$ 3.72	$ 8,310,662	
	7.024	Load, Haul and Place - Zone 2A - Filter	616,000	Tons					$ 3.20	$ 1,968,455	
	7.025	*Load at stockpile and haul to fill location, 0.5 mile haul*	125,012	LCY	$ 0.93	$ 2.52	$ -	$ -	$ 3.45	$ 431,222	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0251	*Direct hauling from quarry*	291,694	LCY						Elsewhere	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.026	*Spread and compact*	416,706	LCY	$ 1.46	$ 2.23	$ -	$ -	$ 3.69	$ 1,537,233	*Include 15% swell factor*
	7.027	Load, Haul and Place - Zone 2A - Drain	682,000	Tons					$ 3.20	$ 2,182,433	
	7.028	*Load at stockpile and haul to fill location, 0.5 mile haul*	138,406	LCY	$ 0.93	$ 2.55	$ -	$ -	$ 3.48	$ 481,953	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0281	*Direct hauling from quarry*	322,947	LCY						Elsewhere	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.029	*Spread and compact*	461,353	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.69	$ 1,700,479	*Include 15% swell factor*
	7.030	Load, Haul and Place - Zone 2A - Transition	385,000	Tons					$ 3.23	$ 1,244,898	
	7.031	*Load at stockpile and haul to fill location, 0.5 mile haul*	78,132	LCY	$ 0.96	$ 2.61	$ -	$ -	$ 3.57	$ 279,026	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0311	*Direct hauling from quarry*	182,309	LCY						Elsewhere	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.032	*Spread and compact*	260,441	LCY	$ 1.46	$ 2.25	$ -	$ -	$ 3.71	$ 965,872	*Include 15% swell factor*
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	
	7.034	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0341	*Direct hauling from quarry*	-	LCY						Elsewhere	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.035	*Spread and compact*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	*Include 15% swell factor*
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	
	7.037	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	*Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location*
	7.0371	*Direct hauling from quarry*	-	LCY						Elsewhere	*Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly*
	7.038	*Spread and compact*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	*Include 15% swell factor*
	7.039	Furnish and Install Zone 3 - Rockfill	1,569,000	ECY					$ 27.54	$ 43,208,931	
	7.040	*Blasting operations*	1,882,800	LCY	$ 4.26	$ 5.69	$ 4.85	$ -	$ 14.80	$ 27,859,498	*Include 20% swell factor*
	7.041	*Load and haul to processing area, 0.5 mile haul*	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	*No stockpiling required, material to be hauled to fill location directly*
	7.042	*Crush and screen material*	1,882,800	LCY	$ -	$ -	$ -	$ -	$ -	Not required	*No crushing and screening required*
	7.043	*Load and haul to zone-3, 1.25 mile haul*	1,882,800	LCY	$ 1.11	$ 3.35	$ -	$ -	$ 4.47	$ 8,411,478	*No stockpiling required, direct haul*
	7.044	*Spread and compact*	1,882,800	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 6,937,956	
	7.045	Furnish and Install Zone 4 - Random	4,080,000	ECY					$ 12.08	$ 49,291,337	

11.1. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.046	Excavations in common soil	3,025,650	LCY	$ 1.55	$ 2.20	$ -	$ -	$ 3.75	$ 11,350,609	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	3,025,650	LCY	$ 1.25	$ 3.47	$ -	$ -	$ 4.72	$ 14,289,895	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	1,666,350	LCY	$ 1.06	$ 2.78	$ -	$ -	$ 3.83	$ 6,387,568	Include 15% swell factor
	7.050	Spread and compact	4,692,000	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 17,263,266	
	7.051	Furnish and Install Riprap	128,000	ECY					$ 40.08	$ 5,130,770	
	7.052	Blasting operations	153,600	LCY	$ 4.29	$ 5.74	$ 4.85	$ -	$ 14.87	$ 2,284,733	Include 20% swell factor
	7.053	Load and haul to processing area, 1 mile haul		LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	153,600	LCY	$ 0.93	$ 2.54	$ -	$ -	$ 3.47	$ 532,685	
	7.056	Riprap placement	153,600	LCY	$ 5.99	$ 9.07	$ -	$ -	$ 15.06	$ 2,313,351	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 1,840,000.00	$ 1,840,000.00	$ 1,840,000	Allowance
	8.003	Seeding and Mulching	261,360	SF	$ -	$ -	$ -	$ 0.69	$ 0.69	$ 180,338	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	1,200	CY					$ 87.48	$ 104,976	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	1,380	LCY	$ 10.69	$ 11.57	$ 37.73	$ -	$ 60.00	$ 82,795	Include 15% swell factor
	8.007	Place and compact	1,380	LCY	$ 5.24	$ 10.83	$ -	$ -	$ 16.07	$ 22,181	
	8.008	Developing haul routes - Haul routes inside reservoir	12	ACRES					$ 27,947.01	$ 335,364	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	522,720	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 104,650	
	8.0091	Load and haul earth fill	9,680	CY	$ 1.74	$ 4.75	$ -	$ -	$ 6.49	$ 62,793	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	522,720	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.32	$ 167,922	
	8.011	Developing haul routes - Haul routes outside reservoir	25	ACRES					$ 27,008.54	$ 675,213	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	1,089,000	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 209,299	
	8.0121	Load and haul earth fill	20,167	CY	$ 1.73	$ 4.72	$ -	$ -	$ 6.45	$ 130,071	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	1,089,000	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 335,844	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	7,400	CY	$ 94.85	$ 50.47	$ 233.06	$ -	$ 378.38	$ 2,799,987	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.020	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 996,666.67	$ 996,666.67	$ 996,667	Allowance
9		**Golden Gate Dam Bypass Pipeline Facilities**									
	9.001	Upstream Cofferdam	-	CY						Included above	Earth fill coffer dam; included within zone 4 fill work
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required; Earth fill coffer dam
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	2,100	LF					$ 1,893.98	$ 3,977,357	
	9.010	Excavate trench in bedrock	4,107	LCY	$ 71.51	$ 51.86	$ -	$ -	$ 123.38	$ 506,670	
	9.011	Load and haul material to disposal site, 0.5 mile haul	4,107	LCY	$ 3.11	$ 7.79	$ -	$ -	$ 10.89	$ 44,740	
	9.012	48" steel pipe placement	2,100	LF	$ 60.87	$ 27.46	$ 845.32	$ -	$ 933.66	$ 1,960,680	
	9.013	Concrete backfill for pipe trench (dam footprint)	2,200	CY	$ 83.28	$ 21.01	$ 194.22	$ -	$ 298.51	$ 656,609	
	9.014	Reinforcement for concrete backfill	132	TON	$ 135.25	$ 9.35	$ 2,663.58	$ -	$ 2,808.18	$ 370,616	Allow 60lbs/CY for reinforcement
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	1	LS	$ 21,679.93	$ 6,197.40	$ 161,625.00	$ -	$ 189,502.33	$ 189,502	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	10	LF	$ -	$ -	$ -	$ 3,450.00	$ 3,450.00	$ 34,500	
	9.017	Install 48'x48" debris rack on conc. Manhole	1	LS	$ -	$ -	$ -	$ 5,865.00	$ 5,865.00	$ 5,865	
	9.018	Grout pipe	1,050	CY	$ 26.27	$ 5.26	$ 151.73	$ -	$ 183.26	$ 192,420	Allow 0.5CY of grout/lf of pipe
	9.019	Field Survey	1	LS	$ -	$ -	$ -	$ 15,755.00	$ 15,755.00	$ 15,755	
	9.020	Riprap Discharge Channel	75	CY					$ 460.11	$ 34,508	
	9.021	Blasting operations	90	LCY	$ 85.14	$ 113.82	$ 4.85	$ -	$ 203.81	$ 18,343	Include 20% swell factor
	9.022	Excavate	90	LCY	$ 22.12	$ 42.13	$ -	$ -	$ 64.25	$ 5,782	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	90	LCY	$ 18.89	$ 32.86	$ -	$ -	$ 51.75	$ 4,657	
	9.025	Place at the channel	90	LCY	$ 37.90	$ 25.72	$ -	$ -	$ 63.62	$ 5,725	
10		Misc allowance for small items, allow 1%	1.0%	%				244,867,760	$ 244,867,760	$ 2,448,678	
		Total Direct Cost Effect	53	Acre	$ 1,403,472	$ 2,155,519	$ 988,365	$ (5,513,613)	$ (966,257)	$ (51,211,638)	

Sites Reservoir (Alt 2): Sites Dam | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

11.2. Construction Cost Summary: Dam Shell Re-design

				Total Cost
Total Direct Cost Effect				(18,489,574)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(18,489,574)
General Conditions				
Mobilization			5.0%	(924,479)
Site General Conditions & Requirements			10.0%	(1,941,405)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(234,910)
Bonds			0.6%	(129,542)
GC Home Office Overhead			6.0%	(1,303,195)
GC Profit			8.0%	(1,841,848)
Total Contractor Indirect Markups				(6,375,379)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(24,864,953)**
Contingencies				
Design Contingencies			10.0%	(2,486,495)
Construction Contingencies			15.0%	(4,102,717)
Total Contingency Allowance				(6,589,212)
TOTAL DIRECT COST BEFORE ESCALATION				**(31,454,165)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(307,160)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(31,761,325)**

11.2. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 163,312,242	$ 163,312,242	$ (163,312,242)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	26	ACRE	$ 3,169.75	$ 5,532.18	$ -	$ -	$ 8,701.93	$ 228,060	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	26	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 98,555	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	220,000	Tons					$ 36.99	$ 8,138,176	
	2.002	*Purchase processed material from quarry*	*220,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 4,883,230*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*148,824*	*LCY*	*$ 10.45*	*$ 11.42*	*$ -*	*$ -*	*$ 21.87*	*$ 3,254,946*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	264,000	Tons					$ 37.03	$ 9,776,844	
	2.005	*Purchase processed material from quarry*	*264,000*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 5,859,876*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*178,588*	*LCY*	*$ 10.48*	*$ 11.45*	*$ -*	*$ -*	*$ 21.93*	*$ 3,916,968*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	38,500	Tons					$ 37.00	$ 1,424,640	
	2.008	*Purchase processed material from quarry*	*38,500*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 854,565*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*26,044*	*LCY*	*$ 10.46*	*$ 11.43*	*$ -*	*$ -*	*$ 21.89*	*$ 570,075*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% waste factor / additional material supply*
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Include 10% waste factor / additional material supply*
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	54,600	BCY					$ 8.46	$ 461,779	
	3.002	*Excavations - remove top soil layer*	*60,060*	*LCY*	*$ 1.43*	*$ 2.22*	*$ -*	*$ -*	*$ 3.65*	*$ 219,299*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*60,060*	*LCY*	*$ 1.12*	*$ 2.91*	*$ -*	*$ -*	*$ 4.04*	*$ 242,480*	
	3.004	Dam Foundation Excavation - Common	114,450	BCY					$ 8.57	$ 980,634	
	3.005	*Excavations - remove top soil layer*	*125,895*	*LCY*	*$ 1.56*	*$ 2.21*	*$ -*	*$ -*	*$ 3.77*	*$ 474,590*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*125,895*	*LCY*	*$ 1.12*	*$ 2.90*	*$ -*	*$ -*	*$ 4.02*	*$ 506,044*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	325,500	BCY					$ 11.73	$ 3,816,871	
	3.008	*Rock excavations, no blasting*	*374,325*	*LCY*	*$ 2.51*	*$ 3.68*	*$ -*	*$ -*	*$ 6.20*	*$ 2,319,824*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*374,325*	*LCY*	*$ 1.11*	*$ 2.89*	*$ -*	*$ -*	*$ 4.00*	*$ 1,497,048*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	45,150	BCY					$ 24.65	$ 1,113,001	
	3.011	*Blasting operations*	*54,180*	*LCY*	*$ 4.38*	*$ 5.86*	*$ 4.85*	*$ -*	*$ 15.09*	*$ 817,809*	*Include 20% swell factor*
	3.012	*Load and haul to stockpile, 0.5 mile haul*	*54,180*	*LCY*	*$ 1.52*	*$ 3.93*	*$ -*	*$ -*	*$ 5.45*	*$ 295,193*	
	3.013	*Crush and screen material*	*54,180*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	*No crushing and screening required*
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	18,000	SY					$ 20.29	$ 365,197	
	4.002	*Initial foundation core cleanup*	*18,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 309,220*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*4,950*	*CY*	*$ 3.79*	*$ 7.52*	*$ -*	*$ -*	*$ 11.31*	*$ 55,977*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	18,000	SY					$ 17.18	$ 309,220	
	4.005	*Final foundation core cleanup*	*18,000*	*SY*	*$ 11.60*	*$ 5.58*	*$ -*	*$ -*	*$ 17.18*	*$ 309,220*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	720	CY					$ 123.44	$ 88,874	
	4.008	*Dental excavations*	*792*	*LCY*	*$ 69.06*	*$ 31.24*	*$ -*	*$ -*	*$ 100.30*	*$ 79,439*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*792*	*LCY*	*$ 4.38*	*$ 7.53*	*$ -*	*$ -*	*$ 11.91*	*$ 9,434*	
	4.010	Dental Concrete	720	CY	$ 43.97	$ 19.98	$ 183.12	$ -	$ 247.07	$ 177,891	
	4.011	Grout Cap with Anchors	3,240	CY	$ 80.60	$ 23.32	$ 519.68	$ 12.42	$ 636.03	$ 2,060,726	3' x 40' cap, includes formwork and reinforcement (150lbs/cy)
	4.012	Curtain Grouting	27,500	LF					$ 78.86	$ 2,168,658	
	4.013	*Drill setup for all holes*	*367*	*ea.*	*$ 194.78*	*$ 325.95*	*$ -*	*$ -*	*$ 520.74*	*$ 190,937*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*27,500*	*lft*	*$ 10.32*	*$ 11.13*	*$ -*	*$ -*	*$ 21.45*	*$ 589,822*	
	4.015	*Redrill grout holes*	*2,750*	*lft*	*$ 10.62*	*$ 11.45*	*$ -*	*$ -*	*$ 22.08*	*$ 60,717*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*1,375*	*ea.*	*$ 91.31*	*$ -*	*$ -*	*$ -*	*$ 91.31*	*$ 125,545*	*1 x hookup every 20'*
	4.017	*Inject portland cement grout*	*1,833*	*hr*	*$ 485.83*	*$ 100.15*	*$ -*	*$ -*	*$ 585.98*	*$ 1,074,294*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*367*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 127,343*	

11.2. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	4.019	Consolidation Grouting	12,300	LF					$ 80.53	$ 990,551	
	4.020	Drill setup for all holes	164	ea.	$ 207.38	$ 347.03	$ -	$ -	$ 554.40	$ 90,922	Assume 75' drilling lengths
	4.021	Drill curtain grout holes	12,300	lft	$ 10.52	$ 11.34	$ -	$ -	$ 21.86	$ 268,889	
	4.022	Redrill grout holes	1,230	lft	$ 13.57	$ 14.63	$ -	$ -	$ 28.21	$ 34,695	Assume 10% to be redrilled
	4.023	Hookup to grout holes and grout nipples	615	ea.	$ 93.06	$ -	$ -	$ -	$ 93.06	$ 57,234	1 x hookup every 20'
	4.024	Inject portland cement grout	820	hr	$ 487.20	$ 100.43	$ -	$ -	$ 587.62	$ 481,852	Allow 5 hours per hole
	4.025	Perform hydraulic conductivity tests	164	ea.	$ -	$ -	$ -	$ 347.30	$ 347.30	$ 56,957	
	4.026	Type III Cement	1,400	Tons	$ 176.82	$ 73.04	$ 113.14	$ -	$ 362.99	$ 508,190	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	69,440	SY					$ 3.68	$ 255,280	
	5.002	Initial dam shell cleanup	69,440	SY	$ 1.36	$ 0.41	$ -	$ -	$ 1.77	$ 123,200	
	5.003	Load and haul to disposal area, 0.5 mile haul	12,731	LCY	$ 3.81	$ 6.56	$ -	$ -	$ 10.37	$ 132,081	Assume removal of top layer, 0.5' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	500	LF	$ 43.36	$ 26.91	$ 35.56	$ -	$ 105.83	$ 52,914	
	6.002	Furnish and Install Foundation Drain Manholes	1	EA	$ 1,670.31	$ 1,017.05	$ 3,070.88	$ -	$ 5,758.23	$ 5,758	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	305,000	BCY					$ 7.48	$ 2,282,215	Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	335,500	LCY	$ 0.98	$ 2.68	$ -	$ -	$ 3.65	$ 1,226,124	Include 10% swell factor
	7.004	Load and haul to site stockpile, 0.25 mile haul	335,500	LCY	$ 0.84	$ 2.30	$ -	$ -	$ 3.15	$ 1,056,091	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	137,500	BCY					$ 9.07	$ 1,247,495	
	7.006	Embankment excavations	151,250	LCY	$ 1.44	$ 3.04	$ -	$ -	$ 4.48	$ 678,196	Include 10% swell factor
	7.007	Load and haul to site stockpile, 0.25 mile haul	151,250	LCY	$ 1.05	$ 2.72	$ -	$ -	$ 3.76	$ 569,300	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	
	7.009	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 10% swell factor
	7.010	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	
	7.012	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	110,625	ECY					$ 6.80	$ 751,921	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	Load and haul to site stockpile, 0.25 mile haul	121,688	LCY	$ 1.11	$ 2.99	$ -	$ -	$ 4.10	$ 498,646	
	7.016	Spread and compact	121,688	LCY	$ 1.15	$ 0.93	$ -	$ -	$ 2.08	$ 253,275	
	7.017	Topsoil Replacement	52,000	ECY					$ 9.94	$ 517,068	Backfill burrow area using material from stockpile
	7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile	57,200	LCY	$ 1.79	$ 5.14	$ -	$ -	$ 6.92	$ 395,937	
	7.019	Spread and compact	57,200	LCY	$ 1.17	$ 0.95	$ -	$ -	$ 2.12	$ 121,132	
	7.020	Furnish and Install Zone 1 - Core	640,000	ECY					$ 13.13	$ 8,402,490	
	7.021	Excavate from burrow area	704,000	LCY	$ 1.43	$ 3.03	$ -	$ -	$ 4.46	$ 3,139,794	Include 10% swell factor
	7.022	Load and haul to zone-1 fill location, 1 mile haul	704,000	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.74	$ 2,635,648	No stockpiling required
	7.023	Spread and compact	704,000	LCY	$ 1.51	$ 2.22	$ -	$ -	$ 3.73	$ 2,627,048	
	7.024	Load, Haul and Place - Zone 2A - Filter	220,000	Tons					$ 3.26	$ 716,149	
	7.025	Load at stockpile and haul to fill location, 0.5 mile haul	44,647	LCY	$ 0.85	$ 2.70	$ -	$ -	$ 3.55	$ 158,392	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	Direct hauling from quarry	104,176	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	Spread and compact	148,824	LCY	$ 1.48	$ 2.27	$ -	$ -	$ 3.75	$ 557,757	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	264,000	Tons					$ 3.22	$ 849,348	
	7.028	Load at stockpile and haul to fill location, 0.5 mile haul	53,576	LCY	$ 0.81	$ 2.60	$ -	$ -	$ 3.41	$ 182,760	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	Direct hauling from quarry	125,012	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	Spread and compact	178,588	LCY	$ 1.47	$ 2.26	$ -	$ -	$ 3.73	$ 666,588	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	38,500	Tons					$ 3.78	$ 145,383	
	7.031	Load at stockpile and haul to fill location, 0.5 mile haul	7,813	LCY	$ 1.11	$ 3.56	$ -	$ -	$ 4.68	$ 36,552	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	Direct hauling from quarry	18,231	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	Spread and compact	26,044	LCY	$ 1.65	$ 2.53	$ -	$ -	$ 4.18	$ 108,831	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	
	7.034	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0341	Direct hauling from quarry	-	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.035	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 15% swell factor
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	
	7.037	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0371	Direct hauling from quarry	-	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.038	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	Include 15% swell factor

11.2. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	7.039	Furnish and Install Zone 3 - Rockfill	700,000	ECY					$ 26.78	$ 18,749,298	
	7.040	Blasting operations	840,000	LCY	$ 4.26	$ 5.70	$ 4.85	$ -	$ 14.80	$ 12,435,318	Include 20% swell factor
	7.041	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	Crush and screen material	840,000	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	Load and haul to zone-3, 1 mile haul	840,000	LCY	$ 0.88	$ 2.94	$ -	$ -	$ 3.82	$ 3,212,306	No stockpiling required, direct haul
	7.044	Spread and compact	840,000	LCY	$ 1.46	$ 2.24	$ -	$ -	$ 3.69	$ 3,101,674	
	7.045	Furnish and Install Zone 4 - Random	1,600,000	ECY					$ 12.45	$ 19,919,233	
	7.046	Excavations in common soil	1,400,815	LCY	$ 1.42	$ 2.20	$ -	$ -	$ 3.62	$ 5,072,480	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	1,400,815	LCY	$ 1.25	$ 3.48	$ -	$ -	$ 4.73	$ 6,622,146	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	439,185	LCY	$ 0.79	$ 2.51	$ -	$ -	$ 3.30	$ 1,449,897	Include 15% swell factor
	7.050	Spread and compact	1,840,000	LCY	$ 1.45	$ 2.23	$ -	$ -	$ 3.68	$ 6,774,710	
	7.051	Furnish and Install Riprap	56,000	ECY					$ 40.22	$ 2,252,409	
	7.052	Blasting operations	67,200	LCY	$ 4.33	$ 5.79	$ 4.85	$ -	$ 14.97	$ 1,006,286	Include 20% swell factor
	7.053	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	67,200	LCY	$ 0.82	$ 2.62	$ -	$ -	$ 3.44	$ 231,496	
	7.056	Riprap placement	67,200	LCY	$ 6.00	$ 9.10	$ -	$ -	$ 15.10	$ 1,014,628	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 1,993,333.33	$ 1,993,333.33	$ 1,993,333	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	800	CY					$ 105.74	$ 84,590	
	8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	920	LCY	$ 14.50	$ 15.60	$ 37.73	$ -	$ 67.84	$ 62,409	Include 15% swell factor
	8.007	Place and compact	920	LCY	$ 7.86	$ 16.25	$ -	$ -	$ 24.11	$ 22,181	
	8.008	Developing haul routes - Haul routes inside reservoir	22	ACRES					$ 26,990.65	$ 593,794	Clear, grade, provide gravel fill layer and compact
	8.009	Clear and grub	958,320	SF	$ 0.07	$ 0.12	$ -	$ -	$ 0.19	$ 183,137	
	8.0091	Load and haul earth fill	17,747	CY	$ 1.69	$ 4.62	$ -	$ -	$ 6.32	$ 112,130	Use existing earth fill material from stockpile
	8.010	Grade and Compact surface for earthen road	958,320	SF	$ 0.13	$ 0.18	$ -	$ -	$ 0.31	$ 298,528	
	8.011	Developing haul routes - Haul routes outside reservoir	15	ACRES					$ 27,785.55	$ 416,783	Clear, grade, provide gravel fill layer and compact
	8.012	Clear and grub	653,400	SF	$ 0.08	$ 0.12	$ -	$ -	$ 0.20	$ 130,812	
	8.0121	Load and haul earth fill	12,100	CY	$ 1.79	$ 4.88	$ -	$ -	$ 6.67	$ 80,733	Use existing earth fill material from stockpile
	8.013	Grade and Compact surface for earthen road	653,400	SF	$ 0.14	$ 0.18	$ -	$ -	$ 0.31	$ 205,238	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	2,400	CY	$ 95.71	$ 50.93	$ 233.06	$ -	$ 379.70	$ 911,274	
	8.016	Mass Concrete for spillway	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.017	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.018	Clay Backfill	-	CY					$ -	$ -	Not required
	8.019	Clay excavations from burrow area	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.02	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.021	Place clay backfill material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.022	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.023	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.024	Load and haul to processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.025	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.027	Spread riprap	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	8.028	Rim Grouting	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	8.030	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 498,333.33	$ 498,333.33	$ 498,333	Allowance
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included within Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	Excavate trench in bedrock	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.011	Load and haul material to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.012	48" steel pipe placement	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.013	Concrete backfill for pipe trench (dam footprint)	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.014	Reinforcement for concrete backfill	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	9.015	48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	9.017	Install 48"x48" debris rack on conc. Manhole	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.018	Grout pipe	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.019	Field Survey	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.022	Excavate	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.023	Crush and screen material			$ -	$ -	$ -	$ -		Not required	
	9.024	Load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	9.025	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	

11.2. Cost Work Sheet Summary: Dam Shell Re-design

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
10		**Sites Dam Diversion Facilities**									
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	Earth fill coffer dam; included within zone 4 fill work
	10.002	Sheet pile cofferdams	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Not required; Earth fill coffer dam
	10.003	Excavations - remove top soil layer and stockpile	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.004	Load and haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.005	Purchase processed material from quarry	-	Ton	$ -	$ -	$ -	$ -	$ -	$ -	
	10.006	Import material to site stockpile, 40 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.007	Load at stockpile and haul to fill location, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.008	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	10.009	Upstream Portal Excavation and Rock Bolts	15,800	CY					$ 44.61	$ 704,890	
	10.010	Excavate and load material	17,380	LCY	$ 1.39	$ 2.42	$ -	$ -	$ 3.81	$ 66,147	Assumed excavating material is either common earth, loam, sand, clay or loose material.
	10.011	Haul to disposal site, 0.5 mile haul	17,380	LCY	$ 1.82	$ 4.37	$ -	$ -	$ 6.19	$ 107,615	
	10.012	Shotcrete portal face	948	CY	$ 86.92	$ 41.04	$ 221.97	$ -	$ 349.92	$ 331,727	
	10.013	Steel fiber for shotcrete	17	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 41,114	Allow 35lbs/CY of concrete
	10.014	20 ft rock bolts, 5 ft on center - Drilling	790	EA	$ 50.73	$ 20.73	$ -	$ -	$ 71.46	$ 56,451	
	10.015	3.5" diam grouted hole with #10 bar	36	CY	$ 263.49	$ 78.40	$ 2,522.70	$ -	$ 2,864.58	$ 101,836	
	10.016	Upstream Portal Backfill	24,500	CY					$ 10.54	$ 258,283	
	10.017	Load at stockpile and haul to fill location, 0.5 mile haul	26,950	LCY	$ 0.99	$ 4.34	$ -	$ -	$ 5.33	$ 143,587	
	10.018	Spread and compact	26,950	LCY	$ 2.11	$ 2.15	$ -	$ -	$ 4.26	$ 114,697	
	10.019	Inlet and Valve Structures	2,200	CY					$ 1,092.50	$ 2,403,500	
	10.020	Pour inlet and valve structures	2,200	CY	$ -	$ -	$ -	$ 1,092.50	$ 1,092.50	$ 2,403,500	
	10.021	Downstream Portal Excavation and Rock Bolts	12,500	CY					$ 45.40	$ 567,445	
	10.022	Excavate and load material	13,750	LCY	$ 1.48	$ 2.59	$ -	$ -	$ 4.07	$ 55,971	
	10.023	Haul to disposal site, 0.5 mile haul	13,750	LCY	$ 1.95	$ 4.56	$ -	$ -	$ 6.51	$ 89,497	
	10.024	Shotcrete portal face	750	CY	$ 87.89	$ 41.50	$ 221.97	$ -	$ 351.36	$ 263,517	
	10.025	Steel fiber for shotcrete	13	TON	$ -	$ -	$ 2,478.25	$ -	$ 2,478.25	$ 32,527	Allow 35lbs/CY of concrete
	10.026	20 ft rock bolts, 5 ft on center - Drilling	625	EA	$ 52.10	$ 21.29	$ -	$ -	$ 73.39	$ 45,867	
	10.027	3.5" diam grouted hole with #10 bar	28	CY	$ 249.79	$ 74.32	$ 2,522.70	$ -	$ 2,846.81	$ 80,066	
	10.028	Downstream Portal Backfill	34,400	CY					$ 10.22	$ 351,620	
	10.029	Load at stockpile and haul to fill location, 0.5 mile haul	37,840	BCY	$ 0.92	$ 4.04	$ -	$ -	$ 4.96	$ 187,767	
	10.030	Spread and compact	37,840	LCY	$ 2.14	$ 2.19	$ -	$ -	$ 4.33	$ 163,852	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	1,590	LF	$ -	$ -	$ -	$ 7,304.42	$ 7,304.42	$ 11,614,023	Second shift work will apply
	10.032	Tunnel Concrete Lining	1,590	LF	$ -	$ -	$ -	$ 7,205.71	$ 7,205.71	$ 11,457,076	Second shift work will apply
	10.033	10-Ft Steel Pipe Cut and Cover Section	1,590	LF	$ -	$ -	$ -	$ 8,094.08	$ 8,094.08	$ 12,869,593	Second shift work will apply
	10.034	Mechanical, Valves, Trash rack, and Metals	1	LS	$ -	$ -	$ -	$ 9,775,000	$ 9,775,000	$ 9,775,000	Allowance
	10.035	Riprap Discharge Channel	75	CY					$ 458.82	$ 34,412	
	10.036	Blasting operations	90	LCY	$ 59.57	$ 64.41	$ 4.85	$ -	$ 128.83	$ 11,594	
	10.037	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	90	LCY	$ 22.81	$ 68.17	$ -	$ -	$ 90.98	$ 8,188	
	10.038	Crush and screen material			$ -	$ -	$ -	$ -			
	10.039	Load and haul to stockpile, 1 mile haul	90	LCY	$ 13.36	$ 58.58	$ -	$ -	$ 71.95	$ 6,475	
	10.040	Place at the channel	90	LCY	$ 35.55	$ 55.05	$ -	$ -	$ 90.60	$ 8,154	
11		**ERS Facility**									Not required
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.003	Haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.006	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.007	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	Haul excavated material and stockpile, 1 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 5 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #10 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 1 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		Misc allowance for small items, allow 1%	1.0%	%				143,388,780	$ 143,388,780	$ 1,433,888	
		Total Direct Cost Effect	27	Acre	$ 1,047,346	$ 1,656,177	$ 720,729	$ (4,109,051)	$ (684,799)	$ (18,489,574)	

Sites Reservoir (Alt 2): Inlet/Outlet & Diversion Works | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

12. Construction Cost Summary: Assume 10% drawdown in 10 days

				Total Cost
Total Direct Cost Effect				(9,237,393)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(9,237,393)
General Conditions				
Mobilization			5.0%	(461,870)
Site General Conditions & Requirements			10.0%	(969,926)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(117,361)
Bonds			0.6%	(64,719)
GC Home Office Overhead			6.0%	(651,076)
GC Profit			8.0%	(920,188)
Total Contractor Indirect Markups				(3,185,140)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(12,422,533)**
Contingencies				
Design Contingencies			10.0%	(1,242,253)
Construction Contingencies			15.0%	(2,049,718)
Total Contingency Allowance				(3,291,971)
TOTAL DIRECT COST BEFORE ESCALATION				**(15,714,504)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(153,457)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(15,867,961)**

12. Cost Work Sheet Summary: Assume 10% drawdown in 10 days

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 167,233,813	$ 167,233,813	$ (167,233,813)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Allowed $0.25/SF to 30% of the total area
9		**Golden Gate Dam Bypass Pipeline Facilities**									Included with Golden Gate Dam Estimate
	9.001	Upstream Cofferdam	-	CY					$ -	$ -	
	9.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.006	*Haul material from quarry to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.009	Install 48-Inch Steel Pipe and Encasement	-	LF					$ -	$ -	
	9.010	*Excavate trench in bedrock*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.011	*Load and haul material to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.012	*48" steel pipe placement*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.013	*Concrete backfill for pipe trench (dam footprint)*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.014	*Reinforcement for concrete backfill*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.015	*48" fixed cone valve for controlled release (baffled hood, no energy dissipation chamber)*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.016	*Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (633 lbs)*	-	*LF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.017	*Install 48"x48" debris rack on conc. Manhole*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.018	*Grout pipe*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.019	*Field Survey*	-	*LS*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.020	Riprap Discharge Channel	-	CY					$ -	$ -	
	9.021	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.022	*Excavate*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.023	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*		*Not required*	
	9.024	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	9.025	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
10		**Sites Dam Diversion Facilities**								**$ -**	Included within Sites Dam Estimate
	10.001	Upstream Cofferdam	-	CY					$ -	Included above	
	10.002	*Sheet pile cofferdams*	-	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.003	*Excavations - remove top soil layer and stockpile*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.004	*Load and haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.005	*Purchase processed material from quarry*	-	*Ton*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.006	*Import material to site stockpile, 40 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.007	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.008	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.009	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.010	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.011	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.012	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.013	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.014	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.015	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.016	Upstream Portal Backfill	-	CY					$ -	$ -	
	10.017	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.018	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.019	Inlet and Valve Structures	-	CY					$ -	$ -	
	10.020	*Pour inlet and valve structures*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.021	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	10.022	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.023	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.024	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.025	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.026	*20 ft rock bolts, 5 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.027	*3.5" diam grouted hole with #10 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.028	Downstream Portal Backfill	-	CY					$ -	$ -	
	10.029	*Load at stockpile and haul to fill location, 0.5 mile haul*	-	*BCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.030	*Spread and compact*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.031	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.032	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.033	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	10.034	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	10.035	Riprap Discharge Channel	-	CY					$ -	$ -	
	10.036	*Blasting operations*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.037	*Excavate, load and haul to stockpile/processing area, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.038	*Crush and screen material*			*$ -*	*$ -*	*$ -*	*$ -*			
	10.039	*Load and haul to stockpile, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	10.040	*Place at the channel*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
11		**ERS Facility 1**								**$ -**	Not required
	11.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.002	*Excavate and load material*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.003	*Haul to disposal site, 0.5 mile haul*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.004	*Shotcrete portal face*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.005	*Steel fiber for shotcrete*	-	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.006	*20 ft rock bolts, 8 ft on center - Drilling*	-	*EA*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.007	*3.5" diam grouted hole with #8 bar*	-	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	11.009	*Haul excavated material and stockpile, 0.5 mi assumed*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.010	*Backfill: Compact and grade*	-	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	11.011	Inlet and Valve Structures	-	CY					$ -	$ -	

12. Cost Work Sheet Summary: Assume 10% drawdown in 10 days

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	11.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	11.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	11.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	11.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	11.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	11.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	11.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	11.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	11.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	11.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
12		**ERS Facility 2**								**$ -**	Not required
	12.001	Upstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.002	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.003	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.004	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.005	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.006	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.007	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.008	Upstream Portal Backfill	-	CY					$ -	$ -	
	12.009	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.010	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.011	Inlet and Valve Structures	-	CY					$ -	$ -	
	12.012	Pour inlet and valve structures	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.013	Downstream Portal Excavation and Rock Bolts	-	CY					$ -	$ -	
	12.014	Excavate and load material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.015	Haul to disposal site, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.016	Shotcrete portal face	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.017	Steel fiber for shotcrete	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	
	12.018	20 ft rock bolts, 8 ft on center - Drilling	-	EA	$ -	$ -	$ -	$ -	$ -	$ -	
	12.019	3.5" diam grouted hole with #8 bar	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.020	Downstream Portal Backfill	-	CY					$ -	$ -	
	12.021	Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.022	Backfill: Compact and grade	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.023	Tunnel Excavation and Initial Support (Double Shift)	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.024	Tunnel Concrete Lining	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.025	10-Ft Steel Pipe Cut and Cover Section	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	
	12.026	Mechanical, Valves, Trash rack, and Metals	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	12.027	Riprap Discharge Channel	-	CY					$ -	$ -	
	12.028	Blasting operations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.029	Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.030	Crush and screen material		LCY	$ -	$ -	$ -	$ -			
	12.031	Load and haul to stockpile, 1 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	12.032	Place at the channel	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
13		**IO Facility**								**$ 156,432,099**	
		Clearing Work									
	13.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -	$ -	$ -	
	13.002	Clearing and Grubbing	9	ACRE	$ 1,230.71	$ 2,147.96	$ -	$ -	$ 3,379	$ 30,408	Light vegetation removal
	13.003	Erosion and Sediment Control	9	ACRE	$ -	$ -	$ -	$ 3,761	$ 3,761	$ 33,845	Allowed $0.25/SF to 30% of the total area
		Access Roads									
	13.004	Develop temporary access roads								Elsewhere	Included within dam and roadwork estimates
		Foundations									
	13.005	Foundation piling	351.00	LF					$ 500.58	$ 175,702	4' dia, 60' deep, 9 piles - drilled piers/piles
	13.006	Drilling rig mobilization/Demobilization allowance	2.00	EA	$ 15,000.00	$ 10,000.00	$ -	$ -	$ 25,000.00	$ 50,000	
	13.007	Foundation piles - drilled piers	351.00	LF	$ 49.50	$ 41.25	$ 74.25	$ -	$ 165.00	$ 57,915	
	13.008	Concrete in piles							$ -	Included above	
	13.009	Pile reinforcement allowance	26	TON	$ 772.50	$ 257.50	$ 1,545.00	$ -	$ 2,575.00	$ 67,787	Allow 150lbs/cy
	13.010	Pile testing allowance	15.0%	%	$ -	$ -	$ -	$ 175,701.88	$ 175,701.88	$ 26,355	
	13.011	Pile cap / base slab	318	CY					$ 678.14	$ 215,558	5' thick base slab
	13.012	Cast in place concrete	318	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 103,888	36" thick slab
	13.013	Formwork	911	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 23,106	Formwork to sides
	13.014	Concrete reinforcement	24	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 88,563	Allow 150lbs/cy
		Intake and Outlet Structures									
	13.015	Multi-Level Inlet/Outlet Tower Cast In Place Concrete	5,158	CY							246' height tower for Alt 2
	13.016	Walls	4,616	CY					$ 1,133.76	$ 5,233,719	
	13.017	Cast in place concrete	4,616	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 1,508,736	Average 4' thick
	13.018	Formwork	62,320	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 1,581,361	
	13.019	Concrete reinforcement	577	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 2,143,623	Allow 250lbs/cy
	13.020	Slabs - elevated decks	469	CY					$ 833.82	$ 391,313	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
	13.021	Cast in place concrete	469	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 153,381	36" thick slab

12. Cost Work Sheet Summary: Assume 10% drawdown in 10 days

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	13.022	Formwork	4,224	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 107,176	
	13.023	Concrete reinforcement	35	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 130,755	Allow 150lbs/cy
	13.024	Piers/Piles	-	CY					$ -	$ -	Included above
	13.025	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.026	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	Allow 30sf/cy
	13.027	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Allow 200lbs/cy
	13.028	Plug at base	-	CY					$ -	$ -	Included above
	13.029	Cast in place concrete	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	
	13.030	Formwork	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	13.031	Concrete reinforcement	-	TON	$ -	$ -	$ -	$ -	$ -	$ -	Not required
	13.032	Bridge Piers	73	CY					$ 1,459.57	$ 106,257	Assume 4 piers with a 4 ft diameter, 60 ft deep
	13.033	Cast in place concrete	73	CY	$ 65.37	$ 32.68	$ 228.78	$ -	$ 326.83	$ 23,793	
	13.034	Formwork	2,184	SF	$ 15.23	$ 2.54	$ 7.61	$ -	$ 25.38	$ 55,419	Allow 30sf/cy
	13.035	Concrete reinforcement	7	TON	$ 742.98	$ 371.49	$ 2,600.43	$ -	$ 3,714.90	$ 27,044	Allow 200lbs/cy
		Mechanical Work									
	13.036	Gates, Mechanical, and Appurtenances	1	LS						Included below	
	13.037	Trash Racks, Miscellaneous Metals and Equipment	1	LS						Included below	
	13.038	Metal ladders	254	LF	$ -	$ -	$ -	$ 3,552.50	$ 3,552.50	$ 904,050	As per May 2020 NODOS Estimate
	13.039	Metal Platforms Intake Tower	-	EA	$ -	$ -	$ -	$ 507.50	$ 507.50	$ -	Not required
	13.04	Roller Gates with hydraulic cylinders and lines	18	EA	$ -	$ -	$ -	$ 384,583.50	$ 384,583.50	$ 6,922,503	As per May 2020 NODOS Estimate
	13.041	Moveable screens and hoists	6	EA	$ -	$ -	$ -	$ 76,125.00	$ 76,125.00	$ 456,750	As per May 2020 NODOS Estimate
	13.042	Sliding steel plates and hoists	6	EA	$ -	$ -	$ -	$ 101,500.00	$ 101,500.00	$ 609,000	As per May 2020 NODOS Estimate
	13.043	8 ton jib crane	1	EA	$ -	$ -	$ -	$ 121,800.00	$ 121,800.00	$ 121,800	As per May 2020 NODOS Estimate
	13.044	12 ft x 30 ft inlet tunnel roller gate	2	EA	$ -	$ -	$ -	$ 1,888,915.00	$ 1,888,915.00	$ 3,777,830	As per May 2020 NODOS Estimate
	13.045	12 ft x 25 ft outlet tunnel roller gates	4	EA	$ -	$ -	$ -	$ 1,609,790.00	$ 1,609,790.00	$ 6,439,160	As per May 2020 NODOS Estimate
	13.046	Other Metals Intake Tower	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
	13.047	Painting	1	LS	$ -	$ -	$ -	$ 50,750.00	$ 50,750.00	$ 50,750	As per May 2020 NODOS Estimate
		Access bridge									
	13.048	Access bridge	10,000	LS	$ -	$ -	$ -	$ 500.00	$ 500.00	$ 5,000,000	Assume 500' x 20' wide bridge
		Electrical Power and Controls									
	13.049	Power for gate hoists, hydraulic system, lighting	1	LS	$ -	$ -	$ -	$ 253,750.00	$ 253,750.00	$ 253,750	As per May 2020 NODOS Estimate
		North & South Tunnels									
	13.050	Excavation	-	LF	$ -	$ -	$ -	$ 8,491.49	$ 8,491.49	$ -	23' Diameter tunnel
	13.051	Concrete Liner	-	LF	$ -	$ -	$ -	$ 9,083.24	$ 9,083.24	$ -	23' Diameter tunnel
	13.052	Steel Liner	-	LF	$ -	$ -	$ -	$ 10,327.63	$ 10,327.63	$ -	23' Diameter tunnel
	13.052a	Excavation	6,222	LF	$ -	$ -	$ -	$ 8,167.74	$ 8,167.74	$ 50,819,695	18' diameter reduced tunnel
	13.052b	Concrete Liner	5,712	LF	$ -	$ -	$ -	$ 8,571.18	$ 8,571.18	$ 48,958,593	18' diameter reduced tunnel
	13.052c	Steel Liner	510	LF	$ -	$ -	$ -	$ 9,718.48	$ 9,718.48	$ 4,956,423	18' diameter reduced tunnel
	13.053	**Lower Intake Channel**	475,000	CY					$ 38.28	$ 18,180,797	
	13.054	Excavations in common material	432,250	LCY	$ 6.00	$ 9.00	$ -	$ -	$ 15.00	$ 6,483,750	Assume 70% in common earth and 30% rock; include a 30% swell factor
	13.055	Excavations in rock	185,250	LCY	$ 10.50	$ 24.50	$ -	$ -	$ 35.00	$ 6,483,750	
	13.056	Haul to disposal site, 0.5 mile haul	617,500	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 4,322,500	
	13.057	Shotcrete portal face	1,387	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 443,769	
	13.058	Steel fiber for shotcrete	21	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 27,042	
	13.059	20 ft rock bolts, 8 ft on center - Drilling	880	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 220,000	
	13.060	3.5" diam grouted hole with #8 bar	40	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 199,986	
		Downstream Portal									
	13.061	Downstream Portal Excavation and Rock Bolts	50,400	CY					$ 49.88	$ 2,514,091	
	13.062	Excavate and load material	65,520	LCY	$ 10.00	$ 15.00	$ -	$ -	$ 25.00	$ 1,638,000	
	13.063	Haul to disposal site, 0.5 mile haul	65,520	LCY	$ 1.75	$ 5.25	$ -	$ -	$ 7.00	$ 458,640	
	13.064	Shotcrete portal face	650	CY	$ 64.00	$ 32.00	$ 224.00	$ -	$ 320.00	$ 208,137	
	13.065	Steel fiber for shotcrete	10	TON	$ 260.00	$ -	$ 1,040.00	$ -	$ 1,300.00	$ 12,683	
	13.066	20 ft rock bolts, 8 ft on center - Drilling	412	EA	$ 187.50	$ 62.50	$ -	$ -	$ 250.00	$ 103,000	
	13.067	3.5" diam grouted hole with #8 bar	19	CY	$ 1,000.00	$ 500.00	$ 3,500.00	$ -	$ 5,000.00	$ 93,630	
	13.068	Downstream Portal Backfill	-	CY					$ -	Not required	
	13.069	Riprap	-	CY					$ -	Not required	
14		Misc allowance for small items, allow 1%	1.0%	%				156,432,099	$ 156,432,099	$ 1,564,321	
		Total Direct Cost Effect	42	Acre	$ 209,604.55	$ 329,240.62	$ 100,389.22	$ (859,172.31)	$ (219,937.93)	$ (9,237,393)	

Sites Reservoir (Alt 1): Roadwork VE Review | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

14. Construction Cost Summary: Produce aggregate base materials from on-site materials

				Unit Cost Rate ($/LF)	Total Cost
			LF:	321,368	
Estimated Cost Effect				(10.83)	(3,479,354)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(10.83)	(3,479,354)
General Conditions					
Mobilization			5.0%	(0.54)	(173,968)
Site General Conditions & Requirements			10.0%	(1.14)	(365,332)
Phasing		*Not included*	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	(0.14)	(44,205)
Bonds			0.6%	(0.08)	(24,377)
GC Field and Home Office Overhead			5.0%	(0.64)	(204,362)
GC Profit			5.0%	(0.67)	(214,580)
Total Contractor Indirect Markups				(3.20)	(1,026,824)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(14.02)**	**(4,506,178)**
Contingencies					
Design Contingencies			10.0%	(1.40)	(450,618)
Construction Contingencies			15.0%	(2.31)	(743,519)
Total Contingency Allowance				(3.72)	(1,194,137)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION				**(17.74)**	**(5,700,315)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(0.17)	(55,665)
Escalation to Mid-point of Construction		*Not included*	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING				**(17.91)**	**(5,755,980)**

14. Cost Work Sheet Summary: Produce aggregate base materials from on-site materials

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
3		**Road Fill and Layer Work**									
	3.008	Class 4 Aggregate subbase	(87,850)	CY					$ 51.04	$ (4,484,236)	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.009	*Purchase processed material from quarry*	*(149,345)*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ (2,262,444)*	*Purchase from commercial quarry, 1.7ton/cy*
	3.010	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*(101,028)*	*LCY*	*$ 10.12*	*$ 11.87*	*$ -*	*$ -*	*$ 21.99*	*$ (2,221,792)*	*Haul to fill location, no stockpiling needed*
	3.011	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.012	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not included as part of review*
	3.013	Class 2 Aggregate base	(146,650)	CY					$ 51.07	$ (7,489,880)	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
	3.014	*Purchase processed material from quarry*	*(249,305)*	*TON*	*$ -*	*$ -*	*$ 15.15*	*$ -*	*$ 15.15*	*$ (3,776,749)*	*Purchase from commercial quarry, 1.7ton/cy*
	3.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*(168,648)*	*LCY*	*$ 10.14*	*$ 11.88*	*$ -*	*$ -*	*$ 22.02*	*$ (3,713,131)*	*Haul to fill location, no stockpiling needed*
	3.016	*Load at stockpile and haul to fill location, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*No stockpiling needed*
	3.017	*Spread and compact*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not included as part of review*
	3.022	Produce aggregate base materials from on-site materials	234,500	CY					$ 36.23	$ 8,494,763	
	3.023	*Excavate material*	*269,675*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 15.00*	*$ 15.00*	*$ 4,045,125*	
	3.024	*Haul excavated material to processing yard, 1 mile haul*	*269,675*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 5.00*	*$ 4.50*	*$ 1,213,538*	
	3.025	*Crush material*	*269,675*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 5.50*	*$ 5.00*	*$ 1,348,375*	
	3.026	*Screen material*	*269,675*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 2.50*	*$ 2.50*	*$ 674,188*	
	3.027	*Haul to stockpile / haul to fill location, 1 mile haul*	*269,675*	*LCY*	*$ -*	*$ -*	*$ -*	*$ 5.00*	*$ 4.50*	*$ 1,213,538*	
		Total Direct Cost Effect	321,368	LF	$ (8.50)	$ (9.97)	$ (18.79)	$ 27.69	$ (10.83)	$ (3,479,354)	

Sites Reservoir (Alt 2): Other Saddle Dams | **Cost Estimate**
Feasibility Report Cost Estimate | **AACEI Class 4**
Sites, CA | **April 16, 2021**

15. Construction Cost Summary: Use spillway conduit

				Total Cost
Total Direct Cost Effect				(299,622)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(299,622)
General Conditions				
Mobilization			5.0%	(14,981)
Site General Conditions & Requirements			10.0%	(31,460)
Phasing		*Not included*	0.0%	-
General Contractor Overhead and Fees				
Insurance			1.1%	(3,807)
Bonds			0.6%	(2,099)
GC Home Office Overhead			6.0%	(21,118)
GC Profit			8.0%	(29,847)
Total Contractor Indirect Markups				(103,312)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				**(402,934)**
Contingencies				
Design Contingencies			10.0%	(40,293)
Construction Contingencies			15.0%	(66,484)
Total Contingency Allowance				(106,777)
TOTAL DIRECT COST BEFORE ESCALATION				**(509,711)**
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(4,977)
Escalation to Mid-point of Construction		*Not included*	0%	-
ESTIMATED CONSTRUCTION COST SAVING				**(514,688)**

15. Cost Work Sheet Summary: Use spillway conduit

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
0		**Omit Baseline Cost Estimate**									
		Omit baseline estimate	-1	LS	$ -	$ -	$ -	$ 39,370,315	$ 39,370,315	$ (39,370,315)	
1		**PRECONSTRUCTION ACTIVITIES**									
	1.001	Demolition Work	-	LS	$ -	$ -	$ -	$ -		Elsewhere	
	1.002	Clearing and Grubbing	26	ACRE	$ 3,195.11	$ 5,576.43	$ -	$ -	$ 8,771.55	$ 228,060	Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	$ -	$ -	$ -	$ -	$ -	$ -	Elsewhere costed
	1.004	Erosion and Sediment Control	26	ACRE	$ -	$ -	$ -	$ 3,760.50	$ 3,760.50	$ 97,773	Allowed $0.25/SF to 30% of the total area
2		**Process and Haul Filter Materials to Project**									
	2.001	Process and Stockpile on Project - Zone 2A - Filter	80,100	Tons					$ 37.35	$ 2,991,648	
	2.002	*Purchase processed material from quarry*	*80,100*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 1,777,940*	*Include 10% waste factor / additional material supply*
	2.003	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*54,185*	*LCY*	*$ 10.70*	*$ 11.70*	*$ -*	*$ -*	*$ 22.40*	*$ 1,213,709*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.004	Process and Stockpile on Project - Zone 2A - Drain	83,200	Tons					$ 37.01	$ 3,078,847	
	2.005	*Purchase processed material from quarry*	*83,200*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 1,846,749*	*Include 10% waste factor / additional material supply*
	2.006	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*56,282*	*LCY*	*$ 10.46*	*$ 11.43*	*$ -*	*$ -*	*$ 21.89*	*$ 1,232,098*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.007	Process and Stockpile on Project - Zone 2A - Transition	22,310	Tons					$ 37.03	$ 826,215	
	2.008	*Purchase processed material from quarry*	*22,310*	*Tons*	*$ -*	*$ -*	*$ 22.20*	*$ -*	*$ 22.20*	*$ 495,204*	*Include 10% waste factor / additional material supply*
	2.009	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*15,092*	*LCY*	*$ 10.48*	*$ 11.45*	*$ -*	*$ -*	*$ 21.93*	*$ 331,011*	*1.7ton/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)*
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	2.011	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.012	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	2.014	*Purchase processed material from quarry*	*-*	*Tons*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	2.015	*Haul material from quarry to site stockpile/fill location, 35 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
		Foundation Preparation and Grouting									
3		**Foundation Excavation**									
	3.001	Topsoil Salvage	52,000	BCY					$ 8.49	$ 441,701	
	3.002	*Excavations - remove top soil layer*	*57,200*	*LCY*	*$ 1.43*	*$ 2.23*	*$ -*	*$ -*	*$ 3.67*	*$ 209,764*	*Include 10% swell factor*
	3.003	*Load and haul to disposal site, 0.5 mile haul*	*57,200*	*LCY*	*$ 1.13*	*$ 2.93*	*$ -*	*$ -*	*$ 4.05*	*$ 231,937*	
	3.004	Dam Foundation Excavation - Common	43,000	BCY					$ 8.55	$ 367,738	
	3.005	*Excavations - remove top soil layer*	*47,300*	*LCY*	*$ 1.55*	*$ 2.21*	*$ -*	*$ -*	*$ 3.76*	*$ 177,971*	*Include 10% swell factor*
	3.006	*Load and haul to disposal site, 0.5 mile haul*	*47,300*	*LCY*	*$ 1.12*	*$ 2.89*	*$ -*	*$ -*	*$ 4.01*	*$ 189,767*	
	3.007	Dam Foundation Rock Exc - Rippable Rock	93,100	BCY					$ 11.87	$ 1,104,659	
	3.008	*Rock excavations, no blasting*	*107,065*	*LCY*	*$ 2.55*	*$ 3.73*	*$ -*	*$ -*	*$ 6.28*	*$ 672,413*	*Include 15% swell factor*
	3.009	*Load and haul to stockpile, 0.5 mile haul*	*107,065*	*LCY*	*$ 1.12*	*$ 2.91*	*$ -*	*$ -*	*$ 4.04*	*$ 432,246*	
	3.010	Dam Foundation Rock Ex - Drill and Shoot	-	BCY					$ -	$ -	Not required
	3.011	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.012	*Excavate, load and haul to stockpile, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	3.013	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*	
4		**Foundation Preparation and Grouting**								Included below	
		Foundation Preparation - Beneath Core									
	4.001	Initial Foundation Cleaning - Core	9,950	SY					$ 12.60	$ 125,350	
	4.002	*Initial foundation core cleanup*	*9,950*	*SY*	*$ 7.79*	*$ 2.31*	*$ -*	*$ -*	*$ 10.10*	*$ 100,471*	
	4.003	*Load and haul to disposal area, 0.5 mile haul*	*2,736*	*CY*	*$ 3.05*	*$ 6.04*	*$ -*	*$ -*	*$ 9.09*	*$ 24,879*	*Assume removal of top layer, 0.75' thick*
	4.004	Final Foundation Cleaning - Core	9,950	SY					$ 10.10	$ 100,471	
	4.005	*Final foundation core cleanup*	*9,950*	*SY*	*$ 7.79*	*$ 2.31*	*$ -*	*$ -*	*$ 10.10*	*$ 100,471*	
	4.006	*Load and haul to disposal area, 0.5 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Not required*
	4.007	Dental Excavation	760	CY					$ 122.75	$ 93,287	
	4.008	*Dental excavations*	*836*	*LCY*	*$ 69.06*	*$ 31.24*	*$ -*	*$ -*	*$ 100.30*	*$ 83,852*	*Include 10% swell factor*
	4.009	*Load and haul to site stockpile, 0.5 mile haul*	*836*	*LCY*	*$ 4.15*	*$ 7.14*	*$ -*	*$ -*	*$ 11.29*	*$ 9,434*	
	4.010	Dental Concrete	760	CY	$ 44.26	$ 20.11	$ 183.12	$ -	$ 247.49	$ 188,093	
	4.011	Grout Cap with Anchors	3,300	CY	$ 79.14	$ 22.90	$ 519.68	$ 12.20	$ 633.91	$ 2,091,906	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	7,000	LF					$ 81.07	$ 567,517	
	4.013	*Drill setup for all holes*	*93*	*ea.*	*$ 218.64*	*$ 365.87*	*$ -*	*$ -*	*$ 584.50*	*$ 54,553*	*Assume 75' drilling lengths*
	4.014	*Drill curtain grout holes*	*7,000*	*lft*	*$ 10.73*	*$ 11.57*	*$ -*	*$ -*	*$ 22.30*	*$ 156,129*	
	4.015	*Redrill grout holes*	*700*	*lft*	*$ 11.93*	*$ 12.86*	*$ -*	*$ -*	*$ 24.78*	*$ 17,348*	*Assume 10% to be redrilled*
	4.016	*Hookup to grout holes and grout nipples*	*350*	*ea.*	*$ 94.95*	*$ -*	*$ -*	*$ -*	*$ 94.95*	*$ 33,233*	
	4.017	*Inject portland cement grout*	*467*	*hr*	*$ 486.51*	*$ 100.29*	*$ -*	*$ -*	*$ 586.80*	*$ 273,840*	*Allow 5 hours per hole*
	4.018	*Perform hydraulic conductivity tests*	*93*	*ea.*	*$ -*	*$ -*	*$ -*	*$ 347.30*	*$ 347.30*	*$ 32,415*	
	4.019	Consolidation Grouting	-	LF					$ -	$ -	Not required
	4.020	*Drill setup for all holes*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.021	*Drill curtain grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.022	*Redrill grout holes*	*-*	*lft*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.023	*Hookup to grout holes and grout nipples*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.024	*Inject portland cement grout*	*-*	*hr*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.025	*Perform hydraulic conductivity tests*	*-*	*ea.*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	4.026	Type III Cement	250	Tons	$ 181.13	$ 74.82	$ 113.14	$ -	$ 369.09	$ 92,272	
	4.027	Backfill Concrete	-	CY	$ -	$ -	$ -	$ -		Elsewhere	
5		**Foundation Preparation - Beneath Shell**									
	5.001	Initial Foundation Cleaning - Shell	23,500	SY					$ 4.04	$ 95,009	
	5.002	*Initial dam shell cleanup*	*23,500*	*SY*	*$ 1.41*	*$ 0.43*	*$ -*	*$ -*	*$ 1.83*	*$ 43,120*	

15. Cost Work Sheet Summary: Use spillway conduit

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	5.003	Load and haul to disposal area, 0.5 mile haul	4,308	LCY	$ 4.43	$ 7.62	$ -	$ -	$ 12.04	$ 51,889	Assume removal of top layer, 0.5' thick
6		**Foundation Drainage**									
	6.001	Furnish and Install Foundation Drain Pipe	1,056	LF	$ 45.17	$ 28.03	$ 35.56	$ -	$ 108.76	$ 114,847	
	6.002	Furnish and Install Foundation Drain Manholes	4	EA	$ 1,252.73	$ 762.78	$ 3,070.88	$ -	$ 5,086.39	$ 20,346	
	6.003	Seepage Partition Walls	-	CY	$ -	$ -	$ -	$ -	$ -	$ -	Not required
7		**Embankment**									
	7.001	Develop Burrow Areas	1	LS						Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	112,400	BCY					$ 7.66	$ 860,507	Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	123,640	LCY	$ 1.00	$ 2.74	$ -	$ -	$ 3.74	$ 462,309	Include 10% swell factor
	7.004	Load and haul to site stockpile, 0.25 mile haul	123,640	LCY	$ 0.86	$ 2.36	$ -	$ -	$ 3.22	$ 398,198	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	92,200	BCY					$ 9.02	$ 831,664	
	7.006	Embankment excavations	101,420	LCY	$ 1.43	$ 3.03	$ -	$ -	$ 4.46	$ 452,130	Include 10% swell factor
	7.007	Load and haul to site stockpile, 0.25 mile haul	101,420	LCY	$ 1.04	$ 2.70	$ -	$ -	$ 3.74	$ 379,533	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					$ -	$ -	Not required
	7.009	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.010	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					$ -	$ -	Not required
	7.012	Embankment excavations	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
		Restore Burrow Areas									
	7.014	Replace Overburden from Stockpile	51,150	ECY					$ 7.30	$ 373,307	Backfill burrow area using material from stockpile, allow 25% of stripping material
	7.015	Load and haul to site stockpile, 0.25 mile haul	56,265	LCY	$ 1.34	$ 3.14	$ -	$ -	$ 4.48	$ 252,175	
	7.016	Spread and compact	56,265	LCY	$ 1.19	$ 0.96	$ -	$ -	$ 2.15	$ 121,132	
	7.017	Topsoil Replacement	42,225	ECY					$ 10.02	$ 423,056	Backfill burrow area using material from stockpile
	7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	46,448	LCY	$ 1.80	$ 5.18	$ -	$ -	$ 6.97	$ 323,948	
	7.019	Spread and compact	46,448	LCY	$ 1.18	$ 0.96	$ -	$ -	$ 2.13	$ 99,108	
	7.020	Furnish and Install Zone 1 - Core	200,000	ECY					$ 13.07	$ 2,613,738	
	7.021	Excavate from burrow area	220,000	LCY	$ 1.43	$ 3.02	$ -	$ -	$ 4.45	$ 979,616	Include 10% swell factor
	7.022	Load and haul to zone-1 fill location, 0.25 mile haul	220,000	LCY	$ 1.14	$ 2.56	$ -	$ -	$ 3.70	$ 815,042	No stockpiling required
	7.023	Spread and compact	220,000	LCY	$ 1.50	$ 2.22	$ -	$ -	$ 3.72	$ 819,080	
	7.024	Load, Haul and Place - Zone 2A - Filter	80,100	Tons					$ 3.34	$ 267,472	
	7.025	Load at stockpile and haul to fill location, 0.5 mile haul	16,256	LCY	$ 1.05	$ 2.85	$ -	$ -	$ 3.90	$ 63,415	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0251	Direct hauling from quarry	37,930	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.026	Spread and compact	54,185	LCY	$ 1.49	$ 2.28	$ -	$ -	$ 3.77	$ 204,058	Include 15% swell factor
	7.027	Load, Haul and Place - Zone 2A - Drain	83,130	Tons					$ 3.38	$ 281,076	
	7.028	Load at stockpile and haul to fill location, 0.5 mile haul	16,871	LCY	$ 1.01	$ 2.75	$ -	$ -	$ 3.76	$ 63,415	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0281	Direct hauling from quarry	39,365	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.029	Spread and compact	56,235	LCY	$ 1.53	$ 2.34	$ -	$ -	$ 3.87	$ 217,661	Include 15% swell factor
	7.030	Load, Haul and Place - Zone 2A - Transition	22,310	Tons					$ 4.19	$ 93,385	
	7.031	Load at stockpile and haul to fill location, 0.5 mile haul	4,528	LCY	$ 1.50	$ 4.10	$ -	$ -	$ 5.60	$ 25,366	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
	7.0311	Direct hauling from quarry	10,564	LCY						Elsewhere	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
	7.032	Spread and compact	15,092	LCY	$ 1.78	$ 2.73	$ -	$ -	$ 4.51	$ 68,019	Include 15% swell factor
	7.033	Load, Haul and Place - Zone 2B - Filter	-	Tons					$ -	$ -	Not required
	7.034	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0341	Direct hauling from quarry	-	LCY						Elsewhere	
	7.035	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.036	Load, Haul and Place - Zone 2B - Transition	-	Tons					$ -	$ -	Not required
	7.037	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.0371	Direct hauling from quarry	-	LCY						Elsewhere	
	7.038	Spread and compact	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.039	Furnish and Install Zone 3 - Rockfill	100,500	ECY					$ 28.73	$ 2,886,965	
	7.040	Blasting operations	120,600	LCY	$ 4.26	$ 5.69	$ 4.85	$ -	$ 14.80	$ 1,784,499	Include 20% swell factor
	7.041	Excavate, load and haul to stockpile, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No stockpiling required, material to be hauled to fill location directly
	7.042	Crush and screen material	120,600	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.043	Load and haul to zone-3, 2 mile haul	120,600	LCY	$ 1.18	$ 4.24	$ -	$ -	$ 5.42	$ 653,539	No stockpiling required, direct haul
	7.044	Spread and compact	120,600	LCY	$ 1.47	$ 2.25	$ -	$ -	$ 3.72	$ 448,927	
	7.045	Furnish and Install Zone 4 - Random	314,000	ECY					$ 14.00	$ 4,397,564	
	7.046	Excavations in common soil	430,100	LCY	$ 1.42	$ 2.21	$ -	$ -	$ 3.64	$ 1,563,697	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
	7.047	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	No crushing and screening required
	7.048	Direct hauling from quarry excavation, 1 mile haul	430,100	LCY	$ 1.12	$ 2.90	$ -	$ -	$ 4.02	$ 1,728,985	Include 15% swell factor, no stockpiling required, direct haul
	7.049	Load at stockpile and haul to fill location, 0.5 mile haul	(69,000)	LCY	$ 0.89	$ 2.42	$ -	$ -	$ 3.31	$ (228,294)	Include 15% swell factor
	7.050	Spread and compact	361,100	LCY	$ 1.46	$ 2.24	$ -	$ -	$ 3.69	$ 1,333,176	
	7.051	Furnish and Install Riprap	24,750	ECY					$ 40.77	$ 1,009,003	
	7.052	Blasting operations	29,700	LCY	$ 4.39	$ 5.86	$ 4.85	$ -	$ 15.10	$ 448,420	Include 20% swell factor
	7.053	Load and haul to processing area, 0.5 mile haul	-	LCY	$ -	$ -	$ -	$ -	$ -	$ -	
	7.054	Crush and screen material	-	LCY	$ -	$ -	$ -	$ -	$ -	Not required	No crushing and screening required
	7.055	Load and haul to fill location, 0.5 mile haul	29,700	LCY	$ 1.03	$ 2.81	$ -	$ -	$ 3.84	$ 114,147	
	7.056	Riprap placement	29,700	LCY	$ 5.98	$ 9.05	$ -	$ -	$ 15.03	$ 446,436	
8		**Other Work**									
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam								Elsewhere	

15. Cost Work Sheet Summary: Use spillway conduit

Item	Sub item	Description	Quantity	Unit	Labor Rate	Equipment Rate	Material Rate	Subcontractor Rate	Unit Rate	Total	Comment
	8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	$ -	$ -	$ -	$ 448,500.00	$ 448,500.00	$ 448,500	Allowance
	8.003	Seeding and Mulching	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.004	Restoration								Elsewhere	
	8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	2,100	CY					$ 90.89	$ 190,877	
	8.006	*Purchase and Import gravel to fill location and stockpile, 35 mi haul*	*2,415*	*LCY*	*$ 11.05*	*$ 11.89*	*$ 37.73*	*$ -*	*$ 60.67*	*$ 146,514*	*Include 15% swell factor*
	8.007	*Place and compact*	*2,415*	*LCY*	*$ 5.99*	*$ 12.38*	*$ -*	*$ -*	*$ 18.37*	*$ 44,362*	
	8.008	Developing haul routes - Haul routes inside reservoir	48	ACRES					$ 28,033.64	$ 1,345,615	Clear, grade, provide gravel fill layer and compact
	8.009	*Clear and grub*	*2,090,880*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 392,436*	
	8.0091	*Load and haul earth fill*	*38,720*	*CY*	*$ 2.14*	*$ 5.85*	*$ -*	*$ -*	*$ 7.99*	*$ 309,478*	*Use existing earth fill material from stockpile*
	8.010	*Grade and Compact surface for earthen road*	*2,090,880*	*SF*	*$ 0.13*	*$ 0.17*	*$ -*	*$ -*	*$ 0.31*	*$ 643,700*	
	8.011	Developing haul routes - Haul routes outside reservoir	32	ACRES					$ 30,193.52	$ 966,193	Clear, grade, provide gravel fill layer and compact
	8.012	*Clear and grub*	*1,393,920*	*SF*	*$ 0.07*	*$ 0.11*	*$ -*	*$ -*	*$ 0.19*	*$ 261,624*	
	8.0121	*Load and haul earth fill*	*25,813*	*CY*	*$ 2.77*	*$ 7.90*	*$ -*	*$ -*	*$ 10.67*	*$ 275,435*	*Use existing earth fill material from stockpile*
	8.013	*Grade and Compact surface for earthen road*	*1,393,920*	*SF*	*$ 0.13*	*$ 0.17*	*$ -*	*$ -*	*$ 0.31*	*$ 429,133*	
	8.014	Rock processing areas								Not required	
	8.015	Mass Concrete / Backfill Concrete	700	CY	$ 91.15	$ 48.50	$ 174.80	$ -	$ 314.45	$ 220,114	
	8.016	Concrete for spillway	-	CY							
	8.017	Spillway walls, reinforced concrete	-	CY					$ -	$ 342,940	
	8.018	*Formwork*	*2,600*	*SF*	*$ 19.82*	*$ 0.38*	*$ 5.24*	*$ -*	*$ 25.44*	*$ 66,152*	
	8.019	*Concrete*	*420*	*CY*	*$ 43.86*	*$ 10.55*	*$ 233.06*	*$ -*	*$ 287.47*	*$ 120,739*	
	8.02	*Reinforcement*	*52.50*	*TON*	*$ 59.07*	*$ -*	*$ 2,913.29*	*$ -*	*$ 2,972.36*	*$ 156,049*	*Allow reinforcement of 250 lbs/cy*
	8.021	Spillway slab concrete, reinforced concrete	-	CY					$ -	$ -	
	8.022	*Formwork*	*-*	*SF*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Allow formwork of 5SF/CY*
	8.023	*Concrete*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.024	*Reinforcement*	*-*	*TON*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*Allow reinforcement of 150 lbs/cy*
	8.025	Spillway mass concrete	-	CY					$ -	$ -	
	8.026	*Formwork*	*-*	*SF*						*Not required*	
	8.027	*Concrete*	*-*	*CY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.028	*Reinforcement*	*-*	*TON*						*Not required*	
	8.029	Bridge	-	SF	$ -	$ -	$ -	$ -	$ -	$ -	
	8.030	Concrete Gravity Dam	-	CY					$ -	$ -	Not required
	8.031	Clay Backfill	-	CY					$ -	$ -	
	8.032	*Clay excavations from burrow area*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.033	*Load and haul from stockpile to fill location, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.034	*Place clay backfill material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.035	Riprap and Drain	-	CY					$ -	$ -	Not required
	8.036	*Blasting operations*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.037	*Load and haul to processing area, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.038	*Crush and screen material*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.039	*Load and haul from stockpile to fill location, 1 mile haul*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.040	*Rip rap placement*	*-*	*LCY*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	
	8.041	Rim Grouting	51,300	LF	$ -	$ -	$ -	$ 120.75	*$ 120.75*	*$ 6,194,475*	Includes clearing & grubbing, furnishing cement material, drill setup for holes, soil drilling to rock, drill curtain holes in rock, grout backfill, hydroseed area.
	8.042	Dewatering allowance	1	LS	$ -	$ -	$ -	$ 249,166.67	$ 249,166.67	$ 249,167	Allowance
	8.043	54" Culvert with concrete encasement	750	LF	$ -	$ -	$ -	$ 750.00	$ 750.00	$ 562,500	Trench, excavations, inlet, energy dissipator, concrete fill
	8.044	Add signal spillway	1	EA	$ -	$ -	$ -	$ 1,500,000.00	$ 1,500,000.00	$ 1,500,000	
9		Misc allowance for small items, allow 1%	1.0%	%				38,683,855	$ 38,683,855	$ 386,839	
		Total Direct Cost Effect	49	Acre	$ 179,202	$ 275,899	$ 148,140	$ (609,355)	$ (6,115)	$ (299,622)	

Appendix C

Responses to Comments on the Draft Cost Estimate Technical Memorandum

Responses to Comments on Draft Feasibility-Level Cost Estimate Technical Memorandum

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	May 5, 2021
From:	Michael Forrest, P.E., G.E.; Jeff Herrin; Mike Smith, P.E., G.E; Howard Michael, P.E.; Abrie Horak (AECOM)
Quality Review:	Joe Barnes, P.E. (AECOM)
Authority Agent Review:	Henry Luu, P.E. (HDR)
Subject:	Responses to Comments on Draft Feasibility-Level Cost Estimate Task Order No. 2, Task HR56

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Appendix

Appendix A – Sources of Sand and Gravel

Acronyms and Abbreviations

Authority	Sites Project Authority
DSOD	State of California Department of Water Resources, Division of Safety of Dams
DWR	California Department of Water Resources
FDR	Full depth reclamation
ft	feet
lf	liner foot
LMC	Land Management Committee
OSG	Orland Sand and Gravel
sf	square foot
TM	technical memorandum
TRR	Terminal Regulating Reservoir
VE	value engineering

1.0 Introduction

1.1 Purpose and Scope

On March 3, 2021, AECOM presented its in-progress feasibility-level cost estimate on the HR facilities (AECOM, 2021a) to the Land Management Committee (LMC) in Maxwell, CA. This presentation was made because of Authority concerns with the cost growth that occurred between the Value Planning Estimate for recommended alternative VP-7 developed in April 2020 and the in-progress feasibility-level cost estimate developed in February 2021. Due to the cost growth, AECOM developed and presented value engineering (VE) ideas and associated approximate cost reductions for the in-progress estimate intended to reduce the construction costs.

This technical memorandum (TM) responds to the LMC's comments on the in-progress cost estimate pertaining to the HR facilities: main and saddle dams, inlet/outlet works, emergency release structures, roads and bridges.

1.2 Limitations

AECOM represents that our services were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession, within the limits prescribed by our client.

This TM is intended for the sole use of the Sites Project Authority. The scope of services performed may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

2.0 Changes from Value Planning Estimate

2.1 Discussion of Cost Estimate Classes

Feasibility level costs have increased significantly from the costs presented in the Value Planning Report (Authority, April, 2020). The Association for the Advancement of Cost Engineering International Recommended Practice 18R-97 (AACEI, 2016) defines five estimating classifications as follows:

- Class 5 – an appraisal estimate that is typically used for concept screening and relying on capacity factors, parametric models, and screening.
- Class 4 – a study of feasibility estimate with equipment factored or parametric models.
- Class 3 – an estimate for budget, authorization, or control based on semi-detailed unit costs with assembly level line items.
- Class 2 – an estimate for control or bid tender with detailed unit costs and forced detailed take-offs.
- Class 1 – a check estimate or bid tender with detailed unit costs and detailed take-offs.

The least detailed estimate is a Class 5 estimate and a Class 1 estimate is the most detailed. The detail of the estimate is limited by the level of detail in the supporting design and documentation of unit rates and equipment costs.

The estimates presented in the Value Planning Report were based on appraisal level engineering designs for conceptual screening and are considered Class 5 estimates. For example, the cost for the 1.5 MAF reservoir was estimated by factoring the cost from estimates developed for 1.3 MAF and 1.8 MAF reservoirs.

The current feasibility estimate is a Class 4 estimate. It is supported by a more detailed design that was not available during development of the Value Planning estimate. The feasibility design is documented in a series of engineering Technical Memoranda, a corresponding package of drawings, a construction schedule, and a Constructability Tech Memo. The current project feasibility-level cost estimate has been prepared by implementing industry standard practices for feasibility level analyses. By the very nature of project development, as this project advances from feasibility to detailed analyses and design, the project definition will obtain higher resolution, promoting greater confidence in project cost estimating for final project budgeting.

2.2 Comparison of VP-7 and Feasibility-Level Cost Estimates

The differences in cost between the value planning and feasibility level estimates are shown in Table 2-1.

Table 2-1. Comparison of Value Planning and Feasibility-Level Estimates for HR Contract Components

(This table does not include VE cost savings)

Facility	VP-7 Estimate ($M)	Feasibility Estimate ($M)	Change in Cost	% Increase
1. Site Demolition and Clearing Work	$11M	$32M	$21M	191%
2. Golden Gate Dam	$306M	$687M	$381M	125%
3. Sites Dam	$144M	$344M	$200M	139%
4. Saddle Dams 1, 2, 6, and 8A/B	$69M	$139M	$70M	101%
5. Saddle Dam 3	$74M	$243M	$169M	228%
6. Saddle Dam 5	$56M	$92M	$36M	64%
7. Hunters Creek Release Structures	$91M	$96M	$5M	5%
8. Inlet/Outlet Tower and Tunnels	$302M	$332M	$30M	10%
9. Sites Lodoga Road	$132M	$213M	$81M	61%
10. Sites Lodoga Bridge	$180M	$168M	($12M)	(7%)
11. Huffmaster Road Realignment (South Residents)	$41M	$49M	$8M	20%
12. North Construction Access Road	$30M	$28M	($2M)	(7%)
13. Other Roads	$79M	$69M	($10M)	(13%)
Total	**$1,515M**	**$2,492M**	**$977M**	**64%**

Table 2-2 summarizes the changes in specific facility designs and costs between the completion of the Value Planning Estimate and the feasibility-level cost estimate prior to the inclusion of VE cost savings.

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities [2]	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
1. Clearing, Grubbing, and Demolition						
Clearing, grubbing, and demolition	$11M	Clearing, grubbing, and demolition	$32M	$21M	Added and updated detail for demolition of silos, sheds and garages, water towers, removal of motor homes, removal and cleaning of septic systems, removal of asphalt paving, decommissioning and verification of closure for all gas wells, and plugging of groundwater wells. Unit prices adjusted for current conditions.	VP estimate combined this item with Sites Lodoga Road as part of Reservoir Development. See #9 below for Sites Lodoga Road.
2. Golden Gate Dam						
Preconstruction	$0M	Preconstruction [3]	$1M	$1M	New addition at feasibility level; previously included in unit rates.	Not broken out in Value Planning estimate
Process and Haul	$71M	Process and Haul	$184M	$113M	The feasibility estimate is based on purchasing and hauling 2,561,000 tons of aggregate for filters, drains, and transition zone versus 1,945,000 tons for the value planning estimate. Cost increases are associated with unit price increases and quantity increases from design refinements. The value planning estimate relied on older unit rates that were escalated, but escalated rates did not reflect current market conditions.	
Foundation	$80M	Foundation Excavation	$37M	($6M)	Cost savings. Also reflects a higher level of core foundation cleanup prior to and after foundation grouting to obtain foundation acceptance from DSOD.	
Foundation Grouting	$9M	Foundation Prep and Grouting	$43M			
	$0M	Foundation Below Shell Prep	$1M			
	$0M	Foundation Drainage	$2M			
Embankment/Borrow	$102M	Embankment/Borrow	$386M	$284M	The feasibility estimate added $92M for removing overburden and stockpiling waste, and $19M for restoring the borrow areas post construction outside of reservoir. The cost for random fill is the single highest component of the embankment construction with a total project cost of $142M in the feasibility level estimate versus $98M for the value planning estimate. Higher unit rates for placing embankment materials for the core zone, rockfill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project cost). The value planning estimate relied on older pricing data that was escalated but escalated rates did not reflect current market conditions.	
Other Work	$0M	Other Work	$16M	$16M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area outside the reservoir limits, haul routes specific to Golden Gate Dam, and an allowance for dewatering.	
Bypass Pipeline	$0M	Bypass Pipeline	$8M	$8M	Revised approach to better manage Funks Creek flows during construction by piping under the dam rather than constructing a diversion channel between Funks Creek and Stone Corral Creek as previously proposed. Eliminating the channel cut reduces management of excess waste material.	
Unlisted Items	$29M	Unlisted Items [4]	$7M	($22M)	Reduced as a result of added design detail.	
Mob/Demob	$15M	Mob/Demob	Included above[2]	N/A		
Golden Gate Dam Total	**$306M**		**$687M**	**$381M**		
3. Sites Dam						
Preconstruction	$0M	Preconstruction [3]	$600K	$600K	New addition at feasibility level; previously assumed to be included in unit rates.	
Process and Haul	$31M	Process and Haul	$64M	$33M	The feasibility estimate is based on purchasing and hauling 881,000 tons of aggregate for filters, drains, and transition zones versus 644,000 tons for the value planning estimate. Cost increases are associated with unit price increases and some double handling of materials. The value planning estimate relied on older pricing data that was escalated and escalated rates did not reflect current market conditions.	

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities [2]	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
Foundation	$19M	Foundation Excavation	$13M	$3M	10% cost growth for foundation-related tasks due to updated pricing information and addition of foundation drainage estimate. Also reflects a higher level of core foundation cleanup prior to and after foundation grouting to obtain foundation acceptance from DSOD.	
Foundation Grouting	$6M	Foundation Prep and Grouting	$14M			
	$0M	Foundation Below Shell Prep	$500K			
	$0M	Foundation Drainage	$100K			
Embankment/Borrow	$54M	Embankment/Borrow	$139M	$85M	The feasibility estimate added $35M for removing overburden and stockpiling waste, and $8M for restoring the borrow areas post construction outside of reservoir. The cost for rockfill is the single highest component of the embankment construction with a total project cost of $54M in the feasibility level estimate versus $31M for the value planning estimate. The cost for random fill similarly increased to $13M, compared to $7M for the value planning effort. Higher unit rates for placing embankment materials for the core zone, rockfill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project cost). The value planning estimate relied on older pricing data that was escalated but did not reflect current market conditions.	
Other Work	$0M	Other Work	$10M	$10M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area, haul routes specific to Sites Dam, and an allowance for dewatering.	
Diversion Tunnel	$17M	Diversion Tunnel	$97M	$80M	For value planning, the Sites diversion was only sized for ecosystem-related creek releases of 10-20 cfs. For the feasibility level design, the Sites diversion is sized for ecosystem-related creek releases of up to 400 cfs (per the request of the permitting team) as well as a larger portion of emergency drawdown flows (1,000 cfs for Value Planning versus 2,000 cfs for feasibility). These are different design criteria that result in much higher costs.	
Unlisted Items	$10M	Unlisted Items [4]	$2M	($8M)	Reduced as a result of added design detail.	
Mob/Demob	$7M	Mob/Demob	Included above[2]	N/A		
Sites Dam Total	**$144M**		**$344M**	**$200M**		
4. Saddle Dams 1, 2, 6, and 8A/B						
Preconstruction	$0M	Preconstruction [3]	$1M	$1M	New addition at feasibility level; previously assumed to be included in unit rates.	
Process and Haul	$12M	Process and Haul	$29M	$17M	The $17M increase in cost is associated with the purchasing and hauling of aggregate for filters, drains, and transition material. The feasibility level estimate is based on 399,000 tons versus 250,000 tons for the value planning estimate. Cost increases are associated with unit price increases and some double handling of materials. The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Foundation	$15M	Foundation Excavation	$8M	$4M	27% cost growth for foundation related tasks due to updated pricing information and addition of foundation drainage estimate. Also reflects a higher level of foundation cleanup prior to and after foundation grouting to obtain foundation acceptance from DSOD.	
		Foundation Prep and Grouting	$10M			
		Foundation Below Shell Prep	$300K			
		Foundation Drainage	$300K			
Embankment/Borrow	$38M	Embankment/Borrow	$53M	$15M	The feasibility estimate added $6M for removing overburden and stockpiling waste, and $3M for restoring the borrow areas post construction outside of reservoir. The cost for rockfill and random fill are roughly equal with a combined total project cost of $25M in the feasibility level estimate versus $21M for the value planning estimate. Higher unit rates for placing embankment materials for the core zone, rock fill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project	

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities [2]	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
					cost). The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Other Work	$0M	Other Work	$34M	$34M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area, haul routes specific to the Saddle Dams, and an allowance for dewatering.	
Unlisted Items	$0M	Unlisted Items [4]	$1M	$1M	Unlisted items were not included in the Value Planning estimates for saddle dams.	
Slurry Wall	$900K	See Notes	Included in Foundation item above.		Costs for the slurry wall were absorbed into the foundation work for the feasibility level estimate	Replaced with grout curtains in feasibility level estimate under the Foundation activity.
Mob/Demob	$3M	Mob/Demob	Included above[2]	N/A		
Saddle Dams 1, 2, 6, and 8A/B Total	**$69M**		**$139M**	**$70M**		
5. Saddle Dam 3						
Preconstruction	$0M	Preconstruction [3]	$1M	$1M	New addition at feasibility level.	
Process and Haul	$12M	Process and Haul	$53M	$41M	The $41M increase in cost is associated with the purchasing and hauling of aggregate for transition zones, filters and drains. The feasibility design included 730,000 tons versus 265,000 tons for the Value Planning estimate. Cost increases are also associated with unit price increases and some double handling of materials. The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Foundation	$19M	Foundation Excavation	$15M	$21M	121% cost growth for foundation related due to more extensive excavation, preparation, and grouting. Costs were also affected by updated pricing information and addition of foundation drainage estimate. Also reflects a higher level of foundation cleanup prior to and after foundation grouting to obtain foundation acceptance from DSOD.	
		Foundation Prep and Grouting	$22M			
		Foundation Below Shell Prep	$1M			
		Foundation Drainage	$1M			
Embankment/Borrow	$37M	Embankment/Borrow	$135M	$98M	The feasibility estimate added $15M for removing overburden and stockpiling waste, and $5M for restoring the borrow areas post construction outside of reservoir . The cost for rockfill was $33M and the cost of random fill was $40M in the feasibility level estimate versus $7M and $18M, respectively, for the value planning estimate. Higher unit rates for placing embankment materials for the core zone, rock fill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project cost). The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Other Work	$0M	Other Work	$10M	$10M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area, haul routes specific to the Saddle Dams, and an allowance for dewatering.	
Unlisted Items	$0M	Unlisted Items [4]	$2M	$2M	An allowance for unlisted items was not included in the Value Planning estimate.	
Slurry Wall	$1M	See Notes	Included in foundation item above.		Costs for the slurry wall were absorbed into the foundation work for the feasibility level estimate.	Replaced with grout curtains in feasibility level estimate under the Foundation activity
Mob/Demob	$2M	Mob/Demob	Included above[2]	N/A		
Saddle Dam 3 Subtotal	**$74M**		**$243M**	**$169M**		
6. Saddle Dam 5						
Preconstruction	$0M	Preconstruction [3]	$1M	$1M	New addition at feasibility level.	
Process and Haul	$8M	Process and Haul	$20M	$12M	The $12M increase in cost is associated with the purchasing and hauling of aggregate for transition zones, filters and drains. The feasibility design included 283,000 tons versus 167,000 tons for the Value Planning estimate. Cost	

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities [2]	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
					increases are also associated with unit price increases and some double handling of materials. The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Foundation	$12M	Foundation Excavation	$7M	$6M	50% cost growth for foundation related due to more extensive excavation, preparation, and grouting. Costs were also affected by updated pricing information and addition of foundation drainage estimate.	
		Foundation Prep and Grouting	$10M			
		Foundation Below Shell Prep	$700K			
		Foundation Drainage	$90K			
Embankment/Borrow	$31M	Embankment/Borrow	$43M	$12M	The feasibility estimate added $5M for removing overburden and stockpiling waste, and $2M for restoring the borrow areas post construction outside of reservoir. The total project cost for rockfill and random fill was about $20M in the feasibility level estimate versus $17M for the value planning estimate. Higher unit rates for placing embankment materials for the core zone, rock fill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project cost). The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Other Work	$0M	Other Work	$7M	$7M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area, haul routes specific to the Saddle Dams, and an allowance for dewatering.	
Unlisted Items	$0M	Unlisted Items [4]	$900K	$900K	An allowance for unlisted items was not included in the Value Planning estimate.	
Slurry Wall	$1M	See Notes	Included in Foundation item above.		Costs for the slurry wall were absorbed into the foundation work for the feasibility level estimate.	Replaced with grout curtains in feasibility level estimate under the Foundation activity
Mob/Demob	$3M	Mob/Demob	Included above[2]	N/A		
Saddle Dam 5 Subtotal	**$56M**		**$92M**	**$36M**		
7. Emergency Release Structures						
Release structures to Hunters Creek	**$91M**	Release structures to Hunters Creek	**$96M**	$5M	The value planning report had no supporting drawings for pricing the release structures. Take-off quantities were developed from feasibility level drawings to support the current estimate.	
8. Inlet/Outlet Facilities						
Construct Multi-Level Inlet/Outlet Tower	$103M	Construct Multi-Level Inlet/Outlet Tower	$113M	$10M	Feasibility estimate uses drawing take-offs to produce quantities for tower.	
Construct Dual Inlet/Outlet Tunnels	$199M	Construct Dual Inlet/Outlet Tunnels	$214M	$15M	Raising the I/O tunnel reduced the length, resulting in $37M savings. Net is $15M additional cost for feasibility estimate. Increase in tunnel cost is due to unit price increase for tunnel construction.	
Unlisted Items	$0	Unlisted Items [4]	$5M	$5M		
I/O Facilities Subtotal	**$302M**		**$332M**	**$30M**		
9. Sites Lodoga Road						
Sites Lodoga East and West Roadways (outside inundation area)	$39M	Sites Lodoga East and West Roadways (outside inundation area)	$71M	$32M	Road length increased from 21,700 ft to 29,000 ft. Cost per linear foot increased from $1,802 per lf to $2,208 per lf. Unit prices were revised to match recent pricing data.	
Embankment for Sites Lodoga Road Bridges	$93M	Embankment for Sites Lodoga Road Bridges	$142M	$49M	Approximately $70M for embankments and $72M for rock slope protection. The rock slope protection is a new feature. Embankment cost increased by $36M from flattening the slopes from a 2:1 to a 3:1 for the embankment to accommodate rapid reservoir drawdown that could jeopardize the stability of the embankments.	
	$132M		**$213M**	**$81M**		

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities [2]	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
10. Sites Lodoga Bridge						
VP7 – One Bridge (L = 1106 feet) Feasibility – Two Bridges (L1 = 1400 feet; L2 = 1633 feet)	$180M	Two Bridges	$168M	($12M)	Value planning estimate included embankment for bridge (see under Sites Lodoga Road above). The feasibility cost is now only bridge cost and this increased due to a second bridge being added, which increased the total bridge length nearly 3 times. The unit price for the bridge increased from $600 per sf to $1,355 per sf due to design of foundation (piers and pier caps) and bridge deck columns. Considered seismic loading.	
11. Huffmaster Road Realignment						
Huffmaster Rd Realignment	$41M	Huffmaster Road Realignment	$49M	$8M	The roadway width was reduced from 24 feet to 15 feet. The roadbed depth was reduced from 18 inches to 12 inches. Cut and fill volumes were adjusted based on comparative earthwork modeling of Sites Lodoga Road. Unit prices were revised to match recent pricing data.	
12. North Construction Access Road						
North Construction Access Road	$30M	North Construction Access Road	$28M	($2M)	Unit prices were revised to match recent pricing data.	
Other Roads						
Other Roads	$79M	Other Roads	$69M	($10M)	Additional access roads were previously undetermined. Also added canal bridge replacements and revised the roadway construction technique from conventional replacement to full depth reclamation for the existing County Roads that was not addressed in the Value Planning estimate.	
Total Estimated Cost	**$1,515M**		**$2,492M**	**$977M**		
VE Savings (Alt 1) – See Rev. Cost Estimate TM, Table 14-1			**($212M)**	**($212M)**		
	$1,515M		**$2,280M**	**$765M**		

[1] Totaling individual costs may not add up to the subtotal or total costs due to rounding.

[2] In the feasibility estimate, contractor indirect mark-ups (including mobilization) and non-contract costs have been distributed into each of the respective line items.

[3] Preconstruction includes clearing and grubbing in facility footprints, demolition, and erosion controls.

[4] Unlisted items is an allowance for what we do not know or have not designed yet.

3.0 Comments on Dams

3.1 Summary of Borrow Areas and Aggregate Sources

Comment: Provide a summary of borrow areas and aggregate sources and how material will be handled (e.g., which quarries will the Authority purchase and develop versus which areas would be owned and operated by others).

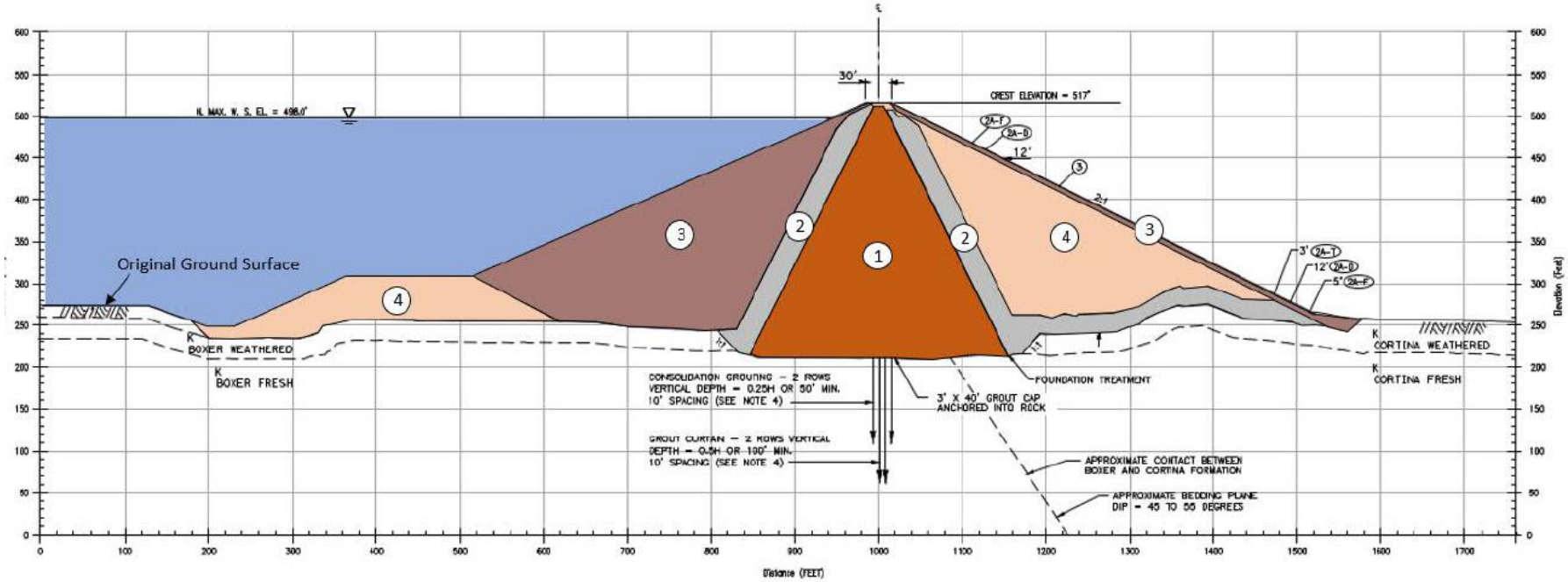
Response: (see also Section 3.2)
A typical dam section for the Sites and Golden Gate dams is shown on Figure 3-1. The location of onsite haul routes, borrow, disposal, stockpile, staging, and rock processing areas are shown on Figure 3-2. The location of offsite quarries is shown on Figure 3-3. A material balance diagram for Golden Gate dam that illustrates the quantities and sources of the zone materials is shown on Figure 3-4. The following discusses the zones and sources:

- Zone 1 – Impervious Core – The central core of the dam will consist of clayey alluvium from within the reservoir. The borrow areas for Zone 1 are shown on Figure 3-2 with Z1 designation. For example, the core material for Golden Gate dam would come from GG-Z1 Borrow. The volume of Zone 1 material for Golden Gate is shown on the Material Balance Diagram on Figure 3-4.

- Zone 2 – Filter, Drain and Transition Zones – These zones flank the core and cover the downstream foundation. The materials will be sands and gravels that meet the durability requirements for concrete aggregate. The source of this material is assumed to be from offsite commercial sand and gravel quarries located between Willows and Orland as shown on Figure 3-3. It is assumed that the Contractor would enter into an agreement with these commercial quarries to supply the Zone 2 materials. The ability of the existing quarries to expand to meet the requirements of the project is a risk factor that should be further evaluated as design progresses.

- Zone 3 – Rockfill Shell – This zone is the upstream shell of the dam. The materials are high quality sandstone rock quarried from the reservoir east rim. The borrow locations are shown on Figure 3-2 with the designation Z3. For example, the rockfill shell for Golden Gate dam will come from GG-Z3 Quarry 1 and 2. The larger quarry is located outside of the reservoir on the eastern side of the east rim because this is where the majority of the high-quality sandstone can be obtained. The western side of the east rim appears to contain more mudstone than sandstone. It is assumed that the Authority will acquire the land for these quarries and make them available to the dam Contractor to develop and use them for the dam construction. The volume of Zone 3 from the borrow areas and required for Golden Gate dam construction are shown on the Material Balance Diagram on Figure 3-4. Visual and other potential impacts will need to be mitigated for major rock quarries located on the east side of the reservoir ridge.

- Zone 4 Random – This zone is the downstream shell and upstream cofferdam of the dams. The materials are the more weathered rock and mudstones. The material will break down to a mixture of soil and rock particles when excavated and compacted in the dam. A portion of Zone 4 will be generated from the dam foundation excavations and that material would be used for the cofferdams. The borrow locations are shown on Figure 3-2 with the designation Z3; Zone 4 materials would also be obtained from the same quarries as Zone 3. .



Zone① Core
Zone② Upstream and Downstream Filter, Drain, and Transition
Zone③ Rockfill and Riprap
Zone④ Random

Figure 3-1. Typical Dam Section

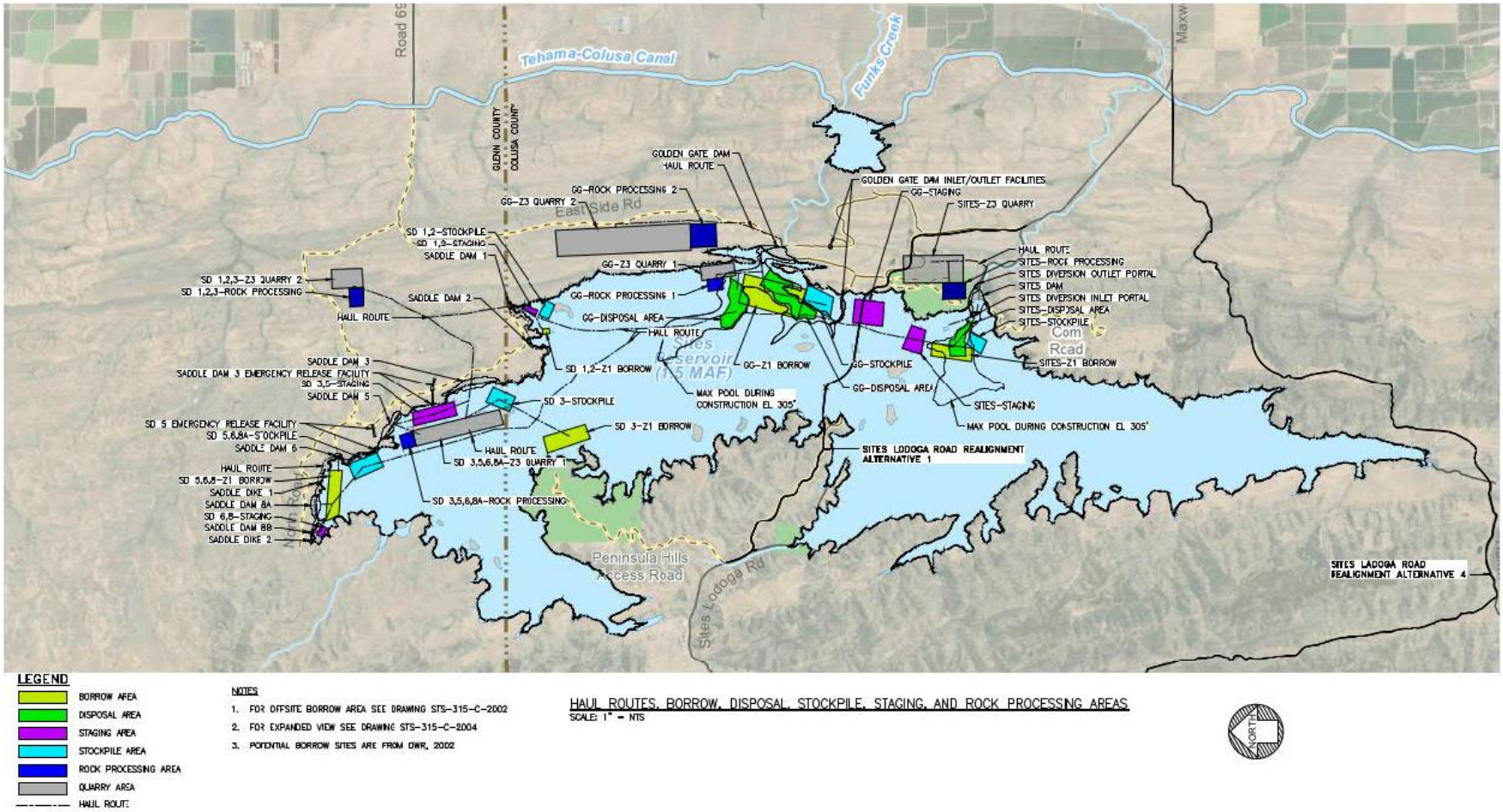


Figure 3-2. Haul Routes, Borrow, Disposal, Stockpile, Staging and Rock Processing Areas

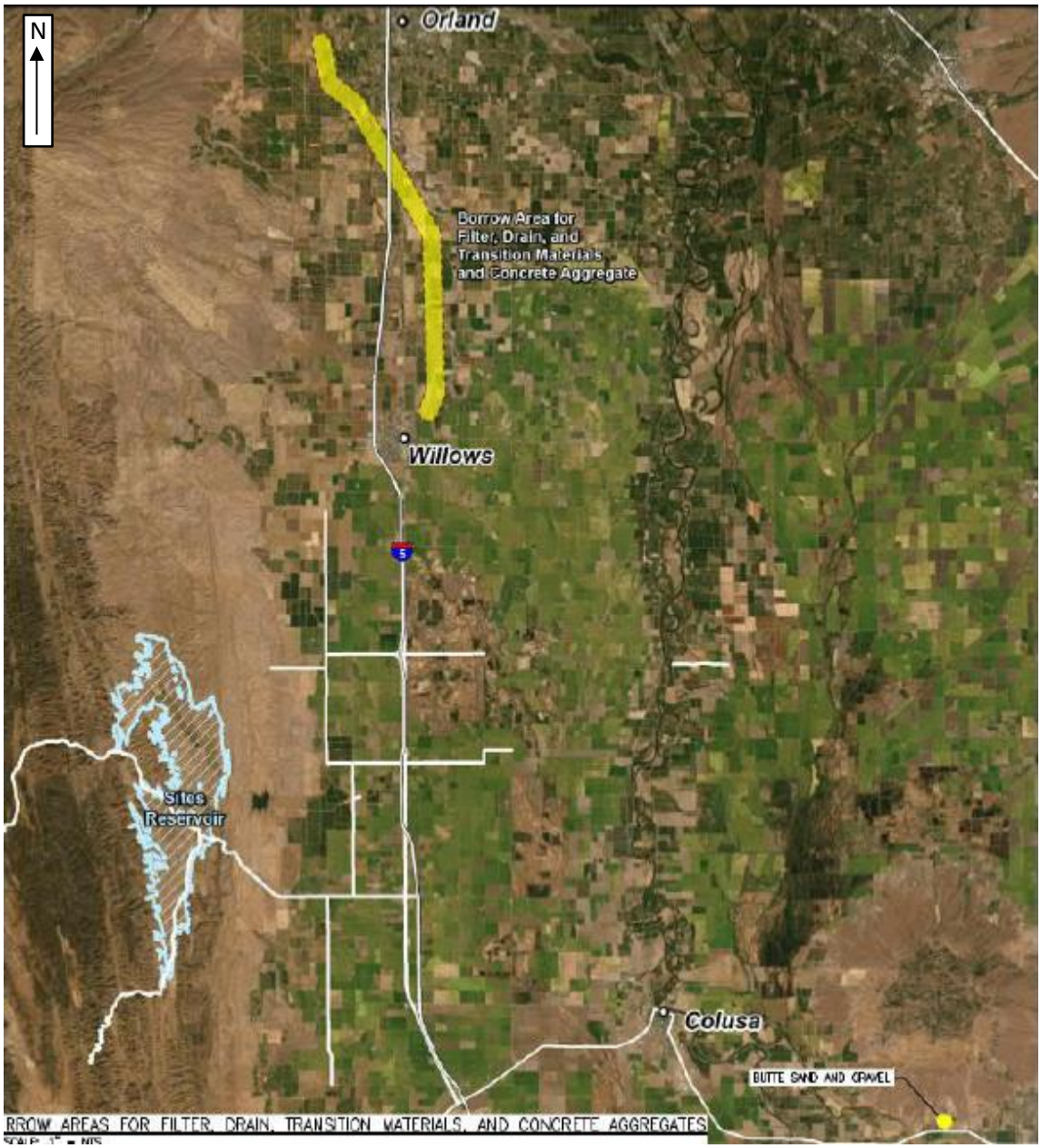


Figure 3-3. Offsite Quarries Location

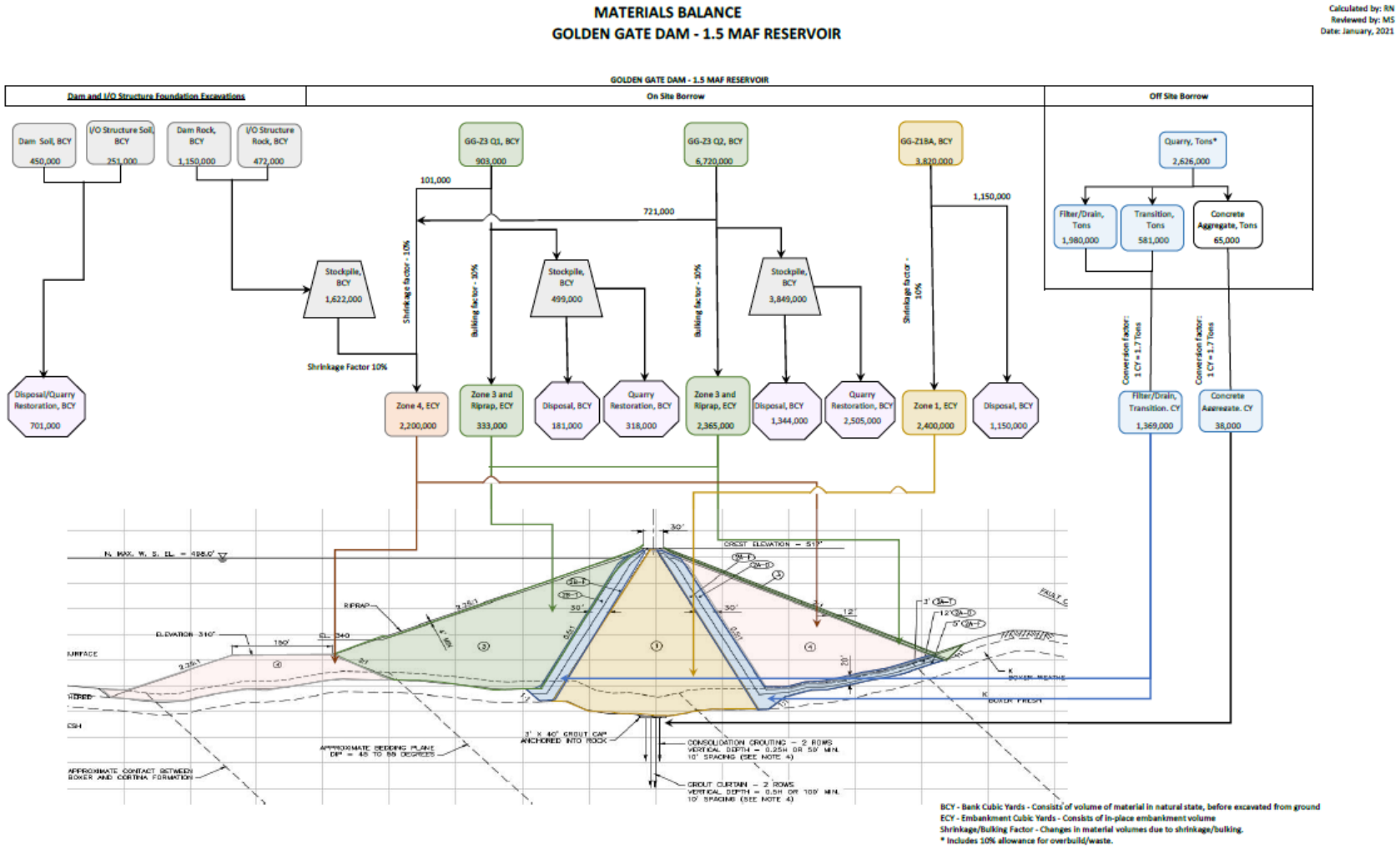


Figure 3-4. Material Balance Diagram - Golden Gate Dam

The Zone 3 quarries have a significant quantity of weathered rock at the surface and the less weathered sandstones that supply Zone 3 are interbedded with layers of mudstone that can be used for Zone 4 but not for Zone 3. As stated above, visual and other potential impacts will need to be mitigated for major rock quarries located on the east side of the reservoir ridge.

- The volume of Zone 4 needed for Golden Gate dam and the volume of material from the quarries are shown on the Material Balance Diagram on Figure 3-4. A significant volume of weathered rock and mudstone would be developed in the quarry that is in excess of the volume of Zone 4 required in the dam. This excess material is designated for disposal and quarry restoration on Figure 3-4; quarry restoration would consist of backfilling the lower portions of the quarry. As discussed above, it is assumed that the Authority will acquire the land for these quarries and make them available to the dam Contractor to develop and use them for the dam construction. It is also noted that one of the current VE alternatives is to modify the zonation of the upstream shell to include both Zone 3 and Zone 4. This would help reduce the excess material that would have to be disposed and decrease the size of the quarries

3.2 Quarry Assumptions and Approach

Comment: Follow up on quarry assumptions and approach.

Response:

3.2.1 Private Development of On-site Quarries

Private development of on-site quarries to produce Zone 3 rockfill was evaluated to confirm the issues facing this approach. We have consulted with our construction team member, Dan Hertel of Engineering Solutions, for this evaluation. The approach of taking the quarries out of the direct control of the Authority and the dam Contractors presents the following potential issues:

- Gearing up for the exploration, permitting, etc. that needs to happen in a timely manner will be challenging for some type of local ownership.
- Under private ownership, exploration and permitting by a third party could create liability issues associated with potential geotechnical observations and conclusions, as well as permit stipulations that may be beyond the bounds or intent of the Sites Project.
- Ramping up for construction activities would be a substantial task and investment in planning, labor and equipment. Early investment would include acquisition of, or commitment to equipment, including for mining, processing, loading and hauling, and for disposal and shop facilities. The cost of early investment would likely be more than several million dollars per quarry and could exceed $20-$30 million per quarry.
- This work would be on the critical path for most of the construction duration. As such, the quarries should be in direct control of the contractors. Any delays caused by the quarry operation that is not under the dam Contractor's direct control would result in claims to the Authority and incur significant cost penalties. Furthermore, any materials produced by private quarries that fail to meet specified requirements would delay approvals by DSOD and create liability for the Authority as these materials would be "owner-furnished". It appears that any

third-party quarry operator would need to provide some type of performance bond to help insure that adequate production and quality were met.

Due to the above potential issues, our feasibility-level cost estimate assumes the rock quarries will be under the control of the Construction Contractor. Besides rock quarries, this assumption also pertains to concrete aggregate and sand and gravel quarries to produce filter and drain materials for the dams. The development of aggregate road base materials by a third party supplier poses less risk and is a smaller magnitude endeavor. This will be further evaluated as the design proceeds. Further work is needed as design progresses to verify the approach to obtaining quarried materials.

3.2.2 Sources of Sand and Gravel

Stony Creek

We were requested to consider Stony Creek as a source of potential sand and gravel for production of dam filter and drain materials, concrete aggregate, and aggregate road base materials. We have not identified a currently active gravel mining operation on Stony Creek closer than Orland. There are significant gravel deposits along Stony Creek, which could potentially be mined for use in the filter, drain, and as concrete aggregate materials. The gravel bed appears to be approximately 100 to 300 feet wide. Since no currently active quarry appears to exist, mining materials from Stony Creek would require purchasing rights to mine the gravel, developing the site, and obtaining the necessary environmental permits.

The Stonyford location is closer to the Sites Project, so there may be opportunities for cost savings. The materials might be purchased at a lower price and hauled directly to the site and processed there, as opposed to hauling 35 miles from Orland. Pros and cons of this approach are:

- Pros: Shorter material haul and less reliance on commercial quarries to produce materials.
- Cons: Would need to haul more materials to account for more waste than from the commercial quarries, and construction water demand would increase due to the need to wash the materials. In addition, the mining rights may need to be purchased and the site developed prior to producing suitable materials for construction. There are also potentially significant environmental review and permitting requirements.

Other Sources of Sand and Gravel

Further to Stony Creek discussed above for a source of sand and gravel, we undertook a very preliminary look at the potential quarry sand and gravel materials in the Project region. Due to the large quantities of required materials, we considered materials within a distance of some 50 miles from the site. Figure 3-5 from the California Department of Conservation, Division of Mine Reclamation, shows the locations of active mines in the project vicinity. The active mines shown on the figure are summarized in Table 3-1.

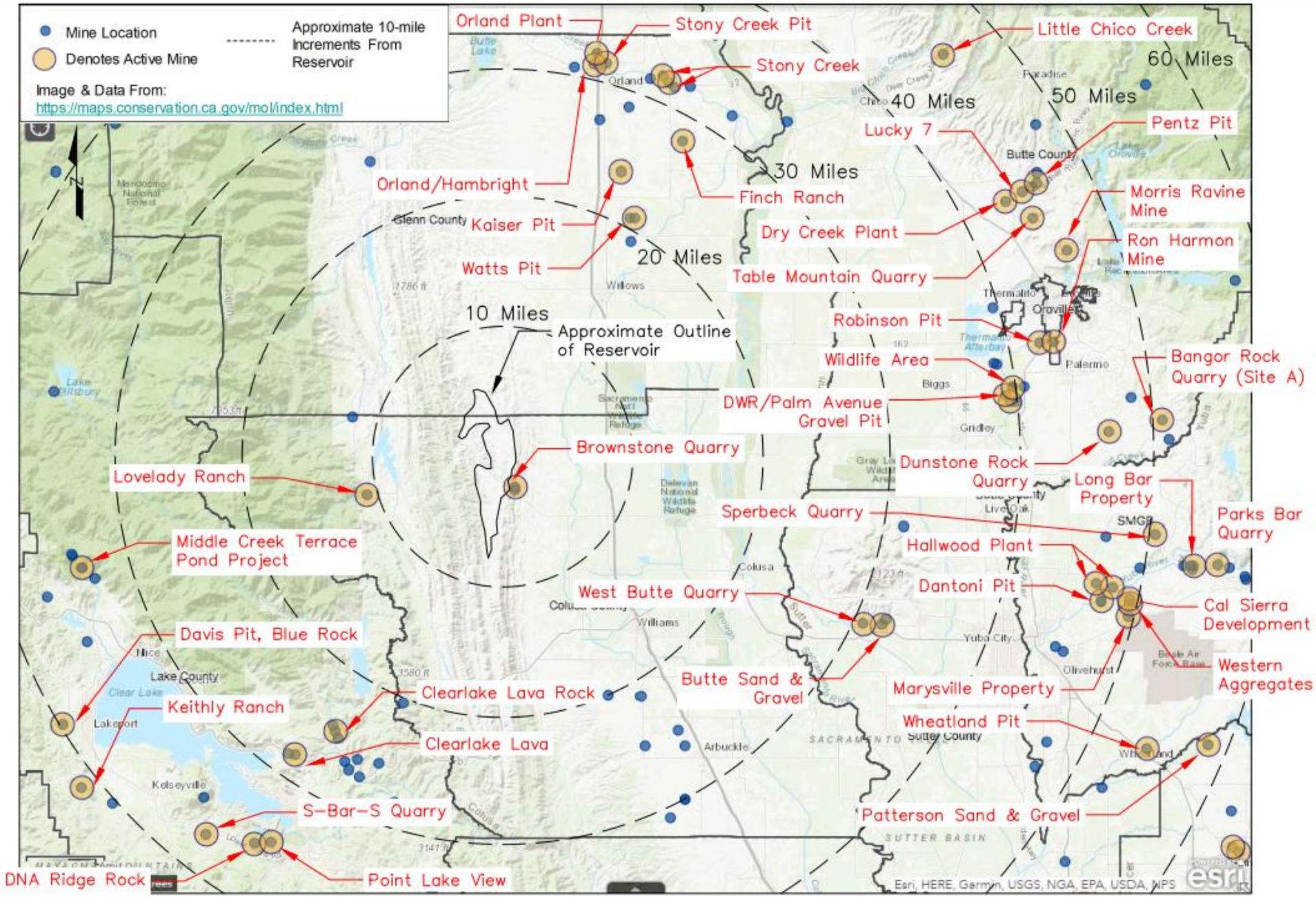


Figure 3-5. Active and Inactive Mines In Project Vicinity

Table 3-1. Summary of Active Mines

Mine Name	Primary Product	Owner	Area Disturbed (acres)	Area Permitted (acres)
Almond Avenue Mine	Sand and Gravel	Franklin Construction Company, Inc.	12	44
Bangor Rock Quarry-Site A	Stone	Bangor Rock LLC	41	28
Brownstone Quarry	Dimension Stone	Brownstone Quarry	5	Unknown
Butte Sand & Gravel	Sand and Gravel	Butte Sand And Gravel	268	481
Cal Sierra Development, Inc.	Gold (Placer)	Cal Sierra Development, Inc.	7	704
Clearlake Lava	Cinders	Clearlake Lava, Inc.	44	50
Clearlake Lava Rock	Sand and Gravel	Clearlake Lava, Inc.	7	11
Dantoni Pit	Sand and Gravel	Noble (Bud) Plant And Eleanor Plant	0	200
Davis Pit, Blue Rock	Sand and Gravel	Thorn	0	10
DNA Ridge Rock	Sand and Gravel	Epidendio	20	20
Dry Creek Plant	Sand and Gravel	Franklin Construction Company, Inc.	2	11
Dunstone Rock Quarry	Sand and Gravel	Hammett	40	120
DWR/Palm Avenue Gravel Pit	Sand and Gravel	DWR Flood Management	10	Unknown
Finch Ranch	Sand and Gravel	Graham	14	313
Hallwood Plant	Sand and Gravel	Baldwin Contracting Company, Inc.	393	688
Kaiser Pit	Sand and Gravel	Glenn County, Department Of Public Works	21	31
Keithly Ranch	Stone	Granite Construction Company	52	200
Little Chico Creek	Sand and Gravel	Franklin Construction Company, Inc.	8	5
Long Bar Property	Sand and Gravel	Silica Resources, Inc.	62	120
Lovelady Ranch, LLC	Sand and Gravel	Lovelady Ranch, LLC & Little Stony, LLC	2	8
Lucky 7	Sand and Gravel	Duke Sherwood Contracting, Inc.	0	10
Marysville Property	Sand and Gravel	Teichert Aggregates	283	590
Middle Creek Terrace Pond Project	Sand and Gravel	Clearlake Redi-Mix, Inc.	2	31
Morris Ravine Mine	Silica	Mineral Resources, LLC	76	520
Orland Plant	Sand and Gravel	Baldwin Contracting Company, Inc.	60	85
Orland/Hambright	Sand and Gravel	Baldwin Contracting Company, Inc.	18	150
Parks Bar Quarry	Rock	Nordic Industries, Inc.	44	234
Patterson Sand And Gravel	Sand and Gravel	Cemex	375	326
Pentz Pit	Sand and Gravel	Baldwin Contracting Company, Inc.	0	362
Point Lake View	Cinders	Clearlake Lava, Inc.	43	150
Robinson Pit	Sand and Gravel	Granite Construction Company	75	130
Ron Harmon Mine	Fill Dirt	Harmon	0	27
Sperbeck Quarry	Rock	Nordic Industries, Inc.	28	28
S-Bar-S Quarry	Not Reported	Rich-Ted Trucking, Inc.	14	Unknown
Stony Creek	Sand and Gravel	North Valley Rock, LLC	4	80
Stony Creek	Sand and Gravel	Baldwin Contracting Company, Inc.	37	192
Stony Creek Pit	Sand and Gravel	Bogart Construction	1	117
Table Mountain Quarry	Sand and Gravel	Florida Rock Industries, Inc	105	320
Watts Pit	Sand and Gravel	Glenn County, Department Of Public Works	21	58
West Butte Quarry	Sand and Gravel	Butte Sand And Gravel	18	36
Western Aggregates	Sand and Gravel	Western Aggregates, Inc.	407	0
Wheatland Pit	Clay	Gladding Mc Bean	2	114
Wildlife Area	Sand and Gravel	Granite Construction Company	72	115

Information in table is based on information from the California Department of Conservation, Division of Mine Reclamation in 2019 (downloaded April 14, 2021)

The primary source of material for these quarries are alluvial deposits or rock outcrops of various quality. Most of the larger quarries for sand and aggregate are located east and north of the project site. We selected six quarries or material providers in the project area to obtain additional information on sand and gravel products, concrete aggregate, and road base and subbase materials as follows:

- Available technical specification sheets/lab certifications
- At-plant costs
- Productivity rates
- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)
- Processing facility location
- Available material remaining/duration of permitted operation

The companies selected and information obtained are shown in Table 3-2 and response sheets are contained in Appendix A. Included in the response sheets are contact names, contact information, and dates of conversations. After researching Stony Creek Quarry, it appears Knife River Construction is doing business as Baldwin Contracting Company in that area so a separate response is not provided in Appendix A.

It is noted that this activity was cursory, and not comprehensive. As the design process progresses, a comprehensive assessment of available quarry materials in the region would be necessary that would include visits to the quarries and sampling and testing of their materials. Testing would include the following:

- Specific gravity and absorption
- Abrasion resistance
- Sodium sulfate soundness
- Flat and elongated particles
- Potential for alkali-silica reaction

Table 3-2. Results of Preliminary Quarry Contact

Material Provider	Mine Name	Material & Technical Specifications or Lab Certification Provided?	At-Plant Costs?	Productivity Rates?	Quarry and/or Processing Facility Location?	Source Material Type?	Available Material and/or Duration of Permitted Operation?
Butte Sand & Gravel	Butte Sand & Gravel	Yes. Provided gradation, R Value, durability and compaction. Meets Caltrans aggregate base requirements. Does not meet quality requirements for concrete.	$9 to $11/ton (depending on product)	Up to 10,000 tons per day	10373 S Butte Road Sutter, CA	Volcanic Rock	Quarry has 100 year permit
Finch Ranch Sand and Gravel	Finch Ranch	Not provided, but material meets Caltrans and concrete aggregate requirements.	$11.5/ton plus tax	Answer not provided	7266 Highway 32, Orland, CA	Answer not provided	Answer not provided
Knife River Corporation	Orland Plant	Not provided, but material meets concrete aggregate standards	$10-$20/ton (depending on product)	Answer not provided	6415 Co Rd 7, Orland, CA (Orland Plant)	Alluvium	Answer not provided
Lovelady Ranch, LLC	Lovelady Ranch, LLC	Multiple attempts made at contact were made. No information was provided.					
Baldwin Contracting Company, Inc.	Stony Creek	See Knife River Corporation (Chico Location, 1764 Skyway Drive, Chico CA)					
Orland Sand & Gravel	Stony Creek Pit	Multiple attempts made at contact were made. No information was provided.					

3.3 Potential Benefits of Using Excess Materials from Construction of the TRR in HR Facilities

Comment: Provide an evaluation of the potential benefits of using waste from the Terminal Regulating Reservoir (TRR) West excavation to construct Golden Gate Dam (we should evaluate other options also, including use for roads).

Response:

Jacobs Engineering/Geosyntec indicated that excess materials from the TRR West excavation could amount to about 9 million cubic yards of total material (e-mail from Peter Rude, Jacobs Engineering, March 18, 2021). These excess excavated materials are being considered for use in the HR facilities. The geotechnical characteristics and volume of the excavated materials require further exploration. Geosyntec has estimated that 30-70% of that material may include the Cretaceous siltstone and 30-70% may include the Quaternary unit, with proportions between the two units dependent upon the ultimate reservoir's location, size, layout, depth, etc. (e-mail from Brian Martinez, PhD, March 19, 2021). As a result, it is not known at this time how much of the material would need to be wasted. Besides material balance (excavation at TRR and use in HR), hauling costs would need to be considered because the TRR is about 4 miles east of Golden Gate Dam. In the Jacobs Engineering cost estimate for the TRR, 4 to 6 miles of hauling costs were included depending on the material and where it will be placed (8 to 12 miles round trip). Reuse of this material could save or add cost to the overall project depending on the quality of the material and amount to be wasted.

The location, size, depth, and layout of the TRR will be further defined through the upcoming geotechnical investigation. The results of this investigation will inform an engineering and cost evaluation of reuse options during preliminary engineering. The weathered rock materials from the TRR excavation are being considered for use in the Golden Gate Dam (Zone 4 earthfill) or in the roadway fills. Reuse of rock from the TRR in Golden Gate Dam would require DSOD approval of earthfill for the upstream shell. There are several areas where roadway fills are anticipated, including Sites Lodoga Road Realignment and Huffmaster Road Realignment. Specific road areas requiring fills will be better defined once design level topography has been obtained.

The VE idea discussed during the March 3, 2021, LMC meeting, *"Replace upstream shell zone and eliminate upstream filter/transition zones[1]",* minimizes excess earthfill by using it as a part of the upstream shell zone (see Section 3.1 above). Utilizing the full amount of TRR excess excavation materials would convert the entire upstream shell into earthfill. Seismic stability for a dam with earthfill upstream shell may be a concern to DSOD due to the adequacy of compaction of the earthfill to preclude excessive seismic deformations. To evaluate the viability of using the TRR material in the Zone 4 upstream shell of the dams, seismic stability would need to be evaluated; this would likely include test fills using weathered rock during the geotechnical investigation phase.

Other limitations on using the TRR excavation materials in Golden Gate Dam include the following:

- If used on the upstream side of the dam, the haul route would need to cross the embankment core and chimney filter and drains, creating potential contamination issues, potentially

[1] This VE option was presented at the 3/3/21 LMC meeting. It replaces a portion of the upstream shell rockfill (Zone 3) with earthfill (Zone 4).

interfering with dam construction, and disturbing the compacted materials. The TRR excavated materials could be used on the downstream side of the dam to avoid hauling across the top of the dam.

- If used on the upstream side of the dam, the haul route lengths would be increased, possibly by 10 miles or more, to avoid crossing the dam.
- The availability of the TRR materials would need to be compatible with the construction schedule.

Instead of using the excess excavated materials in the dam, the materials may be used in the less stringent road fills (not DSOD jurisdictional) on the east side of the reservoir. The demand for the fill material versus the amount available from TRR would need to be evaluated, and locating disposal sites would be required for excess materials. Alternatively, excess material could be disposed of in the deadpool of the reservoir or along the roads.

3.4 Cost Comparison for 40% Increase in Foundation Preparation and 50% Increase in Processing and Hauling

Comment: Provide breakdown/cost comparison for 40% increase in foundation preparation and 50% increase in processing and hauling.

Response:

Refer to Table 2-2 for response to this comments. This comment was expanded to include reviewing all cost increases, not only the cost for foundation preparation and processing and hauling.

3.5 Double Handling of Commercially-Obtained Material

Comment: Justify/support assumption for double-handling of commercially obtained material – reason for transporting to stockpile area instead of directly to placement.

Response:

This is a question on material availability and timing of the demand. For the feasibility-level cost estimate, AECOM assumed 70 percent direct haul and 30 percent stockpile onsite prior to placement in the dams. The reason is the demand for the materials will vary significantly with time, the quantities are large, and the Contractor will need to have the material available for placement without delaying construction. For example, a significant quantity of blanket drain material will be quickly needed to cover large areas of the downstream shell foundation upon receipt of DSOD approval of the foundation.

Due to the volumes of material required, particularly for the large dams, placing the materials by direct delivery may not be achievable and a surge pile may be needed for blanket placement to keep pace with the schedule. The construction schedule shows the first use of filter/drain material starting in the Saddle Dams in late 2026 (AECOM, 2021b). Golden Gate Dam filter/drain construction would start in early 2027 and Sites Dam filter/drain would start in early 2028. The final use of filter/drain would be in 2028 for the Saddle dams and in 2029 for Golden Gate and Sites dams.

As stated above, the demand for the materials would vary significantly and our opinion is that would require a surge pile of material on site to help meet the peak demands. In addition, to even out the

demand on the offsite quarries, it was assumed that filter/drain delivery to the site would need to begin in 2025. Therefore, double handling of a portion of the filter/drain materials would be needed. As such, our estimate for feasibility is 70 percent direct haul and 30 percent stockpile/double handling of the filter/drain materials.

4.0 Comments on Roads and Bridges

4.1 Reevaluation of Bridge Length and Fill Prism

Comment: Re-evaluate the bridge length and fill prism (we know from an engineering perspective how to proceed but are unsure if this would result in any environmental impacts other than handling the additional fill prism – suggest coordination with ICF, maybe including their limnologist). Evaluate option for one bridge (only eastern span).

Response

The Environmental Team has been consulted regarding the potential for additional environmental impacts and mitigation needs. A response is forthcoming.

The additional fill required to replace the 1,400-foot-long westerly bridge has been evaluated and results in approximately $14M savings. The 1,400-foot-long bridge would be replaced with approximately 3.6M cubic yards of local fill material, 260,000 cubic yards of rock slope protection, 1,760 cubic yards of aggregate base, and 1,200 tons of hot-mix asphalt, for the fill prism and roadway elements The engineering issue is the absence of geotechnical data and analysis of the alluvium to evaluate its use to support a large fill prism on the valley floor. This cost savings will need to be verified once the subsurface materials investigations are complete.

4.2 Realignment of Sites-Lodoga Road

Comment: Sites Lodoga Road – an alternative alignment closer to the water's edge may provide some savings.

Response:

A comparative analysis has been performed of the current alignment relative to the reservoir water's edge alignment and the cost savings would be roughly $10M. The water's edge alignment traverses approximately 900 feet of less difficult mountainous terrain, but is approximately 1,800 feet longer overall. However, the net is still expected to be a savings based on approximately 1,300 additional tons of hot-mix asphalt, 2,000 additional cubic yards of aggregate base, 21,000 less square feet of retaining walls, 550,000 less cubic yards of roadway excavation, and approximately 3,000 linear feet of full-depth reclamation of roadway. Figure 4-1 shows the comparison of the two alignments.

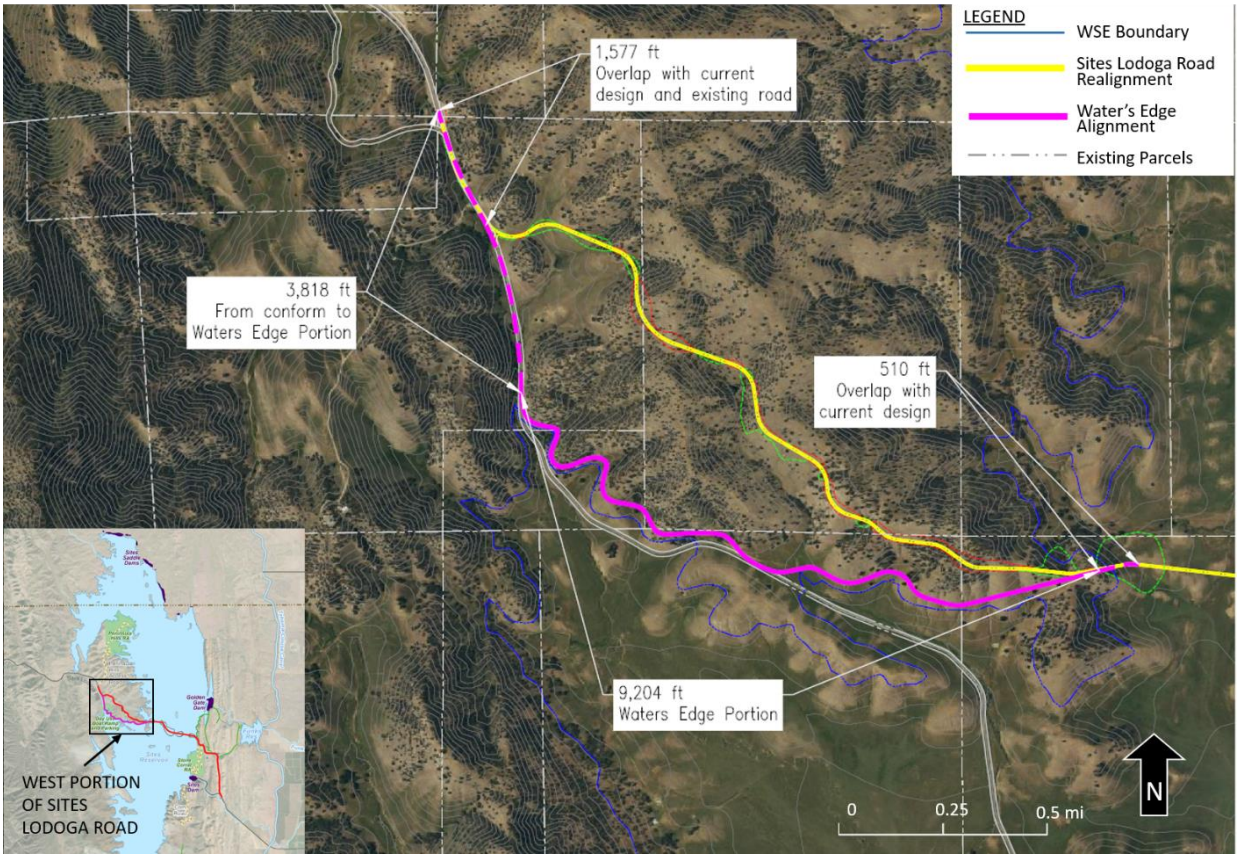


Figure 4-1. West Sites-Ladoga Road Alternative Alignment Options

4.3 Reduction of Length of Huffmaster Road Realignment

Comment: It appears possible to reduce the road length of Huffmaster Road realignment by tying in to the existing Huffmaster Road north of "Ladybug's" residence (this alignment change would need to be coordinated with the environmental team).

Response:

The reduced length of Huffmaster Road realignment is approximately 4,000 feet and would result in approximately $4M in savings. The reduction in length reduces the roadway excavation by approximately 150,000 cubic yards, reduces the aggregate base by approximately 2,200 cubic yards, and reduces the retaining walls by approximately 6,000 square feet. Figure 4-2 shows the reduced roadway length.

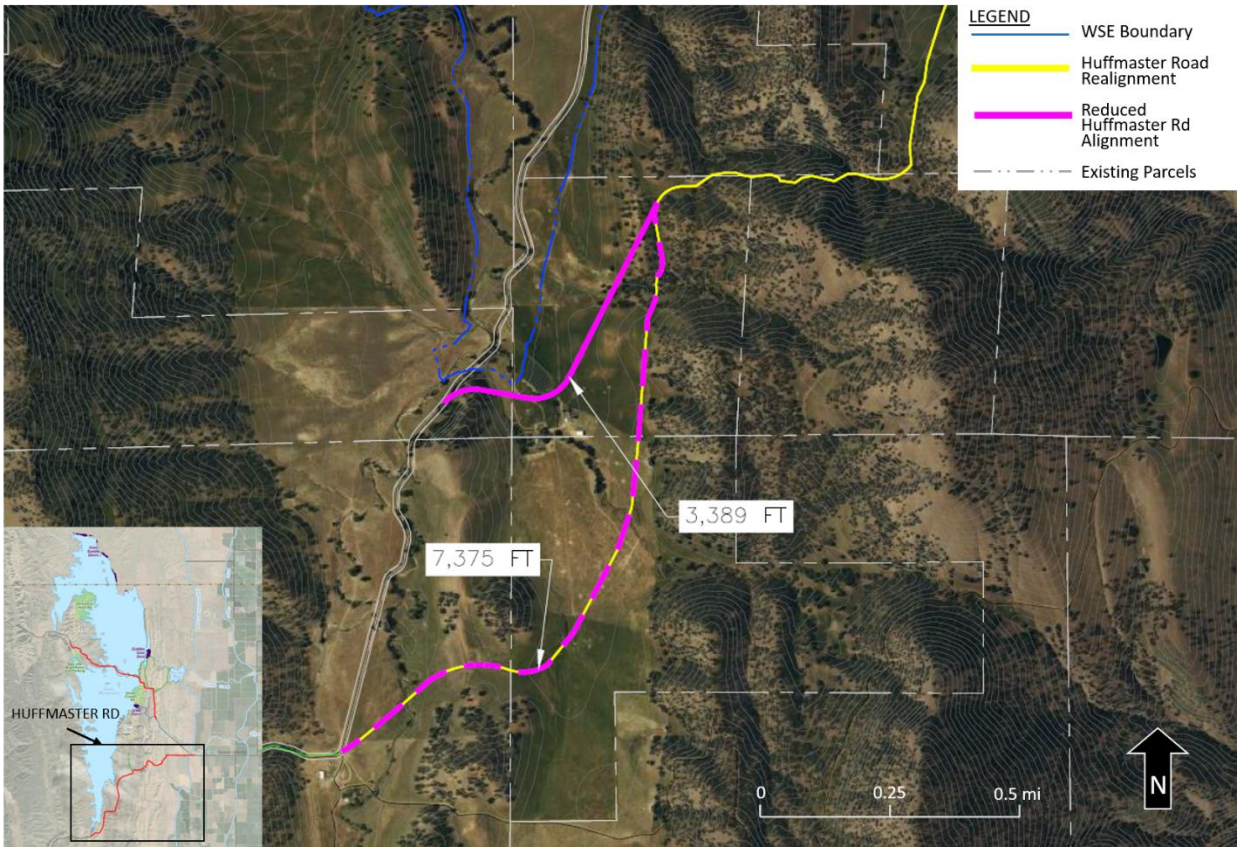


Figure 4-2. South Huffmaster Road Realignment Options

4.4 Colusa County Cost Data

Comment: Coordinate with Mike Azevedo to obtain recent Colusa County data on costs/linear foot and review for application to the road cost estimate.

Response:

Colusa County provided the Lodoga-Stonyford Road Project construction documents and bid results dated September 24, 2020, for evaluation. This project involves partial depth reconstruction of the roadway structural section. The cost evaluation of this Lodoga-Stonyford Road Project compares well with the Site Reservoir Project as demonstrated below and affirms the feasibility-level cost estimate established for the reconstruction of County roads that would provide construction access from Interstate 5 to the Sites Reservoir site. Table 4-1 summarizes the evaluation.

Table 4-1. Comparison of Road Project Features

Sites Reservoir - County Roads Full Depth Reclamation (FDR)	**Colusa County – Lodoga Stonyford Road Rehabilitation Project (County Rehab)**
$233 per lf of roadway based on engineers estimate	$91.10 per lf of roadway based on bid results
14 inch deep pulverizing with 2 inch AC overlay (16 inch total structural section)	5 inch deep pulverization with 4 inch AC overlay (9 inch total structural section)
Additional items not included in the Lodoga-Stonyford Road Project: Metal pipe culvert and concrete box culvert replacements, and intersection upgrades	No additional items
28 ft wide road	22 ft wide road
Additional items not included in the Lodoga-Stonyford Road Project: 2 feet of shoulder widening on each side of the road which involves an additional bid item for roadway excavation	No shoulder widening or roadway excavation
Project Comparison Summary – Equivalent Basis	
$189 per lf without the additional items *	$206 per lf with factored width and depth *
21.28 miles combined length	2.07 miles long
Total cost = $26.25M (high economy of scale)	Total cost = $1M (low economy of scale)

* Equating Project Cost:

- FDR 16-inch deep structural section : County Rehab 9-inch deep section (1.78:1 ratio)
- FDR 28-foot road width : County Rehab 22-foot road width (1.27:1 ratio)
- County Road factored cost: $91.10 per lf x 1.78 x 1.27 = $206 per lf
- FDR equivalent cost: $189 per lf (high economy of scale)

As would be expected based on the relative economy of scale, the FDR equivalent cost per linear foot is less but reasonably close to the County Rehabilitation project cost ($189 per lf vs $206 per lf).

5.0 References

AECOM (2021a). Draft Feasibility-Level Cost Estimate Technical Memorandum, Task Order No. 2, Task HR56. February 3.

AECOM (2021b). Constructability Analysis – Draft, Task Order No. 2, Task HR53. February 22.

AACEI (2016). Association for the Advancement of Cost Engineering International. Recommended Practice No. 12R-97, Cost Estimate Classification System. March 1.

Authority (2020). Value Planning Report. April.

Appendix A

Sources of Sand and Gravel

MATERIAL PROVIDER: BUTTE SAND & GRAVEL
NAME OF CONTACT: MEGAN AND JOE
CONTACT PHONE/EMAIL: 530-696-2486
DATE OF CONVERSATION/CONTACT: APRIL 5, 2021

Responses below were transcribed from phone conversation

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?

  Response: Provided gradation, R Value, durability and compaction data for ¾ AB material showing material meets Caltrans aggregate base specifications. Material does not meet concrete aggregate requirements.

- At-plant costs (not a bid)

  Response: $9-$11/ton (depending on the product)

- Productivity rates

  Response: Up to 10,000 tons per day

- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)

  Response: 10373 S Butte Road Sutter, CA. The source is volcanic rock.

- Processing facility location

  Response: 10373 S Butte Road Sutter, CA

- Available material remaining/duration of permitted operation

  Response: The quarry has a 100-year permit to operate.

MATERIAL PROVIDER: FINCH RANCH SAND AND GRAVEL
NAME OF CONTACT: NORTH VALLEY ROCK PRODUCTS - BILL GRAHAM
CONTACT PHONE/EMAIL: 530-865-9668, 530-624-6399
DATE OF CONVERSATION/CONTACT: APRIL 21, 2021

Responses below were transcribed from phone conversation

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?

  Response: They produce sand and gravel products that meet Caltrans aggregate base specifications and meet concrete aggregate requirements.

- At-plant costs (not a bid)

  Response: $11.5/ton plus tax.

- Productivity rates

  Response: Would not provide

- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)

  Response: Would not say

- Processing facility location

  Response: 7266 Highway 32 Orland

- Available material remaining/duration of permitted operation

  Response: Would not discuss.

MINE NAME: KNIFE RIVER CORPORATION
NAME OF CONTACT: MARC INGVOLDSEN
CONTACT PHONE/EMAIL: MARC.INGVOLDSEN@KNIFERIVER.COM
DATE OF CONVERSATION/CONTACT: APRIL 5 AND APRIL 8, 2020

Responses below were transcribed from phone and email conversation

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?

  Response: Not willing to provide without project name

- At-plant costs (not a bid)

  Response: $10-$20/ton (depending on the product)

- Productivity rates

  Response: Not willing to provide without project name

- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)

  Response: 6415 Co Rd 7, Orland, CA; Material is alluvium

- Processing facility location

  Response: 6415 Co Rd 7, Orland, CA

- Available material remaining/duration of permitted operation

  Response: Not willing to provide without project name

MINE NAME: LOVELDAY RANCH, LLC
NAME OF CONTACT: WILLY WYCOFF CONSTRUCTION
CONTACT PHONE/EMAIL: 530-218-1687 AND 530-963-3093
DATE OF CONVERSATION/CONTACT: APRIL 1 AND APRIL 2, 2021

No responses received

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?

- At-plant costs (not a bid)

- Productivity rates

- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)

- Processing facility location

- Available material remaining/duration of permitted operation

MINE NAME: ORLAND SAND & GRAVEL
NAME OF CONTACT: DALE ROY BOGART
CONTACT PHONE/EMAIL: (530)865-2478; DRDOCBOGART@GMAIL.COM
DATE OF CONVERSATION/CONTACT: APRIL 5 AND APRIL 8, 2021

No responses received

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?

- At-plant costs (not a bid)

- Productivity rates

- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)

- Processing facility location

- Available material remaining/duration of permitted operation

Appendix D

Responses to Metropolitan Water District's Comments on Draft Cost Estimate

Metropolitan Water District's Comments on the 2/3/21 Draft Cost Estimate Technical Memorandum
Received 3/2/21

Soft costs and Contingencies

1. Assumptions seem reasonable.

Pipeline Conveyance

2. Costs per linear foot for the pipeline appears a bit high based on Metropolitan past experience. The pipeline internal pressures are unknown so it's difficult to determine appropriate pipe thickness and costs. Could be cost savings here.
   Response: *To be addressed by the HC Contractor.*

Filter, Drain, Transition Zones:

3. Quarry Development - I don't know that characteristics of local rock in the area; however, I strongly consider developing a Sites Quarry for filter, drain, and transition materials. An onsite Sites Quarry could produce filter, drain, and transition materials for the dams and saddle dams, aggregate base for roads and concrete aggregate for concrete batch plant for appurtenant facilities. If a site closer than 40 miles is available, cost savings could be realized rather purchasing and transporting materials from a quarry located 40 miles away. It would minimize the amount of waste and degradation of materials being delivered to the site.
   Response*: Onsite quarries will be a focus of future geotechnical investigations and testing. At this time, there is limited testing data on samples of sandstone from a quarry immediately downstream of the Sites dam right abutment. That testing showed that the sandstone did not meet the quality requirements for the filter and drain zone material. The sandstone is also interlayered with mudstones, which would be challenging to selectively excavate the fresh sandstone and to not incorporate the mudstone with the sandstone. Based on these considerations, it was decided to check for offsite quarries that can supply the required high quality materials. Quarries that have this quality material appear to be between Willows and Orland, about 35 miles from the Sites reservoir. These offsite quarries will need to be investigated further. The transition zones are less critical than the filter and drain zones and, therefore, a lower quality rock could be used for the transition zones. On-site sandstone may be quarried for use in the transition zones to reduce costs.*

4. With 10% of the purchased quarry being allocated for waste, the assumption that 70% of the transported materials can go directly into the fill after a 40-mile trip (roughly 1 hour on the road each way) may be optimistic. The most important zones for Quality Control are the filter, drain, and transitions and QC may be difficult to maintain due to material degradation from handling, trucking, etc. There is a risk significant out-of-spec or rejected materials.
   Response*: We agree that the most important zones for QC are the filter, drain, and transitions. The specification requirements would state that the Contractor would need to determine the gradation that the materials must have before transportation to the embankments to ensure that the specified gradations are obtained in place in the embankment after hauling, placing, spreading, moisture conditioning and compacting. The 70 percent assumption is based on the expected demand for materials and the need to have surge piles onsite to handle peak demands. The 10 percent is based on the tendency to slightly "overbuild" the filter/drain zones ("Christmas*

tree effect"). As noted above, it is now currently assumed that the onsite sandstone can be used for transition materials. A proven source of quality filter and drain materials onsite has not been established; this will be confirmed during the next phase of geotechnical investigations. Offsite quarries that are closer and that can provide high quality material will also be the evaluated in the next phase of geotechnical investigations.

5. Constructability TM shows the construction durations of Diamond Valley Lake (DVL) and Seven Oaks Dam (SOD) compared with Sites Reservoir. This may be a little misleading because DVL and SOD borrow and quarry materials were located on site or nearby. Those projects didn't depend on transporting materials by truck from 40 miles away.
   ***Response**: Acknowledged. These projects have significant differences that make them difficult to compare. For example, the volumes of embankment material for DVL are over five times greater than Sites. The discussion of duration is meant to be a rough order of magnitude comparison only. The project schedule considered that the filter and drain materials would be imported from off site.*

Dam Zonation & Cross-Section:

6. For taller dams such as Sites and Golden Gate Dams (267 ft and 287 ft high, respectively), the 30-foot wide crest seems narrow, especially since the smaller saddle dams also have 30-foot crest widths.
   ***Response**: The crest width for Sites and Golden Gate will be revisited in preliminary design to check if the crest should be widened for these two dams.*

7. Flattening the upstream slope of the two larger dams and replacing some Zone 3 Rockfill with more Zone 4 Random materials should be considered and the section optimized. While more materials would be needed, less Zone 3 rock is required.
   ***Response**: Modifying the upstream shell to accommodate random fill will be considered during preliminary design. The upstream slope would need to be flattened, but the benefit of using more random materials (and less waste) and reduced rockfill would likely result in savings. The concern will be the saturated random material (expected to be a rocky earthfill) in the upstream shell that would be subject to high seismic loading. The characteristics of the random fill will need to be carefully evaluated during next phases of geotechnical investigation. Test fills using the random materials to evaluate their compaction characteristics are being considered.*

Construction Water

8. While construction water is discussed in the Constructability TM, I don't see a line item for water purchase or the development of temporary construction water sources. With all the embankments being constructed simultaneously (or at least some), a temporary pipeline system and perhaps a pumping system may be required.
   ***Response**: There is not a line item for development of construction water sources in the cost estimate. There are water wells within the valley and it was assumed that the water for dam construction would come from existing water supply wells within the inundation area that will be acquired as part of the project. Water may also be available during the wet season at the cofferdam location to be constructed on Funks Creek to enable the construction of Golden Gate Dam. Water used for construction purposes would also be transferred from the GCID Main*

Canal, by trucks and/or temporary pipelines. The cost for construction water was assumed to be part of the miscellaneous allowance for small items included in the feasibility-level cost estimate.

Appendix C.1.B Sites Reservoir Project HC Conveyance Facilities Feasibility Design Basis of Estimate

Sites Reservoir Project HC Conveyance Facilities

Feasibility Design Basis of Estimate

Final

June 2, 2021

Site Project Authority

Sites Reservoir Project HC Conveyance Facilities

Project No: D3380602.A.P1.OE.58.58-05
Document Title: Feasibility Design Basis of Estimate
Document No.: PPS0430211428SAC
Revision: Final
Date: June 2, 2021
Client Name: Sites Project Authority
Project Manager: Peter Rude
Author: Nick Cavalleri and Peter Rude

Jacobs Engineering Group Inc.

2525 Airpark Drive
Redding, CA 96001
United States
T +1.530.243.5831
www.jacobs.com

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Document History and Status

Revision	Date	Description	By	Review	Approved

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A HC VP-7 Cost Comparison Draft Technical Memorandum
B Detailed Cost Estimate
C AACEI Classification

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Acronyms and Abbreviations

AACEI	Association for the Advancement of Cost Engineering International
GC	General Conditions or General Contractor
NTP	Notice to Proceed
VE	Value Engineering

1. Executive Summary

1.1 Project Overview

The Sites Reservoir Project consists of a large reservoir, ancillary roads, and conveyance facilities. The Sites Project Authority decided to segregate the design of these facilities into an HR (Segment H Reservoir) segment that is responsible for the design of the reservoir features, including several dams, inlet/outlet tunnels at Golden Gate Dam, as well as relocation of roads displaced by the reservoir. The other segment is known as the HC (Segment H Conveyance) segment and consists of improvements to the two existing diversion canals from the Sacramento River to the Project Area (Tehama-Colusa Canal and Glenn-Colusa Irrigation District Main Canal), regulating reservoirs (existing Funks Reservoir and new Terminal Regulating Reservoir), two pumping/generating plants (PGP), large-diameter pipelines from each PGP to Sites Reservoir, and a large-diameter pipeline to convey water from the Tehama Colusa Canal (TCC) to the Colusa Basin Drain or Sacramento River near Dunnigan, California.

Table 1-1. Project Overview

Estimate Information

Estimate Classification:	**Class 4**
Requested By:	Sites Project Authority
Estimated By:	Nick Cavalleri/Robert Wells - Jacobs
Estimate Date	June 2, 2021

1.2 Overall Costs

This executive summary provides an overview of the HC Cost Estimates. The Overall Cost Table 1-2 is the summary of the HC Cost Estimates dated March 2021. Overall Cost Table 1-3 is the summary of the HC Cost Estimates de-escalated to July 2019 using the U.S. Bureau of Reclamation Construction Cost Trends (base 1977 = 100 for indexing field costs only). The composite trend indices for April 2021 and July 2019 were used to adjust the cost to 2019 dollars. The de-escalation was 3% for that time period. Reliance on this information is advised to be in consideration of the full context of this report.

The cost estimate has been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project will depend on actual labor and material costs, competitive market conditions, final project costs, implementation schedule and other variable factors. As a result, the final project costs will vary from the estimate presented herein. See Appendix A for Detailed Cost Estimates.

Table 1-2. Overall Costs

Overall Costs Estimate Date March 2021

Bid Package	Description	Date Completed	Construction Cost W/O Soft Costs ($Millions)	Non-Contract Soft Cost 17% ($Millions)	Non-Contract Soft Cost 15% ($Millions)	Alt 1 PGE	Alt 1 WAPA	Alt 2 PGE	Alt 2 WAPA
1	TRR East/Funks Pipelines	5/4/2021	$325.38		$374.19	x	x	x	x
2	Dunnigan Pipeline Alt 1	2/26/2021	$84.04		$96.65	x	x		
3	Dunnigan Pipeline Alt 2	5/4/2021	$231.42		$266.13			x	x
4	Funks Reservoir	2/26/2021	$34.20	$39.96		x	x	x	x
5	Funks PGP	2/26/2021	$97.80	$114.40		x	x	x	x
6	TRR East Reservoir	3/1/2021	$158.22	$185.11		x	x	x	x
7	TRR East PGP	2/26/2021	$96.35	$112.73		x	x	x	x
8	Transmission Power Lines - WAPA	3/26/2021	$50.20		$57.80		x		x
9	Transmission Power Lines - PGE	3/26/2021	$52.50		$60.37	x		x	
10	Substations - WAPA	2/26/2021	$82.90		$95.30		x		x
11	Substations - PGE	2/26/2021	$82.90		$95.30	x		x	
12	Red Bluff Improvements	3/1/2021	$4.18		$4.81	x	x	x	x
13	GCID Improvements	3/1/2021	$5.74		$6.60	x	x	x	x
14	Interconnection Facilities - WAPA*	12/31/2020	$16.80		$19.30		x		x
15	Interconnection Facilities - PGE*	12/31/2020	$18.70		$21.51	x		x	
16	CAISO Interconnection Study Process	4/7/2021	$0.40		$0.46	x	x	x	x
					Construction Cost TRR East Subtotals	$960.41	$956.21	$1,107.79	$1,103.59
					Total HC Program Costs TRR East	$1,112.09	$1,107.31	$1,281.57	$1,276.79

Table 1-2. Overall Costs

Overall Costs Estimate Date March 2021

Bid Package	Description	Date Completed	Construction Cost W/O Soft Costs ($Millions)	Non-Contract Soft Cost 17% ($Millions)	Non-Contract Soft Cost 15% ($Millions)	Alt 1 PGE	Alt 1 WAPA	Alt 2 PGE	Alt 2 WAPA
17	TRR West/Funks Pipelines	5/4/2021	$197.25		$226.84	x	x	x	x
18	TRR West Reservoir	3/31/2021	$181.14	$211.93		x	x	x	x
19	TRR West PGP	2/26/2021	$96.35	$112.73		x	x	x	x
20	TRR West Transmission Power Lines - WAPA	3/22/2021	$31.00		$35.64		x		x
21	TRR West Transmission Power Lines - PGE	3/22/2021	$34.17		$39.30	x		x	
					Construction Cost TRR West Subtotal	$836.87	$831.80	$984.25	$979.18
					Total HC Program Costs TRR West	$970.49	$964.62	$1,139.97	$1,134.10

Note: Bid Packages 14, 15, and 16 cost estimates were developed by Z Global, all other HC Bid Packages cost estimates were developed by Jacobs

Note: TRR West options Bid Packages 17, 18, 19, 20, and 21 replace Bid Packages 1, 6, 7, 8, and 9 respectively.

Table 1-3. Overall Costs

Overall Costs Estimate Date July 2019

Bid Package	Description	Date Completed	Construction Cost W/O Soft Costs ($Millions)	Non-Contract Soft Cost 17% ($Millions)	Non-Contract Soft Cost 15% ($Millions)	Alt 1 PGE	Alt 1 WAPA	Alt 2 PGE	Alt 2 WAPA
1	TRR East/Funks Pipelines	5/4/2021	$315.62		$362.96	x	x	x	x
2	Dunnigan Pipeline Alt 1	2/26/2021	$81.52		$93.75	x	x		
3	Dunnigan Pipeline Alt 2	5/4/2021	$224.48		$258.15			x	x
4	Funks Reservoir	2/26/2021	$33.17	$38.81		x	x	x	x
5	Funks PGP	2/26/2021	$94.87	$110.99		x	x	x	x
6	TRR East Reservoir	3/1/2021	$153.47	$179.56		x	x	x	x
7	TRR East PGP	2/26/2021	$93.46	$109.35		x	x	x	x
8	Transmission Power Lines - WAPA	3/26/2021	$48.69		$56.00		x		x
9	Transmission Power Lines - PGE	3/26/2021	$50.93		$58.56	x		x	
10	Substations - WAPA	2/26/2021	$80.41		$92.47		x		x
11	Substations - PGE	2/26/2021	$80.41		$92.47	x		x	
12	Red Bluff Improvements	3/1/2021	$4.05		$4.66	x	x	x	x
13	GCID Improvements	3/1/2021	$5.57		$6.40	x	x	x	x
14	Interconnection Facilities - WAPA*	12/31/2020	$16.30		$18.74		x		x
15	Interconnection Facilities - PGE*	12/31/2020	$18.14		$20.86	x		x	
16	CAISO Interconnection Study Process	4/7/2021	$0.39		$0.45	x	x	x	x
Construction Cost TRR East Subtotals						$931.60	$927.52	$1,074.56	$1,070.48

Table 1-3. Overall Costs

Overall Costs Estimate Date July 2019

Bid Package	Description	Date Completed	Construction Cost W/O Soft Costs ($Millions)	Non-Contract Soft Cost 17% ($Millions)	Non-Contract Soft Cost 15% ($Millions)	Alt 1 PGE	Alt 1 WAPA	Alt 2 PGE	Alt 2 WAPA
	Total HC Program Costs TRR East					$1,078.84	$1,074.15	$1,243.24	$1,238.55
17	TRR West/Funks Pipelines	5/4/2021	$191.33		$220.03	x	x	x	x
18	TRR West Reservoir	3/31/2021	$175.71	$205.58		x	x	x	x
19	TRR West PGP	2/26/2021	$93.46	$109.35		x	x	x	x
20	TRR West Transmission Power Lines – WAPA	3/22/2021	$30.07		$34.58		x		x
21	TRR West Transmission Power Lines - PGE	3/22/2021	$33.14		$38.12	x		x	
	Construction Cost TRR West Subtotals					$811.76	$806.85	$954.72	$949.80
	Total HC Program Costs TRR West					$941.47	$935.82	$1,105.87	$1,100.22

Note: Bid Packages 14, 15, and 16 cost estimates were developed by Z Global, all other HC Bid Packages cost estimates were developed by Jacobs

Note: TRR West options Bid Packages 17, 18, 19, 20, and 21 replace Bid Packages 1, 6, 7, 8, and 9 respectively.

2. Estimate Information

2.1 Purpose of Estimate

The purpose of this Estimate of Construction Costs is to establish an Engineer's opinion of probable construction cost at a feasibility level of design development.

2.2 Scope of Work

The project consists of a large reservoir, ancillary roads, and conveyance facilities near Maxwell, California. The Authority decided to segregate the design of these facilities into an HR (Segment H Reservoir) segment that is responsible for design of the reservoir features, including several dams, inlet/outlet tunnels at Golden Gate Dam, as well as relocation of roads displaced by the reservoir. The other segment is known as the HC (Segment H Conveyance) segment and includes improvements to the two existing diversion canals from the Sacramento River to the Project Area (Tehama-Colusa Canal and Glenn-Colusa Irrigation District Canal), regulating reservoirs (existing Funks Reservoir and new Terminal Regulating Reservoir either TRR East or TRR West), two pumping generating plants (PGP), large-diameter pipelines from each PGP to Sites Reservoir, and a large-diameter pipeline to convey water from the Tehama Colusa Canal (TCC) to the Colusa Basin Drain or Sacramento River near Dunnigan, California. Detailed descriptions of only the facilities associated with TRR West and TRR East are provided in the following subsections. The TRR PGP is common to both and is not described.

2.2.1 Improvements to the Red Bluff Pumping Plant

The existing Red Bluff Pumping Plant is located on the Sacramento River at the upstream end of the Tehama Colusa Canal(TCC) near Red Bluff, California. This facility was constructed and put into operation in October 2012. It was designed to accommodate the Sites Project and includes space to add two additional 250 cfs pumping units, bringing the total pumping capacity to 2,500 cfs. The estimate includes furnishing and installation of two new pumps and all appurtenances in the available space within the existing pumping plant.

2.2.2 Glenn Colusa Irrigation District (GCID)Main Canal Improvements

Improvements to the GCID Main Canal will include a 3,000 cfs headworks structure just downstream of the Hamilton City Diversion on the Sacramento River, canal embankment earthwork, and some canal bank gravel road improvements.

2.2.3 Terminal Regulating Reservoir - East

Construct a new Terminal Regulating Reservoir (TRR) East that will be hydraulically connected to the GCID Main Canal about three miles east of Funks Reservoir. It has about a 130-acre footprint and a capacity of about 600 acre-feet.

2.2.4 TRR PGP

Construction of a new pumping and generating plant will be used to pump water from the TRR to the Sites Reservoir. This facility will also include hydroelectric turbines to generate electricity when flow is released from Sites Reservoir to the TRR and into the GCID Main Canal. As part of this PGP facility, there will also be an energy-dissipation facility that will allow releases back to the TRR as backup to the hydroelectric turbine facilities.

2.2.5 TRR East Pipelines

These are two parallel, 12-foot-diameter pipelines used to convey water between the TRR PGP and the Sites Reservoir. These pipelines will connect from the piping manifold at TRR PGP to the downstream side of the two proposed 23-foot-diameter tunnels connected to the Site Reservoir inlet/outlet structure. The approximate length of these pipelines is 5 miles each.

2.2.6 Funks Reservoir

Reclamation constructed the Funks Reservoir in the mid-1970s with the intent of providing operational flexibility for the TCC. There are check structures on the TCC just upstream and downstream of the reservoir. The TCC is located about 1 mile east of the proposed Sites Reservoir on Funks Creek. At the time of construction, the reservoir had a useable capacity of 1,170 acre-feet between operating levels of 199.5- and 205.2-feet elevation, and 1,080 acre-feet of inactive storage below elevation 199.5 feet, for a total capacity of 2,250 acre-feet; however, the addition of sediment from Funks Creek and the TCC have reduced the total storage volume. The project will remove accumulated sediment to recapture the design storage volume. A temporary cofferdam will be constructed within Funks Reservoir to facilitate construction of the TRR pipelines.

2.2.7 Funks PGP

Construction of a new pumping and generating plant will be used to pump water from Funks Reservoir to the Sites Reservoir. This facility will also include hydroelectric turbines to generate electricity when flow is released from Sites Reservoir to Funks Reservoir and, ultimately, the TCC. There will also be an energy-dissipation facility as part of this PGP facility that will allow releases back to Funks Reservoir as backup to the hydroelectric turbine facilities.

2.2.8 Funks Pipelines

These are 2 parallel, 12-foot-diameter pipelines used to convey water between the Funks PGP and the Sites Reservoir. These pipelines will connect from the piping manifold at Funks PGP to the downstream side of the two proposed 23 foot-diameter tunnels connected to the Site Reservoir inlet/outlet structure. The approximate length of these pipelines is 1 mile each.

2.2.9 Dunnigan Pipelines Alternative 1 and 2

The Dunnigan pipeline consists of either a 9-foot-diameter or 10.5-diameter pipeline that will be used to release water from the TCC to the Sacramento River. The concept is to release flow from Sites Reservoir to Funks Reservoir, where the flow will then go south about 40 miles to near the end of the TCC. At this point, flow will be diverted into the Dunnigan pipeline, where flow will go either to the Colusa Basin Drain (CBD), which flows to Sacramento River, or directly to the Sacramento River. If the pipeline discharges directly into the Sacramento River, a portion of the water will also be diverted and discharged in the CBD. The pipeline is 9-feet in diameter and approximately 4 miles long to the CBD, or 10.5-feet in diameter and approximately 10 miles long if it goes directly to the Sacramento River.

2.2.10 WAPA or PG&E Substations

There are 230 kilovolt (kV) electrical transmission lines running near the proposed project area. Specifically, the WAPA transmission lines run very close to Funks Reservoir in a north-south direction, with a parallel 230 kV line owned by PG&E a few miles east of the WAPA transmission lines. It is anticipated that one of these transmission lines will be connected to provide power for the project, as well as receive generated electrical power from the hydroelectric turbines. There will be three substations, an

interconnection substation at either the PG&E or WAPA transmission lines, and then a substation at the TRR PGP and a substation at the Funks PGP.

2.2.11 Electrical Transmission Lines

Electrical transmission lines will be required to connect the WAPA or PGE 230 kV transmission lines to the TRR PGP and the Funks PGP.

2.2.12 Administration and Operations Building

Construction of a new Administration and Operations Building with all appurtenances near Funks PGP. This facility is included in the Funks PGP cost estimate.

2.2.13 Maintenance and Storage Building

Construction of a new Maintenance and Storage Building with all appurtenances near Funks PGP. This Facility is included in the Funks PGP cost estimate.

2.2.14 Access Roads

Access to the proposed TRR site would likely be from McDermott Road, which lies adjacent to the proposed reservoir. Access to the Funks complex (PGP and Reservoir) is currently accomplished using the O & M road along the TCC. A new access road will be required that allows larger equipment and year-round access. It is also anticipated that roads will be constructed within the TRR and Funks Pipeline easements, both to provide access to the pipelines and electrical power transmission lines but also as a secondary access road to the project facilities. Access Roads are included in the Funks/TRR Pipelines, Funks PGP and TRR East cost estimates.

2.2.15 Terminal Regulating Reservoir West

This would be a new reservoir that will be hydraulically connected to the GCID Main Canal, about 3 miles east of Funks Reservoir and just upstream of the Funks Creek Siphon at milepost 41.3 on the GCID Main Canal. The facility is located on the west side of the GCID main canal in the foot-hills. The footprint of the TRR will be approximately 170 acres, with a storage volume of approximately 600 acre-feet. TRR west will also include 3 gates to control water flow in and out of the GCID Main Canal and one gate to control water from the inlet/outlet channel into the reservoir. It also includes a relocated canal and associated siphon to provide water to the adjacent landowner.

The TRR West will produce very large quantities of materials from the excavations that are needed to create the inlet/outlet canal, the relocated canal, the reservoir and the area for the PGP and substation. Approximately 8.5 million cubic yards of material may be produced from these excavations. Very little of this material will be needed as fill at the TRR-West location. Therefore, these large quantities of material will be hauled from the TRR-West site to other locations on the Sites project for use as fill. This reuse will include placement as Zone 4 random fill at the dams, as fill for the large embankments of Sites-Lodoga Road, as fill for quarry restoration, or as other general fill. The cost estimate assumes a 10-mile round trip to dispose of this excess material.

2.2.16 TRR West Pipelines

These are two parallel, 12-foot-diameter welded steel pipelines used to convey water between the TRR West PGP and the Sites Reservoir. These pipelines will connect from the piping manifold at TRR West PGP

to the downstream side of the two proposed 23-foot-diameter tunnels connected to the Site Reservoir inlet/outlet structure. The approximate length of these pipelines is 13,000 feet (2.5 miles) each.

2.2.17 Electrical Transmission Lines for TRR West

Electrical transmission lines will be required to connect the WAPA or PGE 230 kV transmission lines to the TRR PGP and the Funks PGP. For TRR West a total of 4 miles of transmission lines will be required for the PGE connection, and a total of 4 miles of transmission lines will be required for the WAPA connection.

2.3 Estimate Classification

This cost estimate prepared is considered a Budget or Class 4 estimate as defined by the Association for the Advancement of Cost Engineering International (AACEI). Refer to Appendix C for more definition.

Project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding. This estimate is based on material, equipment, and labor pricing as of March 2021.

This Cost Estimate is based on the use of conceptual and stochastic costs and detailed items using separate Labor, Materials and Equipment costs. The estimate uses parametric costs where design information or details are insufficient to allow a detailed item method. Quotations, allowances, and other costs are as described in Section 3.

3. Basis of Estimate

3.1 Estimate Methodology

This cost estimate is considered a bottom rolled up type estimate with cost items and breakdown of Labor, Materials and Equipment.

For the development of this cost estimate, there may be systems that have yet to be defined enough on which to base a scope of work for estimating purposes. JACOBS estimating provides parametric costing based on a unit of measurement (i.e. cost per square foot or cost per unit). The cost is assigned per unit and typically is developed by averaging similar projects and analysis of historic costs. Using this approach estimators strive to generate a basic system design fitting the parameters of the structure and its proposed function.

Finally, pricing is geographically adjusted to reflect local labor and material rates and job site conditions and requirements. As the design process progresses and the details have increased the parametric costing can be replaced with a detailed takeoff and estimated accordingly.

3.2 Estimate Major Assumptions

The estimate assumes the work will be done on a competitive bid basis and the contractor will have a reasonable amount of time to complete the work. All contractors are equal, with a reasonable project schedule, no overtime, constructed as under a single contract, no liquidated damages.

Purchase of PGP Pump's and Turbine Generators is assumed Contractor purchased and include minimal Contractor's markup of 20%. Installation of equipment includes full Contractor markups.

This estimate should be evaluated for market changes after 90 days of the issue date. It is assumed that much of the fabricated equipment will be shipped from the mainland USA.

3.3 Estimate Exclusions

The cost estimate excludes the following costs;

- Remediation of hazardous materials.
- Material Adjustment allowances above and beyond what is included at the time of the cost estimate.

3.4 Project Delivery and Methodology

It is assumed that this project will be procured using the traditional Design/Bid/Build method. The general contractor will contract directly with the owner.

The estimate assumes the work will be done on a competitive bid basis and the contractor will have a reasonable amount of time to complete the work. All contractors are equal, with a reasonable project schedule, no overtime, constructed as under a single contract, no liquidated damages.

3.5 Labor, Material, Subcontracts and Other Direct Costs

3.5.1 Labor

The estimate has been adjusted for local area labor rates, based upon Prevailing Wage Rates for Colusa County, General Decision Number CA20200007 Modification 15 Dated 08/14/2020.

Labor unit prices reflect a burdened rate, including: workers compensation, unemployment taxes, Fringe Benefits, and medical insurance.

3.5.2 Material

Materials pricing is national average as determined by RS Means or other data sources. Quotes on certain items may have been obtained and included in this estimate. Many quotes given for engineering estimates are budgetary and may not reflect actual contractor pricing.

3.5.3 Subcontracts

It is assumed that General Contractors will subcontract a portion of the work. Items listed in the cost estimate as subcontractor includes all anticipated markups that a general contractor would receive.

3.5.4 Construction Equipment

Equipment items listed in this cost estimate are for the construction equipment necessary for the installation of the work. Equipment rates in this estimate are assumed to be 100% of 2020 Blue Book value.

3.6 Markups, Taxes, and Other Indirect Costs

It is assumed that this project will be procured using the traditional Design/Bid/Build method. The general contractor will contract directly with the owner.

Table 3-1. Markups, Taxes, and Other Indirect Costs

Estimate Summary

Item	Unit	Comments
Subcontractor Markups	20.00% to 25.00%	Varies by Trade
Materials Sales Tax	7.25%	Current Sales Tax Rate for Dunnigan Ca.
General Conditions	5.00%	
Mobilization/Demobilization	3.00%	
Prime Contractor Overhead	10.00%	Includes Home office and construction site Overhead
Prime Contractor Profit	6.00%	
Bonds and Insurances	2.17%	
Contractor Contingency	3.00% to 5.00%	Varies based on construction project type. Electrical Transmission Lines and WAPA or PG&E Substations include 5.00% all other HC estimates include 3.00%

Table 3-1. Markups, Taxes, and Other Indirect Costs
Estimate Summary

Item	Unit	Comments
Design Contingency	15%	
Escalation		There is no escalation included in this estimate.
Non-Contract Costs	15.00% to 17.00%	Varies by Trade

3.7 Design Contingency

A Design Contingency of 15% is included to account for the level of design detail and the potential for additional unforeseen site conditions identified during the design phase.

The contingences are intended to allow for scope that is inherent in the individual projects but is not yet identified in the design documentation. This contingency would be fully consumed or released by the completion of the procurement documents.

3.8 Contractor Contingency

Contractor Contingency is intended to cover unforeseen conditions or changes post contract award. It remains under the control of the owner, separate from the bid award. Contractor contingencies vary from 3% to 5% based on the construction project types. Electrical Transmission Lines and WAPA or PG&E Substations include 5.00% all other HC estimates include 3.00%

3.9 Escalation Costs

There is no escalation included in this estimate.

3.10 Non-Contract Costs

Non-contract costs include geotechnical investigation, engineering, construction management, administration, real estate, legal services, permitting costs, environmental monitoring, and other owner costs attributable to the project. These costs are distinguished from Contract Costs (costs to the construction contractor). An estimate for the non-contract cost has been developed, but it has also been applied as a percentage to each of the project facilities for presentation purposes. The non-contract cost estimate is approximately 18% of the construction cost if real estate is included.

3.11 Market Conditions

During volatile economic conditions, an estimate may have a Market Conditions amount applied. This adjustment is done to account for the current volatility in the construction market and/or the location of a project.

However, based on the current construction market, and the location of the work proposed in this estimate, a Market Conditions adjustment was not applied.

3.12 Cost Resources

The following is a list of the various cost resources used in the development of the cost estimate

- R.S. Means 2015 Data
- CH2M HILL Historical Data
- Vendor Quotes where available
- Estimator Judgment

3.13 Value Engineering

Potential areas of Value Engineering that may bring the construction cost down are provided below. The Value Engineering has not been conducted as of this time pending the results of: 1) geologic mapping and geotechnical exploration being conducted by Fugro and U.S. Bureau of Reclamation during December 2020 through March 2021, 2) condition assessment of existing siphon structures in the GCID Main Canal being conducted by Jacobs in February 2021 and 3) hydraulic modeling of the GCID Main Canal being conducted by Jacobs scheduled for preliminary results in February 2021.

- Decrease the footprint and size of the TRR
- Potentially reducing the effort to replace two GCID siphons and reduce the effort on adding capacity to one GCID siphon

3.14 Disclaimer

The opinions of cost (estimates) shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time the opinion was prepared. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. The recent increases or decreases in material pricing may have a significant impact which is not predictable and careful review or consideration must be used in evaluation of material prices. As a result, the final project costs will vary from the opinions of cost presented herein. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

Appendix A
HC VP-7 Cost Comparison Draft Technical Memorandum

Draft HC VP-7 Cost Comparison Technical Memorandum

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	May 5, 2021
From:	Jeff Smith, P.E./Jacobs
Quality Review by:	Peter Rude, P.E./Jacobs
Authority Agent Review by:	Henry Luu, P.E. (HDR)
Subject:	VP-7 Cost Comparison for HC Facilities

1.0 Purpose and Scope

On March 3 and April 20, 2021, Jacobs presented its in-progress feasibility-level cost estimate on the HC facilities to the Sites Land Management Committee (LMC) and to the Value Planning Workgroup on April 29, 2021 in Maxwell, California. The presentations were conducted in response to Sites Project Authority (Authority) concerns with the cost growth that occurred between the Value Planning Estimate for recommended alternative VP-7 developed in April 2020 and the in-progress feasibility-level cost estimate developed in February 2021.

The purpose of this TM is to provide a summary of cost differences between the April 2020 VP-7 estimate and the most recent Feasibility Level estimates developed in May 2021. In addition, this TM will provide Value Engineering proposals to potentially help reduce HC project costs.

2.0 Summary Cost Comparison

2.1 Discussion of Cost Estimate Classes

Feasibility level costs have increased significantly from the costs presented in the Value Planning Report (Authority, April, 2020). The Association for the Advancement of Cost Engineering International Recommended Practice 18R-97 (AACEI, 2016) defines five estimating classifications as follows:

- Class 5 – an appraisal estimate that is typically used for concept screening and relying on capacity factors, parametric models, and screening.
- Class 4 – a study of feasibility estimate with equipment factored or parametric models.
- Class 3 – an estimate for budget, authorization, or control based on semi-detailed unit costs with assembly level line items.
- Class 2 – an estimate for control or bid tender with detailed unit costs and forced detailed take-offs
- Class 1 – a check estimate or bid tender with detailed unit costs and detailed take-offs

The least detailed estimate is a Class 5 estimate and a Class 1 estimate is the most detailed. The detail of the estimate is limited by the level of detail in the supporting design and documentation of unit rates and equipment costs.

The estimates presented in the Value Planning Report were based on appraisal level engineering designs for conceptual screening and are considered Class 5 estimates. The current feasibility estimate is a Class 4 estimate. It is supported by a more detailed design (153 drawings) than what was available and used for the Value Planning estimate.

2.2 Comparison of Estimated Costs

The current project cost estimate has been prepared by implementing industry standard practices for feasibility level analyses. By the very nature of project development, as this project advances from feasibility to detailed design, the project definition will obtain higher resolution, promoting greater confidence in project cost estimating for final project budgeting.

Following is a list of the HC individual new facilities and existing facilities that require improvements. Feasibility Level cost estimates were developed for each of these facilities, but the cost estimates for VP-7 did not always breakdown costs by these same facilities.

- Improvements to the Tehama Colusa Canal Authority (TCCA) Red Bluff Pumping Plant on the Sacramento River
- Glenn Colusa Irrigation District (GCID) Main Canal improvements upstream of the Terminal Regulating Reservoir (TRR)
- TRR – West Alternative
- TRR Pumping Generating Plant (PGP)
- TRR and Funks pipelines
- Funks Reservoir
- Funks PGP
- Pacific Gas and Electric (PG&E) Substation/Switchyard, and Power transmission lines
- Dunnigan Pipeline to Colusa Basin Drain (CBD)

Table 1 contains the costs summary for each of these facilities (as applicable) for the VP-7 and the Feasibility Level estimates in 2019 dollars. The costs include the construction costs as well as the program soft costs. The costs have continued to be refined since the March 3, 2021 LMC meeting and have been updated again since the April Value Planning meeting with the completion of the Feasibility Study – HC Conveyance Facilities Rev 3 drawing package of April 30, 2021.

Table 1. 2019 Cost Comparison – VP-7 vs Feasibility Level

Facility	2019 Cost ($M)		
	VP-7	Feasibility Level Alt 1	Variance
TCCA Red Bluff Pumping Plant Improvements	4	4.7	(0.7)
GCID Main Canal Improvements	0.0	6.4	(6.4)
TRR East/West Pumping Generating Plant	200	109.4	90.6
TRR – West Reservoir	51	205.6	(154.6)
TRR West and Funks Pipelines	227	220.0	7.0

Table 1. 2019 Cost Comparison – VP-7 vs Feasibility Level

Facility	2019 Cost ($M)		
	VP-7	Feasibility Level Alt 1	Variance
Funks Reservoir	24	38.8	(14.8)
Funks Pumping Generating Plant	200	111.0	89.0
TRR West-Transmission Lines, Substations (2), and Switchyards (2)- PG&E	136	152.0	(16.0)
Dunnigan Pipeline to CBD	66	93.8	(27.8)
Release Structure	8.6	0.0	8.6
Total	916.6	941.7	(25.1)

Table 2. 2021 Cost Comparison – VP-7 Feasibility Level

Facility	2021 Cost ($M)		
	VP-7	Feasibility Level Alt 1	Variance
TCCA Red Bluff Pumping Plant Improvements	4	4.8	(0.8)
GCID Main Canal Improvements	0.0	6.6	(6.6)
TRR East/West Pumping Generating Plant	200	112.7	87.3
TRR – West Reservoir	51	211.9	(160.9)
TRR West and Funks Pipelines	227	226.8	0.2
Funks Reservoir	24	40.0	(16.0)
Funks Pumping Generating Plant	200	114.4	85.6
TRR West-Transmission Lines, Substations (2), and Switchyards (2)- PG&E	136	156.6	(20.6)
Dunnigan Pipeline to CBD	66	96.7	(30.7)
Release Structure	8.6	0	8.6
Total	916.6	970.5	(53.9)

2.3 Description of Estimated Cost Variances

A comparison of the VP-7 estimated costs and the updated 2019 Feasibility Level costs shows an increased variance of about $25.1 M and compared to 2021 Feasibility Level costs shows an increase of about $53.9 M. The PGP costs are significantly lower for the feasibility level costs, but higher for the Dunnigan Alt pipeline and significantly higher for the TRR West Reservoir. The higher pipeline costs can primarily be attributed to a significant increase in cost of raw steel materials have more than doubled over the last few years. The Feasibility Level pipeline costs have been developed using two vendor quotes for the large diameter welded steel pipes (10 to 12 feet in diameter). The higher TRR West Reservoir costs are primarily due to excavating

8.5 million cubic yards of material. The advantage of TRR West is that it has significantly lower pipeline and electrical transmission line costs. In all, the total increased estimated cost from VP-7 2019 $916.6M to current May 2021 of $970.5 M represents an increase of about 6 percent, which is within the range of accuracy of the original Class V estimate for VP-7.

3.0 Summary of Value Engineering Ideas

Given the increased costs summarized in Section 2, the following Value Engineering ideas were developed as potential concepts to reduce project costs. The potential costs savings have not developed for these ideas as part of the Feasibility Level task but can be further investigated under the next design phase.

1. Decrease the footprint and size of the TRR. The TRR is currently sized at 600 acre-feet which can accommodate about 4 hours of flow at 1,800 cfs.

2. Eliminate the geomembrane liner for TRR West

3. Potentially reduce the size the Administration and Operations and Maintenance Buildings.

4.0 Items to Improve Construction Cost Certainty

Items to improve construction cost certainty for the Conveyance components include:

1. Obtain the results of the December 2020 to March 2021 geotechnical field investigation and see if the data impacts the Feasibility Design

2. Conduct further geotechnical investigations at HC facilities starting in 2022 for the preliminary design effort

3. HR and HC materials balance effort to see where excess material from TRR West can be used at HR facilities

4. Conduct the preliminary design effort (30%) starting in 2022

Appendix B
Detailed Cost Estimate

TRR East/Funks Pipelines

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Funks/TRR Pipelines Rev 5
Project Number: D3880600
Design Stage: Feasibility Study

Estimator: Cavalleri/Wells Jacobs
Revision/Date: 5 / May 4, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
05			***Funks/TRR Pipelines***										
	05.01		**Funks TRR Connection Manifold**										
		33.00.510	*Funks TRR Connection Manifold*	***673.00*** *LF*	*866.46 /LF*	*523.04 /LF*	*4,819.62 /LF*	*300.75 /LF*	*/LF*	*6,509.87 /LF*	*4,381,142*	*10,403.75 /LF*	*7,001,722*
			05.01 Funks TRR Connection Manifold	***1.00*** **LS**	**583,127.16 /LS**	**352,005.74 /LS**	**3,243,604.00 /LS**	**202,405.00 /LS**	**/LS**	**4,381,141.90 /LS**	**4,381,142**	**7,001,722.30 /LS**	**7,001,722**
	05.02		**Funks Pipeline**										
		33.00.502	*Funks Pipeline, Open Cut, Dual Bore*	*10,590.00 LF*	*666.88 /LF*	*284.32 /LF*	*2,142.78 /LF*	*101.92 /LF*	*/LF*	*3,195.90 /LF*	*33,844,575*	*5,091.34 /LF*	*53,917,247*
			05.02 Funks Pipeline	**10,590.00 LF**	**666.88 /LF**	**284.32 /LF**	**2,142.78 /LF**	**101.92 /LF**	**/LF**	**3,195.90 /LF**	**33,844,575**	**5,091.34 /LF**	**53,917,247**
	05.03		**Terminal Regulating Reservoir Pipeline**										
		32.00.000	*TRR Access Roads*	***31,455.00*** *LF*	*13.35 /LF*	*14.13 /LF*	*69.83 /LF*	*/LF*	*/LF*	*97.32 /LF*	*3,061,151*	*155.37 /LF*	*4,887,126*
		33.00.500	*TRR Pipeline, Open Cut, Dual Bore*	*44,944.00 LF*	*704.78 /LF*	*298.45 /LF*	*2,149.49 /LF*	*201.89 /LF*	*/LF*	*3,354.61 /LF*	*150,769,425*	*5,336.94 /LF*	*239,863,489*
		33.00.504	*Funks Pipeline, Trenchless Pipe Installation, Dual Bore at TC Canal*	*702.00 LF*	*1,995.71 /LF*	*271.70 /LF*	*3,155.21 /LF*	*1,062.68 /LF*	*/LF*	*6,485.30 /LF*	*4,552,678*	*10,245.13 /LF*	*7,192,079*
		33.00.506	*Funks Pipeline, Trenchless Pipe Installation, Dual Bore at GCID Canal*	*642.00 LF*	*1,999.48 /LF*	*273.59 /LF*	*3,167.05 /LF*	*1,161.99 /LF*	*/LF*	*6,602.11 /LF*	*4,238,557*	*10,426.40 /LF*	*6,693,752*
		33.00.508	*Funks Pipeline, Enviormental Water Pipeline*	*2,550.00 LF*	*248.30 /LF*	*117.42 /LF*	*608.82 /LF*	*79.00 /LF*	*/LF*	*1,053.53 /LF*	*2,686,510*	*1,671.29 /LF*	*4,261,802*
		33.00.530	*Funks Pipeline, Enviormental Water Pipeline, Energy Dissipation Structure*	***1.00*** *EA*	*465,190.61 /EA*	*16,851.09 /EA*	*507,322.79 /EA*	*/EA*	*/EA*	*989,364.49 /EA*	*989,364*	*1,564,828.93 /EA*	*1,564,829*
			05.03 Terminal Regulating Reservoir Pipeline	**48,838.00 LF**	**734.65 /LF**	**297.73 /LF**	**2,152.25 /LF**	**220.46 /LF**	**/LF**	**3,405.09 /LF**	**166,297,686**	**5,415.11 /LF**	**264,463,076**
			05 Funks/TRR Pipelines	***59,853.00 LF***	***727.18 /LF***	***299.12 /LF***	***2,189.48 /LF***	***201.31 /LF***	***/LF***	***3,417.10 /LF***	***204,523,403***	***5,436.35 /LF***	***325,382,045***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	67,221,849		548,220.907 hrs	
Material	211,899,675			
Allowance	18,609,058			
Equipment	27,651,463		202,766.734 hrs	
Other				
Total Construction Cost	**325,382,045**	**325,382,045**		
Non-Contract Costs	48,807,307			15.000 %
Total Project Costs	**48,807,307**	**374,189,352**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Funks/TRR Pipelines Rev 5
Project Number: D3880600
Design Stage: Feasibility Study

Estimator: Cavalleri/Wells Jacobs
Revision/Date: 5 / May 4, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
05						Funks/TRR Pipelines										
	05.01					Funks TRR Connection Manifold										
		33.00.510				Funks TRR Connection Manifold										
			33.2			Pipeline Specialties										
				33.01		Pipeline Specialties										
					33.10.99.01	Buried Pipe Specials, Other										
						Butterfly valve, iron body, Flgd, MTR OPER, 150#, 144"	5.00 ea	5,001.82 /ea	600.00 /ea	170,000.00 /ea	-	-	175,601.82 /ea	878,009	283,537.50 /ea	1,417,688
						Gasket and bolt set, for flanges, 150 lb., 144" pipe size	10.00 ea	1,491.57 /ea	-	5,250.00 /ea	-	-	6,741.57 /ea	67,416	10,792.81 /ea	107,928
						Reducer, steel, butt weld, 32" x 17"	1.00 ea	6,563.14 /ea	1,800.00 /ea	217,200.00 /ea	-	-	225,563.14 /ea	225,563	364,123.46 /ea	364,123
						Reducer, steel, butt weld, 17" x 12"	2.00 ea	4,375.43 /ea	1,200.00 /ea	42,600.00 /ea	-	-	48,175.43 /ea	96,351	77,494.21 /ea	154,988
						Flange, steel, forged steel, weld neck, 150 lb., 144" pipe size, includes 1 weld per joint and weld machine	10.00 ea	6,563.16 /ea	195.36 /ea	11,250.00 /ea	-	-	18,008.52 /ea	180,085	28,629.32 /ea	286,293
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	31,415.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	138,594	6.81 /cy	214,055
						Pipe bedding and zone, CLSM	7,920.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	595,841	121.27 /cy	960,455
						Backfill native material	20,420.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	160,730	12.16 /cy	248,244
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	10,995.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	176,309	24.77 /cy	272,305
						Load excavated spoils	10,995.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	17,779	2.50 /cy	27,459
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	20,420.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	41,468	3.14 /cy	64,046
						Compaction, water for, 6000 gallon wagon, 6 mile haul	20,420.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	37,852	2.95 /cy	60,239
						Piping, pipe, WSP, plain end, welded, 144" diameter, excludes excavation or backfill	340.00 lf	121.97 /lf	62.10 /lf	1,790.00 /lf	-	-	1,974.07 /lf	671,182	3,178.67 /lf	1,080,747
						Piping, pipe, WSP, plain end, welded, 384" diameter, excludes excavation or backfill	50.00 lf	243.94 /lf	124.19 /lf	4,770.00 /lf	-	-	5,138.13 /lf	256,907	8,281.54 /lf	414,077
						Piping, pipe, WSP, plain end, welded, 204" diameter, excludes excavation or backfill	160.00 lf	121.97 /lf	62.10 /lf	2,470.00 /lf	-	-	2,654.07 /lf	424,651	4,278.21 /lf	684,514
						Erosion Controls Allowance	625.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	0.00 /lf	55.00 /lf	34,375	84.95 /lf	53,091
						Dewatering Allowance	18.67 msf	0.00 /msf	0.00 /msf	0.00 /msf	9,000.00 /msf	0.00 /msf	9,000.00 /msf	168,030	13,900.27 /msf	259,518
						Miscellaneous Items Allowance	1.00 ls	52,500.00 /ls	52,500.00 /ls	105,000.00 /ls	0.00 /ls	0.00 /ls	210,000.00 /ls	210,000	331,952.10 /ls	331,952
						33.10.99.01 Buried Pipe Specials, Other	673.00 LF	866.46 /LF	523.04 /LF	4,819.62 /LF	300.75 /LF	/LF	6,509.87 /LF	4,381,142	10,403.75 /LF	7,001,722
						33.01 Pipeline Specialties	1.00 LS	583,127.16 /LS	352,005.74 /LS	3,243,604.00 /LS	202,405.00 /LS	/LS	4,381,141.90 /LS	4,381,142	7,001,722.30 /LS	7,001,722
						33.2 Pipeline Specialties	1.00 LS	583,127.16 /LS	352,005.74 /LS	3,243,604.00 /LS	202,405.00 /LS	/LS	4,381,141.90 /LS	4,381,142	7,001,722.30 /LS	7,001,722
						33.00.510 Funks TRR Connection Manifold	673.00 LF	866.46 /LF	523.04 /LF	4,819.62 /LF	300.75 /LF	/LF	6,509.87 /LF	4,381,142	10,403.75 /LF	7,001,722
						05.01 Funks TRR Connection Manifold	1.00 LS	583,127.16 /LS	352,005.74 /LS	3,243,604.00 /LS	202,405.00 /LS	/LS	4,381,141.90 /LS	4,381,142	7,001,722.30 /LS	7,001,722
	05.02					Funks Pipeline										
		33.00.502				Funks Pipeline, Open Cut, Dual Bore										
			33.0			Pipelines										
				33.03		Buried Process Pipe, Carbon Steel										
					33.00.10.144	Buried Pipe, WSP, 144"										
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	271,261.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	1,196,729	6.81 /cy	1,848,317
						Trench Stabilization, Geotextile Wrapped	4,530.00 cy	5.50 /cy	2.25 /cy	40.00 /cy	-	-	47.75 /cy	216,294	76.64 /cy	347,197
						Pipe bedding and zone, CLSM	95,090.00 cy	4.52 /cy	0.71 /cy	35.00 /cy	-	-	40.23 /cy	3,825,701	64.68 /cy	6,149,987
						Backfill native material	188,805.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	1,486,127	12.16 /cy	2,295,285
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	82,456.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	1,322,213	24.77 /cy	2,042,124
						Load excavated spoils	82,456.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	133,330	2.50 /cy	205,925
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	188,805.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	383,413	3.14 /cy	592,171
						Compaction, water for, 6000 gallon wagon, 6 mile haul	188,805.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	349,987	2.95 /cy	556,972
						Piping, WSP 0.6" Wt Polyurethane Lined and Coated, 144" diameter	10,590.00 LF	379.47 /LF	82.79 /LF	1,790.00 /LF	-	-	2,252.26 /LF	23,851,420	3,608.33 /LF	38,212,221
						Dewatering Allowance	223.00 msf	0.00 /msf	0.00 /msf	0.00 /msf	3,000.00 /msf	0.00 /msf	3,000.00 /msf	669,000	4,633.42 /msf	1,033,253
						Erosion Controls Allowance	5,295.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	0.00 /lf	55.00 /lf	291,225	84.95 /lf	449,790
						Surface Restoration Allowance	794.25 msf	0.00 /msf	0.00 /msf	0.00 /msf	150.00 /msf	0.00 /msf	150.00 /msf	119,138	231.67 /msf	184,005
						33.00.10.144 Buried Pipe, WSP, 144"	10,590.00 LF	666.88 /LF	284.32 /LF	2,142.78 /LF	101.92 /LF	/LF	3,195.90 /LF	33,844,575	5,091.34 /LF	53,917,247
						33.03 Buried Process Pipe, Carbon Steel	10,590.00 LF	666.88 /LF	284.32 /LF	2,142.78 /LF	101.92 /LF	/LF	3,195.90 /LF	33,844,575	5,091.34 /LF	53,917,247
						33.0 Pipelines	10,590.00 LF	666.88 /LF	284.32 /LF	2,142.78 /LF	101.92 /LF	/LF	3,195.90 /LF	33,844,575	5,091.34 /LF	53,917,247
						33.00.502 Funks Pipeline, Open Cut, Dual Bore	10,590.00 LF	666.88 /LF	284.32 /LF	2,142.78 /LF	101.92 /LF	/LF	3,195.90 /LF	33,844,575	5,091.34 /LF	53,917,247
						05.02 Funks Pipeline	10,590.00 LF	666.88 /LF	284.32 /LF	2,142.78 /LF	101.92 /LF	/LF	3,195.90 /LF	33,844,575	5,091.34 /LF	53,917,247
	05.03					Terminal Regulating Reservoir Pipeline										
		32.00.000				TRR Access Roads										
			32.0			Exterior Improvements										
				32.12		Paving										
					32.40.04.00	Site Improvements, Access Roads, Gravel										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	92,996.67 SY	0.62 /SY	0.35 /SY	-	-	-	0.98 /SY	90,635	1.51 /SY	139,984
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	20,800.00 cy	1.68 /cy	4.63 /cy	-	-	-	6.31 /cy	131,208	9.74 /cy	202,647
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	10,400.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	166,768	24.77 /cy	257,569
						Load excavated spoils	10,400.00 cy	0.77 /cy	0.84 /cy	-	-	-	1.62 /cy	16,817	2.50 /cy	25,973
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,18"deep	92,996.67 sy	1.34 /sy	1.31 /sy	20.00 /sy	-	-	22.64 /sy	2,105,575	36.42 /sy	3,386,851
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	92,996.67 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	90,674	1.51 /sy	140,044
						32.40.04.00 Site Improvements, Access Roads, Gravel	92,996.67 SY	3.79 /SY	4.18 /SY	20.00 /SY	/SY	/SY	27.98 /SY	2,601,677	44.66 /SY	4,153,068
					32.40.04.90	Site Improvements, Access Roads, Asphalt										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	11,853.33 sy	0.62 /sy	0.35 /sy	-	-	-	0.98 /sy	11,552	1.51 /sy	17,842
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	2,000.00 cy	1.68 /cy	4.63 /cy	-	-	-	6.31 /cy	12,616	9.74 /cy	19,485
						Fill by borrow and utility bedding, borrow, select fill for shoulders and embankments, spread fill, with front-end loader	300.00 cy	20.18 /cy	14.41 /cy	35.00 /cy	-	-	69.59 /cy	20,877	110.02 /cy	33,005
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	1,000.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	16,035	24.77 /cy	24,766
						Load excavated spoils	1,000.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	1,617	2.50 /cy	2,497
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,12"deep	11,853.33 sy	1.34 /sy	1.31 /sy	15.00 /sy	-	-	17.64 /sy	209,109	28.33 /sy	335,854
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	11,853.33 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	11,557	1.51 /sy	17,850
						Plant-mix asphalt paving, for highways and large paved areas, binder course, 2" thick, no hauling included	9,482.67 SY	0.99 /SY	0.39 /SY	7.40 /SY	-	-	8.78 /SY	83,284	14.10 /SY	133,717
						Plant-mix asphalt paving, for highways and large paved areas, wearing course, 2" thick, no hauling included	9,482.67 sy	1.11 /sy	0.43 /sy	8.25 /sy	-	-	9.79 /sy	92,827	15.72 /sy	149,040
						32.40.04.90 Site Improvements, Access Roads, Asphalt	9,482.67 SY	7.09 /SY	5.86 /SY	35.51 /SY	/SY	/SY	48.45 /SY	459,475	77.41 /SY	734,058
						32.12 Paving	102,479.34 SY	4.10 /SY	4.34 /SY	21.44 /SY	/SY	/SY	29.87 /SY	3,061,151	47.69 /SY	4,887,126
						32.0 Exterior Improvements	1.00 LS	419,930.02 /LS	444,584.27 /LS	2,196,637.08 /LS	/LS	/LS	3,061,151.37 /LS	3,061,151	4,887,125.76 /LS	4,887,126
						32.00.000 TRR Access Roads	31,455.00 LF	13.35 /LF	14.13 /LF	69.83 /LF	/LF	/LF	97.32 /LF	3,061,151	155.37 /LF	4,887,126
		33.00.500				TRR Pipeline, Open Cut, Dual Bore										
			33.0			Pipelines										
				33.03		Buried Process Pipe, Carbon Steel										
					33.00.10.144	Buried Pipe, WSP, 144"										
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	1,338,768.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	5,906,276	6.81 /cy	9,122,092
						Trench Stabilization, Geotextile Wrapped	19,230.00 cy	5.50 /cy	2.25 /cy	40.00 /cy	-	-	47.75 /cy	918,174	76.64 /cy	1,473,863
						Pipe bedding and zone, CLSM	403,570.00 cy	4.52 /cy	0.71 /cy	35.00 /cy	-	-	40.23 /cy	16,236,596	64.68 /cy	26,101,064
						Backfill native material	1,052,364.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	8,283,395	12.16 /cy	12,793,491

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					33.00.10.144	Buried Pipe, WSP, 144"										
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	285,404.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	4,576,561	24.77 /cy	7,068,380
						Load excavated spoils	285,404.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	461,495	2.50 /cy	712,767
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	1,052,364.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	2,137,071	3.14 /cy	3,300,651
						Compaction, water for, 6000 gallon wagon, 6 mile haul	1,052,364.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	1,950,782	2.95 /cy	3,104,457
						Piping, WSP 0.6875" Wt Polyurethane Lined and Coated, 144" diameter	44,944.00 LF	379.47 /LF	82.79 /LF	1,790.00 /LF	-	-	2,252.26 /LF	101,225,515	3,608.33 /LF	162,172,812
						Dewatering Allowance	944.00 msf	0.00 /msf	0.00 /msf	0.00 /msf	3,000.00 /msf	0.00 /msf	3,000.00 /msf	2,832,000	4,633.42 /msf	4,373,951
						Erosion Controls Allowance	22,472.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	0.00 /lf	55.00 /lf	1,235,960	84.95 /lf	1,908,908
						Surface Restorations Allowance	33,370.80 msf	0.00 /msf	0.00 /msf	0.00 /msf	150.00 /msf	0.00 /msf	150.00 /msf	5,005,620	231.67 /msf	7,731,051
						33.00.10.144 Buried Pipe, WSP, 144"	44,944.00 LF	704.78 /LF	298.45 /LF	2,149.49 /LF	201.89 /LF	/LF	3,354.61 /LF	150,769,425	5,336.94 /LF	239,863,489
						33.03 Buried Process Pipe, Carbon Steel	44,944.00 LF	704.78 /LF	298.45 /LF	2,149.49 /LF	201.89 /LF	/LF	3,354.61 /LF	150,769,425	5,336.94 /LF	239,863,489
						33.0 Pipelines	44,944.00 LF	704.78 /LF	298.45 /LF	2,149.49 /LF	201.89 /LF	/LF	3,354.61 /LF	150,769,425	5,336.94 /LF	239,863,489
						33.00.500 TRR Pipeline, Open Cut, Dual Bore	44,944.00 LF	704.78 /LF	298.45 /LF	2,149.49 /LF	201.89 /LF	/LF	3,354.61 /LF	150,769,425	5,336.94 /LF	239,863,489
		33.00.504				Funks Pipeline, Trenchless Pipe Installation, Dual Bore at TC Canal										
			33.0			Pipelines										
				33.60		Trenchless Technology, Tunneling										
					33.60.01.08	Pipeline Specials, Tunneling, 144" Piping in 186" Casing										
						Grout Annular Space Between Carrier Pipe and Casing	53,072.00 cf	9.30 /cf	0.43 /cf	0.95 /cf	-	-	10.68 /cf	566,756	16.56 /cf	878,995
						Final Surface Restoration Allowance	222.22 sy	0.00 /sy	0.00 /sy	0.00 /sy	13.50 /sy	0.00 /sy	13.50 /sy	3,000	20.85 /sy	4,633
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	2,300.00 cy	2.65 /cy	2.21 /cy	-	-	-	4.85 /cy	11,163	7.50 /cy	17,241
						Jacking and Receiving Pits Shoring, SF of Pit Walls	5,400.00 sf	0.00 /sf	0.00 /sf	0.00 /sf	45.00 /sf	0.00 /sf	45.00 /sf	243,000	69.50 /sf	375,307
						Backfill Pits, Native material	1,590.00 cy	6.18 /cy	1.15 /cy	0.00 /cy	-	-	7.33 /cy	11,661	11.33 /cy	18,010
						Pipe bedding and zone in pits, CLSM	855.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	64,324	121.27 /cy	103,685
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	5,620.00 cy	7.24 /cy	6.00 /cy	-	-	-	13.24 /cy	74,387	20.44 /cy	114,889
						Load excavated spoils	5,620.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	-	1.80 /cy	10,104	2.78 /cy	15,605
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	1,590.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	2,619	2.54 /cy	4,044
						Compaction, water for, 6000 gallon wagon, 6 mile haul	1,590.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	2,795	2.80 /cy	4,455
						Horizontal boring, roadwork, 186" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	702.00 lf	596.42 /lf	142.23 /lf	1,100.00 /lf	-	-	1,838.65 /lf	1,290,729	2,919.49 /lf	2,049,483
						Carrier Pipe Spacers	148.00 ea	14.91 /ea	4.74 /ea	500.00 /ea	0.00 /ea	0.00 /ea	519.65 /ea	76,908	838.84 /ea	124,148
						Piping, WSP 0.6875" Wt Polyurethane Lined and Coated, 144" diameter	702.00 LF	596.41 /LF	28.45 /LF	1,790.00 /LF	-	-	2,414.86 /LF	1,695,232	3,859.46 /LF	2,709,344
						Dewatering Allowance	1.00 ls	0.00 /ls	0.00 /ls	0.00 /ls	500,000.00 /ls	0.00 /ls	500,000.00 /ls	500,000	772,237.15 /ls	772,237
						33.60.01.08 Pipeline Specials, Tunneling, 144" Piping in 186" Casing	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,245.13 /LF	7,192,079
						33.60 Trenchless Technology, Tunneling	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,245.13 /LF	7,192,079
						33.0 Pipelines	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,245.13 /LF	7,192,079
						33.00.504 Funks Pipeline, Trenchless Pipe Installation, Dual Bore at TC Canal	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,245.13 /LF	7,192,079
		33.00.506				Funks Pipeline, Trenchless Pipe Installation, Dual Bore at GCID Canal										
			33.0			Pipelines										
				33.60		Trenchless Technology, Tunneling										
					33.60.01.08	Pipeline Specials, Tunneling, 144" Piping in 186" Casing										
						Grout Annular Space Between Carrier Pipe and Casing	48,536.00 cf	9.30 /cf	0.43 /cf	0.95 /cf	-	-	10.68 /cf	518,316	16.56 /cf	803,869
						Final Surface Restoration Allowance	222.22 sy				13.50 /sy		13.50 /sy	3,000	20.85 /sy	4,633
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	2,300.00 cy	2.65 /cy	2.21 /cy	-	-	-	4.85 /cy	11,163	7.50 /cy	17,241
						Jacking and Receiving Pits Shoring, SF of Pit Walls	5,400.00 sf				45.00 /sf		45.00 /sf	243,000	69.50 /sf	375,307
						Backfill Pits, Native material	1,590.00 cy	6.18 /cy	1.15 /cy		-	-	7.33 /cy	11,661	11.33 /cy	18,010
						Pipe bedding and zone in pits, CLSM	855.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	64,324	121.27 /cy	103,685
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	5,200.00 cy	7.24 /cy	6.00 /cy	-	-	-	13.24 /cy	68,828	20.44 /cy	106,303
						Load excavated spoils	5,200.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	-	1.80 /cy	9,349	2.78 /cy	14,439
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	1,590.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	2,619	2.54 /cy	4,044
						Compaction, water for, 6000 gallon wagon, 6 mile haul	1,590.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	2,795	2.80 /cy	4,455
						Horizontal boring, roadwork, 186" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	642.00 lf	596.42 /lf	142.23 /lf	1,100.00 /lf	-	-	1,838.65 /lf	1,180,411	2,919.49 /lf	1,874,314
						Carrier Pipe Spacers	140.00 ea	14.91 /ea	4.74 /ea	500.00 /ea	0.00 /ea	0.00 /ea	519.65 /ea	72,751	838.84 /ea	117,437
						Piping, WSP 0.6875" Wt Polyurethane Lined and Coated, 144" diameter	642.00 LF	596.41 /LF	28.45 /LF	1,790.00 /LF	-	-	2,414.86 /LF	1,550,340	3,859.46 /LF	2,477,776
						Dewatering Allowance	1.00 ls				500,000.00 /ls		500,000.00 /ls	500,000	772,237.14 /ls	772,237
						33.60.01.08 Pipeline Specials, Tunneling, 144" Piping in 186" Casing	642.00 LF	1,999.48 /LF	273.59 /LF	3,167.05 /LF	1,161.99 /LF	/LF	6,602.11 /LF	4,238,557	10,426.40 /LF	6,693,752
						33.60 Trenchless Technology, Tunneling	642.00 LF	1,999.48 /LF	273.59 /LF	3,167.05 /LF	1,161.99 /LF	/LF	6,602.11 /LF	4,238,557	10,426.40 /LF	6,693,752
						33.0 Pipelines	642.00 LF	1,999.48 /LF	273.59 /LF	3,167.05 /LF	1,161.99 /LF	/LF	6,602.11 /LF	4,238,557	10,426.40 /LF	6,693,752
						33.00.506 Funks Pipeline, Trenchless Pipe Installation, Dual Bore at GCID Canal	642.00 LF	1,999.48 /LF	273.59 /LF	3,167.05 /LF	1,161.99 /LF	/LF	6,602.11 /LF	4,238,557	10,426.40 /LF	6,693,752
		33.00.508				Funks Pipeline, Enviornmental Water Pipeline										
			33.0			Pipelines										
				33.03		Buried Process Pipe, Carbon Steel										
					33.00.10.042	Buried Pipe, WSP, 42"										
						Excavating, trench or continuous footing, common earth, 1-1/2 C.Y. excavator, 6' to 10' deep, excludes sheeting or dewatering	7,481.00 cy	2.27 /cy	1.76 /cy	-	-	-	4.03 /cy	30,115	6.22 /cy	46,512
						Trench Stabilization, Geotextile Wrapped	378.00 cy	5.50 /cy	2.25 /cy	40.00 /cy	-	-	47.75 /cy	18,048	76.64 /cy	28,971
						Pipe bedding and zone, CLSM	3,157.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	237,509	121.27 /cy	382,848
						Backfill native material	3,657.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	28,785	12.16 /cy	44,458
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	3,824.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	61,319	24.77 /cy	94,706
						Load excavated spoils	3,824.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	6,183	2.50 /cy	9,550
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	3,657.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	7,426	3.14 /cy	11,470
						Compaction, water for, 6000 gallon wagon, 6 mile haul	3,657.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	6,779	2.95 /cy	10,788
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 42" diameter	2,550.00 LF	210.04 /LF	91.65 /LF	500.00 /LF	-	-	801.69 /LF	2,044,308	1,274.44 /LF	3,249,818
						Butterfly Valve, 42" Dia	1.00 ea	1,681.37 /ea	343.64 /ea	22,000.00 /ea	-	-	24,025.01 /ea	24,025	38,701.02 /ea	38,701
						Dewatering Allowance	20.40 msf	0.00 /msf	0.00 /msf	0.00 /msf	3,000.00 /msf	0.00 /msf	3,000.00 /msf	61,200	4,633.42 /msf	94,522
						Erosion Controls Allowance	2,550.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	0.00 /lf	55.00 /lf	140,250	84.95 /lf	216,613
						Connection to TRR Pipeline	1.00 ls	5,001.82 /ls	560.00 /ls	15,000.00 /ls	0.00 /ls	0.00 /ls	20,561.82 /ls	20,562	32,844.69 /ls	32,845
						33.00.10.042 Buried Pipe, WSP, 42"	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,671.29 /LF	4,261,802
						33.03 Buried Process Pipe, Carbon Steel	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,671.29 /LF	4,261,802
						33.0 Pipelines	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,671.29 /LF	4,261,802
						33.00.508 Funks Pipeline, Enviornmental Water Pipeline	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,671.29 /LF	4,261,802
		33.00.530				Funks Pipeline, Enviornmental Water Pipeline, Energy Dissipation Structure										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.36	Cast-In-Place Concrete, Slabs on Grade, 36" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,848.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	16,328	13.72 /sfca	25,348
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	56.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	143,973	4,057.76 /ton	227,234
						Reinforcing in place, unloading & sorting, add to above - slabs	56.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	3,119	86.03 /ton	4,818
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	762.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	99,822	211.82 /cy	161,410
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	740.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	21,461	44.79 /CY	33,145
						Cfnsh,flrs,for spcf rndm accs flrs acl clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val l35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,656.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	6,234	1.45 /sf	9,629
						Curing, sprayed membrane curing compound	66.56 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,534	36.50 /csf	2,429
						Fine grading, fine grade for slab on grade, machine	739.56 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,386	2.89 /sy	2,141
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	629.94 /CY	466,154
						03.18 Cast-In-Place Concrete, Slabs on Grade	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	629.94 /CY	466,154
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	12,800.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	188,641	23.16 /sfca	296,408

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Form oil, coverage varies greatly, maximum, includes material only	34.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	805	38.00 /gal	1,301
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	53.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	137,546	4,057.76 /ton	217,090
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	53.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,980	86.03 /ton	4,603
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	53.50 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	3,239	93.52 /ton	5,003
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	734.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	96,154	211.82 /cy	155,479
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	712.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	31,833	69.05 /CY	49,166
						Finishing; break ties & patch voids (walls, cols or beams)	12,800.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	12,915	1.56 /sf	19,974
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	712.00 CY	331.46 /CY	9.57 /CY	324.86 /CY	/CY	/CY	665.89 /CY	474,113	1,052.00 /CY	749,024
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7' 6" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	840.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	12,380	23.16 /sfca	19,452
						Form oil, coverage varies greatly, maximum, includes material only	2.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	53	38.00 /gal	85
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	22,496	4,057.76 /ton	35,505
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	8.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	487	86.04 /ton	753
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	8.75 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	530	93.52 /ton	818
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	120.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	15,720	211.82 /cy	25,419
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	117.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	5,231	69.05 /CY	8,079
						Finishing; break ties & patch voids (walls, cols or beams)	840.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	848	1.56 /sf	1,311
						03.10.06.90 Cast-In-Place Concrete, Straight Walls, 7' 6" thick	117.00 CY	220.08 /CY	9.57 /CY	263.90 /CY	/CY	/CY	493.54 /CY	57,744	781.39 /CY	91,423
						03.20 Cast-In-Place Concrete, Straight Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,013.81 /CY	840,447
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.36	Cast-In-Place Concrete, Elevated Decks, 36" thick										
						Slab shoring	46,000.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	31,497	1.06 /cf	48,814
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	2,000.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	17,753	13.81 /sf	27,612
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	280.00 lf	5.41 /lf	-	0.22 /lf	-	-	5.63 /lf	1,577	8.71 /lf	2,440
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	43,063	4,057.76 /ton	67,967
						Reinforcing in place, unloading & sorting, add to above - decks	16.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	933	86.04 /ton	1,441
						Reinforcing steel, crane cost for handling, maximum, add	16.75 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	2,666	245.81 /ton	4,117
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	230.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	30,130	211.82 /cy	48,719
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	223.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	6,647	46.04 /CY	10,266
						Finishing elev slab, bull float, manual float & manual steel trowel	2,000.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	2,468	1.91 /sf	3,812
						Curing, sprayed membrane curing compound, elevated decks	20.00 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	461	36.50 /csf	730
						03.10.10.36 Cast-In-Place Concrete, Elevated Decks, 36" thick	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	968.24 /CY	215,918
						03.24 Cast-In-Place Concrete, Elevated Slabs	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	968.24 /CY	215,918
						03.0 Concrete Work	1,792.00 CY	257.15 /CY	8.24 /CY	271.94 /CY	/CY	/CY	537.34 /CY	962,909	849.62 /CY	1,522,519
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.24	Process Pipe, Carbon Steel, 24"										
						Energy Dissipating Valves W/ Hood	1.00 ea	2,187.72 /ea	1,560.00 /ea	15,000.00 /ea	-	-	18,747.72 /ea	18,748	30,042.87 /ea	30,043
						42" x 24" Reducer	1.00 ea	2,187.71 /ea	520.00 /ea	5,000.00 /ea	-	-	7,707.71 /ea	7,708	12,266.86 /ea	12,267
						40.10.02.24 Process Pipe, Carbon Steel, 24"	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,455	/LF	42,310
						40.11 Process Pipe, Carbon Steel	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,455	/LF	42,310
						40.0 Process Pipe	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,455	/LF	42,310
						33.00.530 Funks Pipeline, Enviornmental Water Pipeline, Energy Dissipation Structure	**1.00** EA	465,190.61 /EA	16,851.09 /EA	507,322.79 /EA	/EA	/EA	989,364.49 /EA	989,364	1,564,828.93 /EA	1,564,829
						05.03 Terminal Regulating Reservoir Pipeline	**48,838.00 LF**	**734.65 /LF**	**297.73 /LF**	**2,152.25 /LF**	**220.46 /LF**	**/LF**	**3,405.09 /LF**	**166,297,686**	**5,415.11 /LF**	**264,463,076**
						05 Funks/TRR Pipelines	***59,853.00 LF***	***727.18 /LF***	***299.12 /LF***	***2,189.48 /LF***	***201.31 /LF***	***/LF***	***3,417.10 /LF***	***204,523,403***	***5,436.35 /LF***	***325,382,045***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	43,524,097		548,220.907 hrs	
Material	131,047,029			
Allowance	12,048,797			
Equipment	17,903,479		202,766.734 hrs	
Other				
Subtotal Direct Costs	**204,523,402**	**204,523,402**		
Material Sales Tax, Dunnigan Ca	9,500,910			7.250 %
Subtotal W/ Sales Tax	**9,500,910**	**214,024,312**		
General Conditions	10,701,216			5.000 %
Subtotal W/ General Conditions	**10,701,216**	**224,725,528**		
Mobilization/Demobilization	6,741,766			3.000 %
Prime Contractor Overhead	23,146,729			10.000 %
Prime Contractor Profit	15,276,841			6.000 %
Bonds & Insurance	5,856,632			2.170 %
Subtotal W/ Prime Markups	**51,021,968**	**275,747,496**		
Contractor Contingency	8,272,425			3.000 %
Design Contingency	41,362,124			15.000 %
Subtotal W/ Contingency	**49,634,549**	**325,382,045**		
Total Construction Cost		**325,382,045**		
Non-Contract Costs	48,807,307			15.000 %
Total Project Costs	**48,807,307**	**374,189,352**		

Dunnigan Pipeline Alt 1

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Dunnigan Pipeline Alt 1 (CBD)
Project Number: D3880600
Design Stage: Feasibility

Estimator: Cavalleri/Wells Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
01			Dunnigan Pipelines - Alt 1 (CBD)									
	01.01		Dunnigan Pipeline - CBD									
		33.00.100	Dunnigan Pipeline, Open Cut	18,658.00 LF	620.75 /LF	251.91 /LF	1,410.98 /LF	120.27 /LF	2,403.91 /LF	44,852,083	3,807.82 /LF	71,046,369
		33.00.102	Dunnigan Pipeline, Trenchless Pipe Installation, at I-5	540.00 LF	1,822.53 /LF	251.04 /LF	2,365.17 /LF	1,401.48 /LF	5,840.22 /LF	3,153,716	9,173.94 /LF	4,953,926
		33.00.104	Dunnigan Pipeline, Trenchless Pipe Installation, at Highway 99/Rail Road Crossing	440.00 LF	1,831.57 /LF	256.26 /LF	2,392.22 /LF	1,720.00 /LF	6,200.04 /LF	2,728,019	9,730.56 /LF	4,281,447
			01.01 Dunnigan Pipeline - CBD	19,638.00 LF	680.92 /LF	251.98 /LF	1,459.20 /LF	191.35 /LF	2,583.45 /LF	50,733,818	4,088.08 /LF	80,281,742
	01.02		Dunnigan - TCC Intake Structure									
		02.00.100	Dunnigan - TCC Intake Structure, Partial Demolition of Existing Canal Lining	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	3.70 /SF	3,476	5.78 /SF	5,431
		03.00.100	Dunnigan - TCC Intake Structure, Foundation Slab	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	430.36 /CY	116,628	681.09 /CY	184,574
		03.00.102	Dunnigan - TCC Intake Structure, Concrete Walls	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	845.08 /CY	233,241	1,330.96 /CY	367,344
		03.00.104	Dunnigan - TCC Intake Structure, Elevated Slab	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	859.09 /CY	12,242	1,345.10 /CY	19,168
		26.00.100	Dunnigan - TCC Intake Structure, Electrical	3,524.00 SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	29.68 /SF	104,583	47.43 /SF	167,156
		31.00.100	Dunnigan - TCC Intake Structure, Excavation and Backfill	8,870.00 CY	5.77 /CY	2.96 /CY	1.21 /CY	/CY	9.94 /CY	88,181	15.41 /CY	136,705
		40.00.100	Dunnigan - TCC Intake Structure, Water Control Gates	2.00 EA	3,605.56 /EA	1,453.15 /EA	25,000.00 /EA	/EA	30,058.71 /EA	60,117	48,146.81 /EA	96,294
		40.90.100	Dunnigan - TCC Intake Structure, I&C	3,524.00 SF	1.87 /SF	0.40 /SF	11.35 /SF	/SF	13.62 /SF	47,994	21.82 /SF	76,881
			01.02 Dunnigan - TCC Intake Structure	3,524.00 SF	75.48 /SF	10.99 /SF	102.65 /SF	/SF	189.12 /SF	666,463	298.96 /SF	1,053,552
	01.03		Dunnigan - CBD Discharge Structure									
		01.00.200	Dunnigan - CBD Discharge Structure, Removal and Control of Water	4.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	180,000	69,365.74 /MO	277,463
		02.00.200	Dunnigan - CBD Discharge Structure, Partial Demolition of Existing Canal Lining	1,218.00 SF	1.58 /SF	0.45 /SF	0.82 /SF	/SF	2.85 /SF	3,476	4.46 /SF	5,431
		03.00.106	Dunnigan - CBD Discharge Structure, Foundation Slab	520.00 CY	174.07 /CY	6.95 /CY	243.14 /CY	/CY	424.16 /CY	220,561	671.45 /CY	349,152
		03.00.108	Dunnigan - CBD Discharge Structure, Concrete Walls	675.00 CY	388.50 /CY	9.65 /CY	358.07 /CY	/CY	756.22 /CY	510,450	1,191.65 /CY	804,363
		03.00.110	Dunnigan - CBD Discharge Structure, Concrete Coverging Walls	114.00 CY	276.35 /CY	9.74 /CY	310.20 /CY	/CY	596.29 /CY	67,977	941.65 /CY	107,348
		31.00.102	Dunnigan - CBD Discharge Structure, Excavation and Backfill	21,500.00 CY	5.78 /CY	3.09 /CY	0.93 /CY	/CY	9.81 /CY	210,800	15.18 /CY	326,393
		33.00.108	Dunnigan - CBD Discharge Structure, CBD Pipeline Connection	111.00 LF	586.06 /LF	305.09 /LF	1,482.99 /LF	270.45 /LF	2,644.59 /LF	293,550	4,184.05 /LF	464,430
		33.00.110	Dunnigan - CBD Discharge Structure, Above Grade Piping	80.00 LF	395.44 /LF	185.10 /LF	2,320.00 /LF	/LF	2,900.53 /LF	232,042	4,639.25 /LF	371,140
			01.03 Dunnigan - CBD Discharge Structure	4,258.00 SF	142.60 /SF	29.80 /SF	181.95 /SF	49.32 /SF	403.68 /SF	1,718,857	635.44 /SF	2,705,721
			01 Dunnigan Pipelines - Alt 1 (CBD)	19,718.00 LF	722.44 /LF	259.36 /LF	1,510.92 /LF	201.22 /LF	2,693.94 /LF	53,119,138	4,262.15 /LF	84,041,015

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	21,958,350		179,451.026 hrs	
Material	48,083,627			
Allowance	6,116,013			
Equipment	7,883,024		60,704.979 hrs	
Other				
Total Construction Cost	**84,041,014**	**84,041,014**		
Non-Contract Costs	12,606,152			15.000 %
Total Project Costs	**12,606,152**	**96,647,166**		

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
01						Dunnigan Pipelines - Alt 1 (CBD)									
	01.01					Dunnigan Pipeline - CBD									
		33.00.100				Dunnigan Pipeline, Open Cut									
			33.0			Pipelines									
				33.03		Buried Process Pipe, Carbon Steel									
					33.00.05.97	Buried Pipe, Carbon Steel, 108"									
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	421,340.00 cy	1.99 /cy	2.43 /cy	-	-	4.41 /cy	1,858,836	6.80 /cy	2,865,323
						Trench Stabilization, Geotextile Wrapped	6,272.00 cy	5.50 /cy	2.25 /cy	40.00 /cy	-	47.75 /cy	299,469	76.50 /cy	479,808
						Pipe bedding and zone, CLSM	99,254.00 cy	4.52 /cy	0.71 /cy	35.00 /cy	-	40.23 /cy	3,993,228	64.55 /cy	6,407,262
						Backfill native material	312,730.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	7.87 /cy	2,461,569	12.13 /cy	3,794,412
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	108,610.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	1,741,602	24.72 /cy	2,684,612
						Load excavated spoils	108,610.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	1.62 /cy	175,621	2.49 /cy	270,713
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	312,730.00 cy	0.82 /cy	1.21 /cy	-	-	2.03 /cy	635,071	3.13 /cy	978,937
						Compaction, water for, 6000 gallon wagon, 6 mile haul	312,730.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	1.85 /cy	579,706	2.94 /cy	920,802
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 108" diameter	18,658.00 LF	379.47 /LF	82.79 /LF	1,190.00 /LF	-	1,652.26 /LF	30,827,843	2,633.17 /LF	49,129,632
						Dewatering Allowance	308.00 msf	0.00 /msf	0.00 /msf	0.00 /msf	3,000.00 /msf	3,000.00 /msf	924,000	4,624.38 /msf	1,424,310
						Erosion Controls Allowance	18,658.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	55.00 /lf	1,026,190	84.78 /lf	1,581,832
						Surface Restorations Allowance	1,959.09 msf	0.00 /msf	0.00 /msf	0.00 /msf	150.00 /msf	150.00 /msf	293,864	231.22 /msf	452,979
						ARV, Complete	2.00 ea	2,500.91 /ea	520.00 /ea	3,500.00 /ea		6,520.91 /ea	13,042	10,305.47 /ea	20,611
						Blowoff, Complete	2.00 ea	2,500.91 /ea	520.00 /ea	8,000.00 /ea		11,020.91 /ea	22,042	17,568.31 /ea	35,137
						33.00.05.97 Buried Pipe, Carbon Steel, 108"	18,658.00 LF	620.75 /LF	251.91 /LF	1,410.98 /LF	120.27 /LF	2,403.91 /LF	44,852,083	3,807.82 /LF	71,046,369
						33.03 Buried Process Pipe, Carbon Steel	18,658.00 LF	620.75 /LF	251.91 /LF	1,410.98 /LF	120.27 /LF	2,403.91 /LF	44,852,083	3,807.82 /LF	71,046,369
						33.0 Pipelines	18,658.00 LF	620.75 /LF	251.91 /LF	1,410.98 /LF	120.27 /LF	2,403.91 /LF	44,852,083	3,807.82 /LF	71,046,369
						33.00.100 Dunnigan Pipeline, Open Cut	18,658.00 LF	620.75 /LF	251.91 /LF	1,410.98 /LF	120.27 /LF	2,403.91 /LF	44,852,083	3,807.82 /LF	71,046,369
		33.00.102				Dunnigan Pipeline, Trenchless Pipe Installation, at I-5									
			33.0			Pipelines									
				33.60		Trenchless Technology, Tunneling									
					33.60.01.07	Pipeline Specials, Tunneling, 108" Piping in 150" Casing									
						Grout Annular Space Between Carrier Pipe and Casing	31,910.00 cf	9.30 /cf	0.43 /cf	0.95 /cf	-	10.68 /cf	340,767	16.53 /cf	527,477
						Final Surface Restoration Allowance	355.55 sy	0.00 /sy	0.00 /sy	0.00 /sy	13.50 /sy	13.50 /sy	4,800	20.81 /sy	7,399
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	1,660.00 cy	2.65 /cy	2.21 /cy	-	-	4.85 /cy	8,057	7.48 /cy	12,419
						Jacking and Receiving Pits Shoring, SF of Pit Walls	5,600.00 sf	0.00 /sf	0.00 /sf	0.00 /sf	45.00 /sf	45.00 /sf	252,000	69.37 /sf	388,448
						Backfill Pits, Native material	680.00 cy	6.18 /cy	1.15 /cy	0.00 /cy	-	7.33 /cy	4,987	11.31 /cy	7,688
						Pipe bedding and zone in pits, CLSM	878.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	75.23 /cy	66,054	121.04 /cy	106,276
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	3,435.00 cy	7.24 /cy	6.00 /cy	-	-	13.24 /cy	45,466	20.40 /cy	70,084
						Load excavated spoils	3,435.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	1.80 /cy	6,176	2.77 /cy	9,520
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	680.00 cy	0.82 /cy	0.82 /cy	-	-	1.65 /cy	1,120	2.54 /cy	1,726
						Compaction, water for, 6000 gallon wagon, 6 mile haul	680.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	1.76 /cy	1,195	2.80 /cy	1,902
						Horizontal boring, roadwork, 150" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	540.00 lf	596.42 /lf	142.23 /lf	900.00 /lf	-	1,638.65 /lf	884,869	2,591.16 /lf	1,399,226
						Carrier Pipe Spacers	112.00 ea	14.91 /ea	4.74 /ea	500.00 /ea	0.00 /ea	519.65 /ea	58,201	837.27 /ea	93,774
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 108" diameter	540.00 LF	596.41 /LF	28.45 /LF	1,190.00 /LF	-	1,814.86 /LF	980,024	2,883.81 /LF	1,557,258
						Dewatering Allowance	1.00 ls	0.00 /ls	0.00 /ls	0.00 /ls	500,000.00 /ls	500,000.00 /ls	500,000	770,730.44 /ls	770,730
						33.60.01.07 Pipeline Specials, Tunneling, 108" Piping in 150" Casing	540.00 LF	1,822.53 /LF	251.04 /LF	2,365.17 /LF	1,401.48 /LF	5,840.22 /LF	3,153,716	9,173.94 /LF	4,953,926
						33.60 Trenchless Technology, Tunneling	540.00 LF	1,822.53 /LF	251.04 /LF	2,365.17 /LF	1,401.48 /LF	5,840.22 /LF	3,153,716	9,173.94 /LF	4,953,926
						33.0 Pipelines	540.00 LF	1,822.53 /LF	251.04 /LF	2,365.17 /LF	1,401.48 /LF	5,840.22 /LF	3,153,716	9,173.94 /LF	4,953,926
						33.00.102 Dunnigan Pipeline, Trenchless Pipe Installation, at I-5	540.00 LF	1,822.53 /LF	251.04 /LF	2,365.17 /LF	1,401.48 /LF	5,840.22 /LF	3,153,716	9,173.94 /LF	4,953,926
		33.00.104				Dunnigan Pipeline, Trenchless Pipe Installation, at Highway 99/Rail Road Crossing									
			33.0			Pipelines									
				33.60		Trenchless Technology, Tunneling									
					33.60.01.07	Pipeline Specials, Tunneling, 108" Piping in 150" Casing									
						Grout Annular Space Between Carrier Pipe and Casing	26,000.00 cf	9.30 /cf	0.43 /cf	0.95 /cf	-	10.68 /cf	277,654	16.53 /cf	429,784
						Final Surface Restoration Allowance	355.55 sy				13.50 /sy	13.50 /sy	4,800	20.81 /sy	7,399
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	1,660.00 cy	2.65 /cy	2.21 /cy	-	-	4.85 /cy	8,057	7.48 /cy	12,419
						Jacking and Receiving Pits Shoring, SF of Pit Walls	5,600.00 sf				45.00 /sf	45.00 /sf	252,000	69.37 /sf	388,448
						Backfill Pits, Native material	680.00 cy	6.18 /cy	1.15 /cy		-	7.33 /cy	4,987	11.31 /cy	7,688
						Pipe bedding and zone in pits, CLSM	878.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	75.23 /cy	66,054	121.04 /cy	106,276
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	2,980.00 cy	7.24 /cy	6.00 /cy	-	-	13.24 /cy	39,444	20.40 /cy	60,801
						Load excavated spoils	2,980.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	1.80 /cy	5,358	2.77 /cy	8,259
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	680.00 cy	0.82 /cy	0.82 /cy	-	-	1.65 /cy	1,120	2.54 /cy	1,726
						Compaction, water for, 6000 gallon wagon, 6 mile haul	680.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	1.76 /cy	1,195	2.80 /cy	1,902
						Horizontal boring, roadwork, 150" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	440.00 lf	596.42 /lf	142.23 /lf	900.00 /lf	-	1,638.65 /lf	721,004	2,591.16 /lf	1,140,110
						Carrier Pipe Spacers	92.00 ea	14.91 /ea	4.74 /ea	500.00 /ea		519.65 /ea	47,808	837.27 /ea	77,029
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 108" diameter	440.00 LF	596.41 /LF	28.45 /LF	1,190.00 /LF	-	1,814.86 /LF	798,538	2,883.81 /LF	1,268,877
						Dewatering Allowance	1.00 ls				500,000.00 /ls	500,000.00 /ls	500,000	770,730.42 /ls	770,730
						33.60.01.07 Pipeline Specials, Tunneling, 108" Piping in 150" Casing	440.00 LF	1,831.57 /LF	256.26 /LF	2,392.22 /LF	1,720.00 /LF	6,200.04 /LF	2,728,019	9,730.56 /LF	4,281,447
						33.60 Trenchless Technology, Tunneling	440.00 LF	1,831.57 /LF	256.26 /LF	2,392.22 /LF	1,720.00 /LF	6,200.04 /LF	2,728,019	9,730.56 /LF	4,281,447
						33.0 Pipelines	440.00 LF	1,831.57 /LF	256.26 /LF	2,392.22 /LF	1,720.00 /LF	6,200.04 /LF	2,728,019	9,730.56 /LF	4,281,447
						33.00.104 Dunnigan Pipeline, Trenchless Pipe Installation, at Highway 99/Rail Road Crossing	440.00 LF	1,831.57 /LF	256.26 /LF	2,392.22 /LF	1,720.00 /LF	6,200.04 /LF	2,728,019	9,730.56 /LF	4,281,447
						01.01 Dunnigan Pipeline - CBD	19,638.00 LF	680.92 /LF	251.98 /LF	1,459.20 /LF	191.35 /LF	2,583.45 /LF	50,733,818	4,088.08 /LF	80,281,742
	01.02					Dunnigan - TCC Intake Structure									
		02.00.100				Dunnigan - TCC Intake Structure, Partial Demolition of Existing Canal Lining									
			02.0			Existing Conditions									
				02.40		Demolition									
					02.01.01.00	General Site Demolition									
						Partial Demolition of Existing Canal Lining	940.00 SF	1.79 /SF	0.37 /SF	1.06 /SF	-	3.22 /SF	3,025	5.04 /SF	4,735
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	30.00 cy	7.24 /cy	6.00 /cy	-	-	13.24 /cy	397	20.40 /cy	612
						Load excavated spoils	30.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	1.80 /cy	54	2.77 /cy	83
						02.01.01.00 General Site Demolition	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	3.70 /SF	3,476	5.78 /SF	5,431
						02.40 Demolition	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	3.70 /SF	3,476	5.78 /SF	5,431
						02.0 Existing Conditions	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	3.70 /SF	3,476	5.78 /SF	5,431
						02.00.100 Dunnigan - TCC Intake Structure, Partial Demolition of Existing Canal Lining	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	3.70 /SF	3,476	5.78 /SF	5,431
		03.00.100				Dunnigan - TCC Intake Structure, Foundation Slab									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.24	Cast-In-Place Concrete, Slabs on Grade, 24" thick									

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.05.24	Cast-In-Place Concrete, Slabs on Grade, 24" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	550.00 sfca	7.87 /sfca	-	0.97 /sfca	-	8.84 /sfca	4,859	13.69 /sfca	7,529
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	23.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	61,060	4,050.01 /ton	96,188
						Reinforcing in place, unloading & sorting, add to above - slabs	23.75 ton	49.21 /ton	6.50 /ton	-	-	55.70 /ton	1,323	85.87 /ton	2,039
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	280.00 cy	-	-	131.00 /cy	-	131.00 /cy	36,680	211.43 /cy	59,200
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	271.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	7,859	44.70 /CY	12,115
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	3,524.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	3,301	1.44 /sf	5,088
						Curing, sprayed membrane curing compound	35.24 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	812	36.43 /csf	1,284
						Fine grading, fine grade for slab on grade, machine	391.56 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	734	2.89 /sy	1,131
						03.10.05.24 Cast-In-Place Concrete, Slabs on Grade, 24" thick	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	430.36 /CY	116,628	681.09 /CY	184,574
						03.18 Cast-In-Place Concrete, Slabs on Grade	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	430.36 /CY	116,628	681.09 /CY	184,574
						03.0 Concrete Work	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	430.36 /CY	116,628	681.09 /CY	184,574
						03.00.100 Dunnigan - TCC Intake Structure, Foundation Slab	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	430.36 /CY	116,628	681.09 /CY	184,574
		03.00.102				Dunnigan - TCC Intake Structure, Concrete Walls									
			03.0			Concrete Work									
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.24	Cast-In-Place Concrete, Straight Walls, 24" thick									
						C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	30.00 lf	23.48 /lf	-	2.45 /lf	-	25.93 /lf	778	40.14 /lf	1,204
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	7,440.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	109,647	23.11 /sfca	171,957
						Form oil, coverage varies greatly, maximum, includes material only	20.00 gal	-	-	23.50 /gal	-	23.50 /gal	470	37.93 /gal	759
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	24.25 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	62,345	4,050.01 /ton	98,213
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	24.25 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	1,351	85.87 /ton	2,082
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	24.25 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	1,468	93.33 /ton	2,263
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	285.00 cy	-	-	131.00 /cy	-	131.00 /cy	37,335	211.43 /cy	60,257
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	276.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	12,340	68.92 /CY	19,021
						Finishing: break ties & patch voids (walls, cols or beams)	7,440.00 sf	0.98 /sf	-	0.03 /sf	-	1.01 /sf	7,507	1.56 /sf	11,588
						03.10.06.24 Cast-In-Place Concrete, Straight Walls, 24" thick	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	845.08 /CY	233,241	1,330.96 /CY	367,344
						03.20 Cast-In-Place Concrete, Straight Walls	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	845.08 /CY	233,241	1,330.96 /CY	367,344
						03.0 Concrete Work	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	845.08 /CY	233,241	1,330.96 /CY	367,344
						03.00.102 Dunnigan - TCC Intake Structure, Concrete Walls	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	845.08 /CY	233,241	1,330.96 /CY	367,344
		03.00.104				Dunnigan - TCC Intake Structure, Elevated Slab									
			03.0			Concrete Work									
				03.24		Cast-In-Place Concrete, Elevated Slabs									
					03.10.10.14	Cast-In-Place Concrete, Elevated Decks, 14" thick									
						Slab shoring	3,250.00 cf	0.64 /cf	-	0.05 /cf	-	0.69 /cf	2,225	1.06 /cf	3,442
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	325.00 sf	7.55 /sf	-	1.33 /sf	-	8.88 /sf	2,885	13.78 /sf	4,478
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	145.00 lf	5.41 /lf	-	0.22 /lf	-	5.63 /lf	817	8.70 /lf	1,261
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	1.25 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	3,214	4,050.02 /ton	5,063
						Reinforcing in place, unloading & sorting, add to above - decks	1.25 ton	49.21 /ton	6.50 /ton	-	-	55.70 /ton	70	85.86 /ton	107
						Reinforcing steel, crane cost for handling, maximum, add	1.25 ton	140.59 /ton	18.56 /ton	-	-	159.15 /ton	199	245.32 /ton	307
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	14.75 cy	-	-	131.00 /cy	-	131.00 /cy	1,932	211.43 /cy	3,119
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	14.25 CY	24.11 /CY	5.70 /CY	-	-	29.81 /CY	425	45.95 /CY	655
						Finishing elev slab, bull float, manual float & manual steel trowel	325.00 sf	1.23 /sf	-	-	-	1.23 /sf	401	1.90 /sf	618
						Curing, sprayed membrane curing compound, elevated decks	3.25 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	75	36.44 /csf	118
						03.10.10.14 Cast-In-Place Concrete, Elevated Decks, 14" thick	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	859.09 /CY	12,242	1,345.10 /CY	19,168
						03.24 Cast-In-Place Concrete, Elevated Slabs	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	859.09 /CY	12,242	1,345.10 /CY	19,168
						03.0 Concrete Work	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	859.09 /CY	12,242	1,345.10 /CY	19,168
						03.00.104 Dunnigan - TCC Intake Structure, Elevated Slab	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	859.09 /CY	12,242	1,345.10 /CY	19,168
		26.00.100				Dunnigan - TCC Intake Structure, Electrical									
			26.0			Electrical Work									
				26.00		Electrical									
					26.00.99.00	Electrical, Other									
						Electrical Allowance	1.00 LS	19,782.96 /LS	2,800.00 /LS	82,000.00 /LS	-	104,582.96 /LS	104,583	167,155.54 /LS	167,156
						26.00.99.00 Electrical, Other	3,524.00 SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	29.68 /SF	104,583	47.43 /SF	167,156
						26.00 Electrical	3,524.00 SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	29.68 /SF	104,583	47.43 /SF	167,156
						26.0 Electrical Work	3,524.00 SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	29.68 /SF	104,583	47.43 /SF	167,156
						26.00.100 Dunnigan - TCC Intake Structure, Electrical	3,524.00 SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	29.68 /SF	104,583	47.43 /SF	167,156
		31.00.100				Dunnigan - TCC Intake Structure, Excavation and Backfill									
			31.0			Earthwork									
				31.25		Earthworks, Structural									
					31.25.01.00	Earthworks, Structural, Excavation									
						Structural Excavation, excludes sheeting or dewatering	4,360.00 CY	2.65 /CY	2.21 /CY	-	-	4.85 /CY	21,161	7.48 /CY	32,619
						Stockpile Excavated Spoils	3,780.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	2.84 /cy	10,725	4.39 /cy	16,600
						31.25.01.00 Earthworks, Structural, Excavation	4,360.00 CY	3.72 /CY	3.38 /CY	0.22 /CY	/CY	7.31 /CY	31,885	11.29 /CY	49,219
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)									
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	150.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	-	48.26 /CY	7,238	76.92 /CY	11,538
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	150.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	/CY	48.26 /CY	7,238	76.92 /CY	11,538
					31.25.03.00	Earthworks, Structural, Backfill									
						Backfill, Native material	3,780.00 CY	6.18 /CY	1.15 /CY	0.00 /CY	-	7.33 /CY	27,723	11.31 /CY	42,734
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	2,780.00 cy	0.82 /cy	0.82 /cy	-	-	1.65 /cy	4,578	2.54 /cy	7,057
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	1,000.00 cy	1.29 /cy	0.10 /cy	-	-	1.39 /cy	1,391	2.14 /cy	2,144
						Compaction, water for, 6000 gallon wagon, 6 mile haul	3,780.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	1.76 /cy	6,645	2.80 /cy	10,572
						31.25.03.00 Earthworks, Structural, Backfill	3,780.00 CY	7.48 /CY	1.99 /CY	1.20 /CY	/CY	10.67 /CY	40,337	16.54 /CY	62,507
					31.25.05.00	Earthworks, Structural, Hauling and Disposal									
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	580.00 CY	7.24 /CY	6.00 /CY	-	-	13.24 /CY	7,677	20.40 /CY	11,834
						Load excavated spoils	580.00 cy	1.03 /cy	0.77 /cy		-	1.80 /cy	1,043	2.77 /cy	1,607

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	580.00 CY	8.27 /CY	6.77 /CY	/CY	/CY	15.03 /CY	8,720	23.17 /CY	13,441
						31.25 Earthworks, Structural	8,870.00 CY	5.77 /CY	2.96 /CY	1.21 /CY	/CY	9.94 /CY	88,181	15.41 /CY	136,705
						31.0 Earthwork	8,870.00 CY	5.77 /CY	2.96 /CY	1.21 /CY	/CY	9.94 /CY	88,181	15.41 /CY	136,705
						31.00.100 Dunnigan - TCC Intake Structure, Excavation and Backfill	8,870.00 CY	5.77 /CY	2.96 /CY	1.21 /CY	/CY	9.94 /CY	88,181	15.41 /CY	136,705
		40.00.100				Dunnigan - TCC Intake Structure, Water Control Gates									
			46.0			Water and Wastewater Equipment									
				40.55		Water Control Gates, Other Gates									
					40.30.06.01	Other Gates									
						Furnish and Install Water Control Gates	2.00 EA	3,605.56 /EA	1,453.15 /EA	25,000.00 /EA	-	30,058.71 /EA	60,117	48,146.81 /EA	96,294
						40.30.06.01 Other Gates	2.00 EA	3,605.56 /EA	1,453.15 /EA	25,000.00 /EA	/EA	30,058.71 /EA	60,117	48,146.81 /EA	96,294
						40.55 Water Control Gates, Other Gates	2.00 EA	3,605.56 /EA	1,453.15 /EA	25,000.00 /EA	/EA	30,058.71 /EA	60,117	48,146.81 /EA	96,294
						46.0 Water and Wastewater Equipment	2.00 EA	3,605.56 /EA	1,453.15 /EA	25,000.00 /EA	/EA	30,058.71 /EA	60,117	48,146.81 /EA	96,294
						40.00.100 Dunnigan - TCC Intake Structure, Water Control Gates	2.00 EA	3,605.56 /EA	1,453.15 /EA	25,000.00 /EA	/EA	30,058.71 /EA	60,117	48,146.81 /EA	96,294
		40.90.100				Dunnigan - TCC Intake Structure, I&C									
			40.9			Instrumentation & Controls									
				40.90		Instrumentation & Controls									
					40.90.99.01	I&C, Other									
						I&C Allowance	1.00 LS	6,594.32 /LS	1,400.00 /LS	40,000.00 /LS	-	47,994.32 /LS	47,994	76,881.38 /LS	76,881
						40.90.99.01 I&C, Other	3,524.00 SF	1.87 /SF	0.40 /SF	11.35 /SF	/SF	13.62 /SF	47,994	21.82 /SF	76,881
						40.90 Instrumentation & Controls	3,524.00 SF	1.87 /SF	0.40 /SF	11.35 /SF	/SF	13.62 /SF	47,994	21.82 /SF	76,881
						40.9 Instrumentation & Controls	3,524.00 SF	1.87 /SF	0.40 /SF	11.35 /SF	/SF	13.62 /SF	47,994	21.82 /SF	76,881
						40.90.100 Dunnigan - TCC Intake Structure, I&C	3,524.00 SF	1.87 /SF	0.40 /SF	11.35 /SF	/SF	13.62 /SF	47,994	21.82 /SF	76,881
						01.02 Dunnigan - TCC Intake Structure	**3,524.00 SF**	**75.48 /SF**	**10.99 /SF**	**102.65 /SF**	**/SF**	**189.12 /SF**	**666,463**	**298.96 /SF**	**1,053,552**
	01.03					**Dunnigan - CBD Discharge Structure**									
		01.00.200				Dunnigan - CBD Discharge Structure, Removal and Control of Water									
			01.0			General Requirements									
				01.01		Construction Operations									
					31.15.02.00	Dewatering									
						CBD Discharge Structure, Removal and Control of Water	4.00 MO		-		45,000.00 /MO	45,000.00 /MO	180,000	69,365.74 /MO	277,463
						31.15.02.00 Dewatering	4.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	180,000	69,365.74 /MO	277,463
						01.01 Construction Operations	4.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	180,000	69,365.74 /MO	277,463
						01.0 General Requirements	4.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	180,000	69,365.74 /MO	277,463
						01.00.200 Dunnigan - CBD Discharge Structure, Removal and Control of Water	4.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	180,000	69,365.74 /MO	277,463
		02.00.200				Dunnigan - CBD Discharge Structure, Partial Demolition of Existing Canal Lining									
			02.0			Existing Conditions									
				02.40		Demolition									
					02.01.01.00	General Site Demolition									
						Partial Demolition of Existing Canal Lining	1,218.00 SF	1.38 /SF	0.28 /SF	0.82 /SF	-	2.48 /SF	3,025	3.89 /SF	4,735
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	30.00 cy	7.24 /cy	6.00 /cy	-	-	13.24 /cy	397	20.40 /cy	612
						Load excavated spoils	30.00 cy	1.03 /cy	0.77 /cy		-	1.80 /cy	54	2.77 /cy	83
						02.01.01.00 General Site Demolition	1,218.00 SF	1.58 /SF	0.45 /SF	0.82 /SF	/SF	2.85 /SF	3,476	4.46 /SF	5,431
						02.40 Demolition	1,218.00 SF	1.58 /SF	0.45 /SF	0.82 /SF	/SF	2.85 /SF	3,476	4.46 /SF	5,431
						02.0 Existing Conditions	1,218.00 SF	1.58 /SF	0.45 /SF	0.82 /SF	/SF	2.85 /SF	3,476	4.46 /SF	5,431
						02.00.200 Dunnigan - CBD Discharge Structure, Partial Demolition of Existing Canal Lining	1,218.00 SF	1.58 /SF	0.45 /SF	0.82 /SF	/SF	2.85 /SF	3,476	4.46 /SF	5,431
		03.00.106				Dunnigan - CBD Discharge Structure, Foundation Slab									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.36	Cast-In-Place Concrete, Slabs on Grade, 36" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,120.00 sfca	7.87 /sfca	-	0.97 /sfca	-	8.84 /sfca	9,896	13.69 /sfca	15,332
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	45.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	116,978	4,050.01 /ton	184,275
						Reinforcing in place, unloading & sorting, add to above - slabs	45.50 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	2,535	85.87 /ton	3,907
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	536.00 cy	-	-	131.00 /cy	-	131.00 /cy	70,216	211.43 /cy	113,326
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	520.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	15,080	44.70 /CY	23,246
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	4,258.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	3,988	1.44 /sf	6,148
						Curing, sprayed membrane curing compound	42.58 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	981	36.43 /csf	1,551
						Fine grading, fine grade for slab on grade, machine	473.11 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	887	2.89 /sy	1,367
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	520.00 CY	174.07 /CY	6.95 /CY	243.14 /CY	/CY	424.16 /CY	220,561	671.45 /CY	349,152
						03.18 Cast-In-Place Concrete, Slabs on Grade	520.00 CY	174.07 /CY	6.95 /CY	243.14 /CY	/CY	424.16 /CY	220,561	671.45 /CY	349,152
						03.0 Concrete Work	520.00 CY	174.07 /CY	6.95 /CY	243.14 /CY	/CY	424.16 /CY	220,561	671.45 /CY	349,152
						03.00.106 Dunnigan - CBD Discharge Structure, Foundation Slab	520.00 CY	174.07 /CY	6.95 /CY	243.14 /CY	/CY	424.16 /CY	220,561	671.45 /CY	349,152
		03.00.108				Dunnigan - CBD Discharge Structure, Concrete Walls									
			03.0			Concrete Work									
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.24	Cast-In-Place Concrete, Straight Walls, 24" thick									
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	14,294.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	210,659	23.11 /sfca	330,370
						Form oil, coverage varies greatly, maximum, includes material only	38.20 gal	-	-	23.50 /gal	-	23.50 /gal	898	37.93 /gal	1,449
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	46.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	119,549	4,050.01 /ton	188,325
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	46.50 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	2,590	85.87 /ton	3,993
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	46.50 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	2,816	93.33 /ton	4,340
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	546.00 cy	-	-	131.00 /cy	-	131.00 /cy	71,526	211.43 /cy	115,440
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	530.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	23,696	68.92 /CY	36,527
						Finishing: break ties & patch voids (walls, cols or beams)	14,294.00 sf	0.98 /sf	-	0.03 /sf	-	1.01 /sf	14,422	1.56 /sf	22,262
						03.10.06.24 Cast-In-Place Concrete, Straight Walls, 24" thick	530.00 CY	442.34 /CY	9.74 /CY	389.73 /CY	/CY	841.80 /CY	446,155	1,325.86 /CY	702,706
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7' 8" thick									
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	1,020.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	15,032	23.11 /sfca	23,575
						Form oil, coverage varies greatly, maximum, includes material only	2.80 gal	-	-	23.50 /gal	-	23.50 /gal	66	37.93 /gal	106
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.20 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	21,082	4,050.01 /ton	33,210
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	8.20 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	457	85.87 /ton	704
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	8.20 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	497	93.33 /ton	765
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	150.00 cy	-	-	131.00 /cy	-	131.00 /cy	19,650	211.43 /cy	31,714

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7' 8" thick									
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	145.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	6,483	68.92 /CY	9,993
						Finishing: break ties & patch voids (walls, cols or beams)	1,020.00 sf	0.98 /sf	-	0.03 /sf	-	1.01 /sf	1,029	1.56 /sf	1,589
						03.10.06.90 Cast-In-Place Concrete, Straight Walls, 7' 8" thick	145.00 CY	191.72 /CY	9.32 /CY	242.38 /CY	/CY	443.42 /CY	64,295	701.08 /CY	101,657
						03.20 Cast-In-Place Concrete, Straight Walls	675.00 CY	388.50 /CY	9.65 /CY	358.07 /CY	/CY	756.22 /CY	510,450	1,191.65 /CY	804,363
						03.0 Concrete Work	675.00 CY	388.50 /CY	9.65 /CY	358.07 /CY	/CY	756.22 /CY	510,450	1,191.65 /CY	804,363
						03.00.108 Dunnigan - CBD Discharge Structure, Concrete Walls	675.00 CY	388.50 /CY	9.65 /CY	358.07 /CY	/CY	756.22 /CY	510,450	1,191.65 /CY	804,363
		03.00.110				Dunnigan - CBD Discharge Structure, Concrete Covering Walls									
			03.0			Concrete Work									
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.99	Cast-In-Place Concrete, Straight Walls, Other									
						Concrete surface treatment, bonding agent, epoxy resin, 80 S.F. per gallon, 4 gallon case, includes material only	16.00 gal	-	-	69.00 /gal	-	69.00 /gal	1,104	111.36 /gal	1,782
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	1,226.00 sfca	9.34 /sfca	-	5.45 /sfca	-	14.79 /sfca	18,127	23.19 /sfca	28,427
						Form oil, coverage varies greatly, maximum, includes material only	3.50 gal	-	-	23.50 /gal	-	23.50 /gal	82	37.93 /gal	133
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	10.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	25,709	4,050.01 /ton	40,500
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	10.00 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	557	85.87 /ton	859
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	10.00 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	605	93.34 /ton	933
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	118.00 cy	-	-	131.00 /cy	-	131.00 /cy	15,458	211.43 /cy	24,949
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	114.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	5,097	68.92 /CY	7,857
						Finishing: break ties & patch voids (walls, cols or beams)	1,226.00 sf	0.98 /sf	-	0.03 /sf	-	1.01 /sf	1,237	1.56 /sf	1,909
						03.10.06.99 Cast-In-Place Concrete, Straight Walls, Other	114.00 CY	276.35 /CY	9.74 /CY	310.20 /CY	/CY	596.29 /CY	67,977	941.65 /CY	107,348
						03.20 Cast-In-Place Concrete, Straight Walls	114.00 CY	276.35 /CY	9.74 /CY	310.20 /CY	/CY	596.29 /CY	67,977	941.65 /CY	107,348
						03.0 Concrete Work	114.00 CY	276.35 /CY	9.74 /CY	310.20 /CY	/CY	596.29 /CY	67,977	941.65 /CY	107,348
						03.00.110 Dunnigan - CBD Discharge Structure, Concrete Covering Walls	114.00 CY	276.35 /CY	9.74 /CY	310.20 /CY	/CY	596.29 /CY	67,977	941.65 /CY	107,348
		31.00.102				Dunnigan - CBD Discharge Structure, Excavation and Backfill									
			31.0			Earthwork									
				31.25		Earthworks, Structural									
					31.25.01.00	Earthworks, Structural, Excavation									
						Structural Excavation, excludes sheeting or dewatering	10,660.00 CY	2.65 /CY	2.21 /CY	-	-	4.85 /CY	51,737	7.48 /CY	79,751
						Stockpile Excavated Spoils	10,660.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	2.84 /cy	30,244	4.39 /cy	46,814
						31.25.01.00 Earthworks, Structural, Excavation	10,660.00 CY	3.89 /CY	3.56 /CY	0.25 /CY	/CY	7.69 /CY	81,982	11.87 /CY	126,565
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)									
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	180.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	-	48.26 /CY	8,686	76.92 /CY	13,846
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	180.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	/CY	48.26 /CY	8,686	76.92 /CY	13,846
					31.25.03.00	Earthworks, Structural, Backfill									
						Backfill, Native material	9,230.00 CY	6.18 /CY	1.15 /CY	0.00 /CY	-	7.33 /CY	67,693	11.31 /CY	104,347
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	7,330.00 cy	0.82 /cy	0.82 /cy	-	-	1.65 /cy	12,072	2.54 /cy	18,608
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	1,900.00 cy	1.29 /cy	0.10 /cy	-	-	1.39 /cy	2,643	2.14 /cy	4,073
						Compaction, water for, 6000 gallon wagon, 6 mile haul	9,230.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	1.76 /cy	16,226	2.80 /cy	25,815
						31.25.03.00 Earthworks, Structural, Backfill	9,230.00 CY	7.46 /CY	2.03 /CY	1.20 /CY	/CY	10.69 /CY	98,634	16.56 /CY	152,843
					31.25.05.00	Earthworks, Structural, Hauling and Disposal									
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	1,430.00 CY	7.24 /CY	6.00 /CY	-	-	13.24 /CY	18,928	20.40 /CY	29,176
						Load excavated spoils	1,430.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	1.80 /cy	2,571	2.77 /cy	3,963
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	1,430.00 CY	8.27 /CY	6.77 /CY	/CY	/CY	15.03 /CY	21,499	23.17 /CY	33,139
						31.25 Earthworks, Structural	21,500.00 CY	5.78 /CY	3.09 /CY	0.93 /CY	/CY	9.81 /CY	210,800	15.18 /CY	326,393
						31.0 Earthwork	21,500.00 CY	5.78 /CY	3.09 /CY	0.93 /CY	/CY	9.81 /CY	210,800	15.18 /CY	326,393
						31.00.102 Dunnigan - CBD Discharge Structure, Excavation and Backfill	21,500.00 CY	5.78 /CY	3.09 /CY	0.93 /CY	/CY	9.81 /CY	210,800	15.18 /CY	326,393
		33.00.108				Dunnigan - CBD Discharge Structure, CBD Pipeline Connection									
			33.2			Pipeline Specialties									
				33.01		Pipeline Specialties									
					33.10.99.01	Buried Pipe Specials, Other									
						Reducer, steel, butt weld, 9' x 7'	1.00 ea	3,281.57 /ea	900.00 /ea	16,600.00 /ea	-	20,781.57 /ea	20,782	33,237.49 /ea	33,237
						Reducer, steel, butt weld, 7' x 5'	2.00 ea	3,281.57 /ea	900.00 /ea	13,700.00 /ea	-	17,881.57 /ea	35,763	28,556.99 /ea	57,114
						Wye, steel, butt weld, 7' Dia	1.00 ea	4,375.42 /ea	1,200.00 /ea	23,900.00 /ea	-	29,475.42 /ea	29,475	47,167.95 /ea	47,168
						Elbow, 45 deg, steel, butt weld, 7' Dia	1.00 ea	3,281.57 /ea	900.00 /ea	13,200.00 /ea	-	17,381.57 /ea	17,382	27,750.02 /ea	27,750
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	3,000.00 cy	1.99 /cy	2.43 /cy	-	-	4.41 /cy	13,235	6.80 /cy	20,402
						Pipe bedding and zone, CLSM	650.00 cy	4.52 /cy	0.71 /cy	35.00 /cy	-	40.23 /cy	26,151	64.55 /cy	41,960
						Backfill native material	2,460.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	7.87 /cy	19,363	12.13 /cy	29,848
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	540.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	8,659	24.72 /cy	13,348
						Load excavated spoils	540.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	1.62 /cy	873	2.49 /cy	1,346
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	2,460.00 cy	0.82 /cy	1.21 /cy	-	-	2.03 /cy	4,996	3.13 /cy	7,701
						Compaction, water for, 6000 gallon wagon, 6 mile haul	2,460.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	1.85 /cy	4,560	2.94 /cy	7,243
						Piping, pipe, WSP, plain end, welded, 84" diameter, excludes excavation or backfill	13.00 lf	121.97 /lf	62.10 /lf	570.00 /lf	-	754.07 /lf	9,803	1,203.69 /lf	15,648
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	120.00 lf	121.97 /lf	62.10 /lf	420.00 /lf	-	604.07 /lf	72,488	961.59 /lf	115,391
						Erosion Controls Allowance	320.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	55.00 /lf	17,600	84.78 /lf	27,130
						Dewatering Allowance	1.38 msf	0.00 /msf	0.00 /msf	0.00 /msf	9,000.00 /msf	9,000.00 /msf	12,420	13,873.14 /msf	19,145
						33.10.99.01 Buried Pipe Specials, Other	111.00 LF	586.06 /LF	305.09 /LF	1,482.99 /LF	270.45 /LF	2,644.59 /LF	293,550	4,184.05 /LF	464,430
						33.01 Pipeline Specialties	1.00 LS	65,053.08 /LS	33,864.82 /LS	164,612.00 /LS	30,020.00 /LS	293,549.90 /LS	293,550	464,430.06 /LS	464,430
						33.2 Pipeline Specialties	1.00 LS	65,053.08 /LS	33,864.82 /LS	164,612.00 /LS	30,020.00 /LS	293,549.90 /LS	293,550	464,430.06 /LS	464,430
						33.00.108 Dunnigan - CBD Discharge Structure, CBD Pipeline Connection	111.00 LF	586.06 /LF	305.09 /LF	1,482.99 /LF	270.45 /LF	2,644.59 /LF	293,550	4,184.05 /LF	464,430
		33.00.110				Dunnigan - CBD Discharge Structure, Above Grade Piping									
			40.0			Process Pipe									
				40.11		Process Pipe, Carbon Steel									
					40.10.02.60	Process Pipe, Carbon Steel, 60"									
						Elbow, 45 deg, steel, butt weld, 60' Dia	4.00 ea	3,281.57 /ea	900.00 /ea	9,500.00 /ea	-	13,681.57 /ea	54,726	21,778.35 /ea	87,113
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	80.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	604.07 /LF	48,325	961.59 /LF	76,928
						Isolation Valves	2.00 ea	2,187.72 /ea	1,560.00 /ea	32,000.00 /ea	-	35,747.72 /ea	71,495	57,423.71 /ea	114,847
						Energy Dissipating Valves W/ Hood	2.00 ea	2,187.72 /ea	1,560.00 /ea	25,000.00 /ea	-	28,747.72 /ea	57,495	46,125.99 /ea	92,252
						40.10.02.60 Process Pipe, Carbon Steel, 60"	80.00 LF	395.44 /LF	185.10 /LF	2,320.00 /LF	/LF	2,900.53 /LF	232,042	4,639.25 /LF	371,140
						40.11 Process Pipe, Carbon Steel	80.00 LF	395.44 /LF	185.10 /LF	2,320.00 /LF	/LF	2,900.53 /LF	232,042	4,639.25 /LF	371,140
						40.0 Process Pipe	80.00 LF	395.44 /LF	185.10 /LF	2,320.00 /LF	/LF	2,900.53 /LF	232,042	4,639.25 /LF	371,140
						33.00.110 Dunnigan - CBD Discharge Structure, Above Grade Piping	80.00 LF	395.44 /LF	185.10 /LF	2,320.00 /LF	/LF	2,900.53 /LF	232,042	4,639.25 /LF	371,140
						01.03 Dunnigan - CBD Discharge Structure	**4,258.00 SF**	**142.60 /SF**	**29.80 /SF**	**181.95 /SF**	**49.32 /SF**	**403.68 /SF**	**1,718,857**	**635.44 /SF**	**2,705,720**
						01 Dunnigan Pipelines - Alt 1 (CBD)	***19,718.00 LF***	***722.44 /LF***	***259.36 /LF***	***1,510.92 /LF***	***201.22 /LF***	***2,693.94 /LF***	***53,119,138***	***4,262.15 /LF***	***84,041,015***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	14,245,156		179,451.026 hrs	
Material	29,792,313			
Allowance	3,967,673			
Equipment	5,113,996		60,704.979 hrs	
Other				
Subtotal Direct Costs	**53,119,138**	**53,119,138**		
Material Sales Tax, Dunnigan Ca	2,159,943			7.250 %
Subtotal W/ Sales Tax	**2,159,943**	**55,279,081**		
General Conditions	2,763,954			5.000 %
Subtotal W/ General Conditions	**2,763,954**	**58,043,035**		
Mobilization/Demobilization	1,741,291			3.000 %
Prime Contractor Overhead	5,978,433			10.000 %
Prime Contractor Profit	3,945,766			6.000 %
Bonds & Insurance	1,512,675			2.170 %
Subtotal W/ Prime Markups	**13,178,165**	**71,221,200**		
Contractor Contingency	2,136,636			3.000 %
Design Contingency	10,683,180			15.000 %
Subtotal W/ Contingency	**12,819,816**	**84,041,016**		
Total Construction Cost		**84,041,016**		
Non-Contract Costs	12,606,152			15.000 %
Total Project Costs	**12,606,152**	**96,647,168**		

Dunnigan Pipeline Alt 2

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Dunnigan Pipeline Alt 2 (Sac River)
Project Number: D3880600
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 4 / May 4, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
02			Dunnigan Pipelines - Alt 2 (Sac River)										
	02.01		Dunnigan Pipeline - Sac River										
		32.00.002	Dunnigan Pipeline Access Road	6,029.00 SY	3.79 /SY	4.19 /SY	20.00 /SY	/SY	/SY	27.98 /SY	168,691	44.61 /SY	268,972
		33.00.100	Dunnigan Pipeline, Open Cut	47,644.00 LF	667.88 /LF	286.41 /LF	1,640.32 /LF	120.25 /LF	/LF	2,714.87 /LF	129,347,054	4,307.01 /LF	205,203,014
		33.00.102	Dunnigan Pipeline, Trenchless Pipe Installation, at I-5	540.00 LF	1,516.63 /LF	234.47 /LF	2,504.21 /LF	1,401.48 /LF	/LF	5,656.79 /LF	3,054,664	8,907.99 /LF	4,810,312
		33.00.104	Dunnigan Pipeline, Trenchless Pipe Installation, at Highway 99/Rail Road Crossing	440.00 LF	1,525.71 /LF	239.71 /LF	2,531.26 /LF	1,720.00 /LF	/LF	6,016.68 /LF	2,647,337	9,465.13 /LF	4,164,657
		33.00.106	Dunnigan Pipeline, Trenchless Pipe Installation, at CBD	840.00 LF	1,502.39 /LF	226.26 /LF	2,461.69 /LF	900.95 /LF	/LF	5,091.30 /LF	4,276,691	8,032.56 /LF	6,747,348
			02.01 Dunnigan Pipeline - Sac River	49,464.00 LF	699.41 /LF	284.92 /LF	1,674.07 /LF	161.73 /LF	/LF	2,820.12 /LF	139,494,437	4,471.82 /LF	221,194,303
	02.02		Dunnigan - TCC Intake Structure										
		02.00.100	Dunnigan - TCC Intake Structure, Partial Demolition of Existing Canal Lining	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	/SF	3.70 /SF	3,476	5.78 /SF	5,435
		03.00.100	Dunnigan - TCC Intake Structure, Foundation Slab	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	/CY	430.36 /CY	116,628	681.60 /CY	184,713
		03.00.102	Dunnigan - TCC Intake Structure, Concrete Walls	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	/CY	845.08 /CY	233,241	1,331.96 /CY	367,621
		03.00.104	Dunnigan - TCC Intake Structure, Elevated Slab	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	/CY	859.09 /CY	12,242	1,346.12 /CY	19,182
		26.00.100	Dunnigan - TCC Intake Structure, Electrical	3,524.00 SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	/SF	29.68 /SF	104,583	47.47 /SF	167,280
		31.00.100	Dunnigan - TCC Intake Structure, Excavation and Backfill	8,870.00 CY	5.77 /CY	2.96 /CY	1.21 /CY	/CY	/CY	9.94 /CY	88,181	15.42 /CY	136,810
		40.00.100	Dunnigan - TCC Intake Structure, Water Control Gates	2.00 EA	3,605.56 /EA	1,453.15 /EA	25,000.00 /EA	/EA	/EA	30,058.71 /EA	60,117	48,182.50 /EA	96,365
		40.90.100	Dunnigan - TCC Intake Structure, I&C	3,524.00 SF	1.87 /SF	0.40 /SF	11.35 /SF	/SF	/SF	13.62 /SF	47,994	21.83 /SF	76,938
			02.02 Dunnigan - TCC Intake Structure	3,524.00 SF	75.48 /SF	10.99 /SF	102.65 /SF	/SF	/SF	189.12 /SF	666,463	299.19 /SF	1,054,344
	02.03		Dunnigan - CBD Discharge Structure										
		01.00.200	Dunnigan - CBD Discharge Structure, Removal and Control of Water	2.00 MO	/MO	/MO	/MO	45,000.00 /MO	/MO	45,000.00 /MO	90,000	69,419.18 /MO	138,838
		02.00.200	Dunnigan - CBD Discharge Structure, Partial Demolition of Existing Canal Lining	770.00 SF	1.64 /SF	0.49 /SF	0.97 /SF	/SF	/SF	3.11 /SF	2,391	4.86 /SF	3,743
		03.00.106	Dunnigan - CBD Discharge Structure, Foundation Slab	338.00 CY	181.52 /CY	6.96 /CY	245.19 /CY	/CY	/CY	433.67 /CY	146,581	686.78 /CY	232,131
		03.00.108	Dunnigan - CBD Discharge Structure, Concrete Walls	331.00 CY	429.78 /CY	9.75 /CY	383.61 /CY	/CY	/CY	823.13 /CY	272,457	1,297.61 /CY	429,510
		03.00.110	Dunnigan - CBD Discharge Structure, Concrete Covering Walls	27.00 CY	333.06 /CY	9.81 /CY	346.67 /CY	/CY	/CY	689.53 /CY	18,617	1,088.84 /CY	29,399
		31.00.102	Dunnigan - CBD Discharge Structure, Excavation and Backfill	10,918.00 CY	5.80 /CY	3.09 /CY	1.02 /CY	/CY	/CY	9.90 /CY	108,108	15.35 /CY	167,577
		33.00.108	Dunnigan - CBD Discharge Structure, CBD Pipeline Connection	20.00 LF	1,322.81 /LF	540.23 /LF	832.70 /LF	200.00 /LF	/LF	2,895.73 /LF	57,915	4,527.47 /LF	90,549
		33.00.110	Dunnigan - CBD Discharge Structure, Above Grade Piping	55.00 LF	436.99 /LF	120.24 /LF	975.00 /LF	/LF	/LF	1,532.23 /LF	84,273	2,434.38 /LF	133,891
			02.03 Dunnigan - CBD Discharge Structure	2,765.00 SF	118.50 /SF	20.75 /SF	108.98 /SF	34.00 /SF	/SF	282.22 /SF	780,341	443.27 /SF	1,225,638
	02.04		Dunnigan - Sac River Discharge Structure										
		01.00.202	Dunnigan - Sac River Discharge Structure, Removal and Control of Water	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	/MO	45,000.00 /MO	135,000	69,419.18 /MO	208,258
		03.00.112	Dunnigan - Sac River Discharge Structure, Foundation Slab	509.00 CY	180.42 /CY	7.37 /CY	243.51 /CY	/CY	/CY	431.30 /CY	219,533	683.00 /CY	347,646
		03.00.114	Dunnigan - Sac River Discharge Structure, Concrete Walls	1,622.00 CY	316.03 /CY	9.74 /CY	317.16 /CY	/CY	/CY	642.92 /CY	1,042,814	1,014.79 /CY	1,645,991
		03.00.116	Dunnigan - Sac River Discharge Structure, Discharge Pipes Support Wall	152.00 CY	461.91 /CY	8.95 /CY	372.32 /CY	/CY	/CY	843.18 /CY	128,163	1,327.72 /CY	201,814
		03.00.118	Dunnigan - Sac River Discharge Structure, Stilling Basin and Apron	620.00 CY	259.06 /CY	9.99 /CY	287.05 /CY	/CY	/CY	556.10 /CY	344,781	878.67 /CY	544,778
		05.00.004	Dunnigan - Sac River Discharge Structure, Metal Grating	1,310.00 SF	11.37 /SF	4.12 /SF	26.84 /SF	/SF	/SF	42.34 /SF	55,462	67.26 /SF	88,108
		31.00.104	Dunnigan - Sac River Discharge Structure, Excavation and Backfill	26,405.00 CY	6.65 /CY	2.40 /CY	17.90 /CY	17.69 /CY	/CY	44.64 /CY	1,178,657	70.16 /CY	1,852,523
		33.00.112	Dunnigan - Sac River Discharge Structure, Above Grade Piping	3,405.00 LF	53.94 /LF	35.01 /LF	470.73 /LF	/LF	/LF	559.68 /LF	1,905,702	897.51 /LF	3,056,033
			02.04 Dunnigan - Sac River Discharge Structure	1,848.00 SF	654.45 /SF	116.34 /SF	1,614.50 /SF	325.81 /SF	/SF	2,711.10 /SF	5,010,113	4,299.32 /SF	7,945,152
			02 Dunnigan Pipelines - Alt 2 (Sac River)	49,464.00 LF	735.86 /LF	291.21 /LF	1,747.79 /LF	175.80 /LF	/LF	2,950.66 /LF	145,951,353	4,678.54 /LF	231,419,438

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	56,150,253		457,651.370 hrs	
Material	139,633,919			
Allowance	13,414,500			
Equipment	22,220,766		166,952.089 hrs	
Other				
Total Construction Cost	**231,419,438**	**231,419,438**		
Non-Contract Costs	34,712,916			15.000 %
Total Project Costs	**34,712,916**	**266,132,354**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Dunnigan Pipeline Alt 2 (Sac River)
Project Number: D3880600
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 4 / May 4, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
02						Dunnigan Pipelines - Alt 2 (Sac River)										
	02.01					Dunnigan Pipeline - Sac River										
		32.00.002				Dunnigan Pipeline Access Road										
			32.0			Exterior Improvements										
				32.12		Paving										
					32.40.04.00	Site Improvements, Access Roads, Gravel										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	6,029.00 SY	0.62 /SY	0.35 /SY	-	-	-	0.98 /SY	5,876	1.50 /SY	9,064
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	1,350.00 cy	1.68 /cy	4.63 /cy	-	-	-	6.31 /cy	8,516	9.73 /cy	13,137
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	675.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	10,824	24.74 /cy	16,697
						Load excavated spoils	675.00 cy	0.77 /cy	0.84 /cy		-	-	1.62 /cy	1,091	2.49 /cy	1,684
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,18"deep	6,029.00 sy	1.34 /sy	1.31 /sy	20.00 /sy	-	-	22.64 /sy	136,505	36.38 /sy	219,321
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	6,029.00 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	5,878	1.50 /sy	9,068
						32.40.04.00 Site Improvements, Access Roads, Gravel	6,029.00 SY	3.79 /SY	4.19 /SY	20.00 /SY	/SY	/SY	27.98 /SY	168,691	44.61 /SY	268,972
						32.12 Paving	6,029.00 SY	3.79 /SY	4.19 /SY	20.00 /SY	/SY	/SY	27.98 /SY	168,691	44.61 /SY	268,972
						32.0 Exterior Improvements	1.00 LS	22,875.04 /LS	25,235.53 /LS	120,580.00 /LS	/LS	/LS	168,690.57 /LS	168,691	268,972.29 /LS	268,972
						32.00.002 Dunnigan Pipeline Access Road	6,029.00 SY	3.79 /SY	4.19 /SY	20.00 /SY	/SY	/SY	27.98 /SY	168,691	44.61 /SY	268,972
		33.00.100				Dunnigan Pipeline, Open Cut										
			33.0			Pipelines										
				33.03		Buried Process Pipe, Carbon Steel										
					33.00.05.98	Buried Pipe, Carbon Steel, 126"										
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	1,291,795.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	5,699,044	6.81 /cy	8,791,621
						Trench Stabilization, Geotextile Wrapped	16,014.00 cy	5.50 /cy	2.25 /cy	40.00 /cy	-	-	47.75 /cy	764,620	76.56 /cy	1,225,980
						Pipe bedding and zone, CLSM	294,970.00 cy	4.52 /cy	0.71 /cy	35.00 /cy	-	-	40.23 /cy	11,867,356	64.60 /cy	19,055,644
						Backfill native material	952,220.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	7,495,139	12.14 /cy	11,562,364
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	339,575.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	5,445,213	24.74 /cy	8,400,049
						Load excavated spoils	339,575.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	549,089	2.49 /cy	847,051
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	952,220.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	1,933,705	3.13 /cy	2,983,027
						Compaction, water for, 6000 gallon wagon, 6 mile haul	952,220.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	1,765,125	2.95 /cy	2,805,811
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 126" diameter	47,644.00 LF	379.47 /LF	82.79 /LF	1,385.00 /LF	-	-	1,847.26 /LF	88,010,793	2,950.08 /LF	140,553,760
						Dewatering Allowance	786.13 msf	0.00 /msf	0.00 /msf	0.00 /msf	3,000.00 /msf	0.00 /msf	3,000.00 /msf	2,358,390	4,627.95 /msf	3,638,166
						Erosion Controls Allowance	47,644.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	0.00 /lf	55.00 /lf	2,620,420	84.85 /lf	4,042,387
						Surface Restorations Allowance	5,003.00 msf	0.00 /msf	0.00 /msf	0.00 /msf	150.00 /msf	0.00 /msf	150.00 /msf	750,450	231.40 /msf	1,157,680
						ARV, Complete	5.00 ea	2,500.91 /ea	520.00 /ea	3,500.00 /ea	0.00 /ea	0.00 /ea	6,520.91 /ea	32,605	10,313.23 /ea	51,566
						Blowoff, Complete	5.00 ea	2,500.91 /ea	520.00 /ea	8,000.00 /ea	0.00 /ea	0.00 /ea	11,020.91 /ea	55,105	17,581.39 /ea	87,907
						33.00.05.98 Buried Pipe, Carbon Steel, 126"	47,644.00 LF	667.88 /LF	286.41 /LF	1,640.32 /LF	120.25 /LF	/LF	2,714.87 /LF	129,347,054	4,307.01 /LF	205,203,014
						33.03 Buried Process Pipe, Carbon Steel	47,644.00 LF	667.88 /LF	286.41 /LF	1,640.32 /LF	120.25 /LF	/LF	2,714.87 /LF	129,347,054	4,307.01 /LF	205,203,014
						33.0 Pipelines	47,644.00 LF	667.88 /LF	286.41 /LF	1,640.32 /LF	120.25 /LF	/LF	2,714.87 /LF	129,347,054	4,307.01 /LF	205,203,014
						33.00.100 Dunnigan Pipeline, Open Cut	47,644.00 LF	667.88 /LF	286.41 /LF	1,640.32 /LF	120.25 /LF	/LF	2,714.87 /LF	129,347,054	4,307.01 /LF	205,203,014
		33.00.102				Dunnigan Pipeline, Trenchless Pipe Installation, at I-5										
			33.0			Pipelines										
				33.60		Trenchless Technology, Tunneling										
					33.60.01.09	Pipeline Specials, Tunneling, 126" Piping in 144" Casing										
						Grout Annular Space Between Carrier Pipe and Casing	14,310.00 cf	9.30 /cf	0.43 /cf	0.95 /cf	-	-	10.68 /cf	152,816	16.54 /cf	236,728
						Final Surface Restoration Allowance	355.55 sy				13.50 /sy		13.50 /sy	4,800	20.83 /sy	7,405
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	1,660.00 cy	2.65 /cy	2.21 /cy	-	-	-	4.85 /cy	8,057	7.49 /cy	12,429
						Jacking and Receiving Pits Shoring, SF of Pit Walls	5,600.00 sf				45.00 /sf		45.00 /sf	252,000	69.42 /sf	388,747
						Backfill Pits, Native material	680.00 cy	6.18 /cy	1.15 /cy		-	-	7.33 /cy	4,987	11.31 /cy	7,693
						Pipe bedding and zone in pits, CLSM	878.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	66,054	121.13 /cy	106,354
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	3,242.00 cy	7.24 /cy	6.00 /cy	-	-	-	13.24 /cy	42,912	20.42 /cy	66,198
						Load excavated spoils	3,242.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	-	1.80 /cy	5,829	2.77 /cy	8,992
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	680.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	1,120	2.54 /cy	1,728
						Compaction, water for, 6000 gallon wagon, 6 mile haul	680.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	1,195	2.80 /cy	1,903
						Horizontal boring, roadwork, 144" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	540.00 lf	596.42 /lf	142.23 /lf	875.00 /lf	-	-	1,613.65 /lf	871,369	2,552.73 /lf	1,378,472
						Carrier Pipe Spacers	112.00 ea	14.91 /ea	4.74 /ea	500.00 /ea			519.65 /ea	58,201	837.89 /ea	93,844
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 126" diameter	540.00 LF	596.41 /LF	28.45 /LF	1,385.00 /LF	-	-	2,009.86 /LF	1,085,324	3,200.92 /LF	1,728,497
						Dewatering Allowance	1.00 ls				500,000.00 /ls		500,000.00 /ls	500,000	771,324.17 /ls	771,324
						33.60.01.09 Pipeline Specials, Tunneling, 126" Piping in 144" Casing	540.00 LF	1,516.63 /LF	234.47 /LF	2,504.21 /LF	1,401.48 /LF	/LF	5,656.79 /LF	3,054,664	8,907.99 /LF	4,810,312
						33.60 Trenchless Technology, Tunneling	540.00 LF	1,516.63 /LF	234.47 /LF	2,504.21 /LF	1,401.48 /LF	/LF	5,656.79 /LF	3,054,664	8,907.99 /LF	4,810,312
						33.0 Pipelines	540.00 LF	1,516.63 /LF	234.47 /LF	2,504.21 /LF	1,401.48 /LF	/LF	5,656.79 /LF	3,054,664	8,907.99 /LF	4,810,312
						33.00.102 Dunnigan Pipeline, Trenchless Pipe Installation, at I-5	540.00 LF	1,516.63 /LF	234.47 /LF	2,504.21 /LF	1,401.48 /LF	/LF	5,656.79 /LF	3,054,664	8,907.99 /LF	4,810,312
		33.00.104				Dunnigan Pipeline, Trenchless Pipe Installation, at Highway 99/Rail Road Crossing										
			33.0			Pipelines										
				33.60		Trenchless Technology, Tunneling										
					33.60.01.09	Pipeline Specials, Tunneling, 126" Piping in 144" Casing										
						Grout Annular Space Between Carrier Pipe and Casing	11,660.00 cf	9.30 /cf	0.43 /cf	0.95 /cf	-	-	10.68 /cf	124,517	16.54 /cf	192,889
						Final Surface Restoration Allowance	355.55 sy				13.50 /sy		13.50 /sy	4,800	20.83 /sy	7,405
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	1,660.00 cy	2.65 /cy	2.21 /cy	-	-	-	4.85 /cy	8,057	7.49 /cy	12,429
						Jacking and Receiving Pits Shoring, SF of Pit Walls	5,600.00 sf				45.00 /sf		45.00 /sf	252,000	69.42 /sf	388,747
						Backfill Pits, Native material	680.00 cy	6.18 /cy	1.15 /cy		-	-	7.33 /cy	4,987	11.31 /cy	7,693
						Pipe bedding and zone in pits, CLSM	878.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	66,054	121.13 /cy	106,354
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	2,824.00 cy	7.24 /cy	6.00 /cy	-	-	-	13.24 /cy	37,379	20.42 /cy	57,663
						Load excavated spoils	2,824.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	-	1.80 /cy	5,077	2.77 /cy	7,832
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	680.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	1,120	2.54 /cy	1,728
						Compaction, water for, 6000 gallon wagon, 6 mile haul	680.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	1,195	2.80 /cy	1,903
						Horizontal boring, roadwork, 144" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	440.00 lf	596.42 /lf	142.23 /lf	875.00 /lf	-	-	1,613.65 /lf	710,004	2,552.73 /lf	1,123,199
						Carrier Pipe Spacers	92.00 ea	14.91 /ea	4.74 /ea	500.00 /ea			519.65 /ea	47,808	837.89 /ea	77,086
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 126" diameter	440.00 LF	596.41 /LF	28.45 /LF	1,385.00 /LF	-	-	2,009.86 /LF	884,338	3,200.92 /LF	1,408,405
						Dewatering Allowance	1.00 ls				500,000.00 /ls		500,000.00 /ls	500,000	771,324.17 /ls	771,324
						33.60.01.09 Pipeline Specials, Tunneling, 126" Piping in 144" Casing	440.00 LF	1,525.71 /LF	239.71 /LF	2,531.26 /LF	1,720.00 /LF	/LF	6,016.68 /LF	2,647,337	9,465.13 /LF	4,164,657
						33.60 Trenchless Technology, Tunneling	440.00 LF	1,525.71 /LF	239.71 /LF	2,531.26 /LF	1,720.00 /LF	/LF	6,016.68 /LF	2,647,337	9,465.13 /LF	4,164,657
						33.0 Pipelines	440.00 LF	1,525.71 /LF	239.71 /LF	2,531.26 /LF	1,720.00 /LF	/LF	6,016.68 /LF	2,647,337	9,465.13 /LF	4,164,657
						33.00.104 Dunnigan Pipeline, Trenchless Pipe Installation, at Highway 99/Rail Road Crossing	440.00 LF	1,525.71 /LF	239.71 /LF	2,531.26 /LF	1,720.00 /LF	/LF	6,016.68 /LF	2,647,337	9,465.13 /LF	4,164,657
		33.00.106				Dunnigan Pipeline, Trenchless Pipe Installation, at CBD										
			33.0			Pipelines										
				33.60		Trenchless Technology, Tunneling										
					33.60.01.09	Pipeline Specials, Tunneling, 126" Piping in 144" Casing										
						Grout Annular Space Between Carrier Pipe and Casing	22,260.00 cf	9.30 /cf	0.43 /cf	0.95 /cf	-	-	10.68 /cf	237,715	16.54 /cf	368,243
						Final Surface Restoration Allowance	355.55 sy				13.50 /sy		13.50 /sy	4,800	20.83 /sy	7,405
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	1,660.00 cy	2.65 /cy	2.21 /cy	-	-	-	4.85 /cy	8,057	7.49 /cy	12,429
						Jacking and Receiving Pits Shoring, SF of Pit Walls	5,600.00 sf				45.00 /sf		45.00 /sf	252,000	69.42 /sf	388,747
						Backfill Pits, Native material	680.00 cy	6.18 /cy	1.15 /cy		-	-	7.33 /cy	4,987	11.31 /cy	7,693
						Pipe bedding and zone in pits, CLSM	878.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	66,054	121.13 /cy	106,354
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	4,499.00 cy	7.24 /cy	6.00 /cy	-	-	-	13.24 /cy	59,550	20.42 /cy	91,864
						Load excavated spoils	4,499.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	-	1.80 /cy	8,089	2.77 /cy	12,478

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					33.60.01.09	Pipeline Specials, Tunneling, 126" Piping in 144" Casing										
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	680.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	1,120	2.54 /cy	1,728
						Compaction, water for, 6000 gallon wagon, 6 mile haul	680.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	1,195	2.80 /cy	1,903
						Horizontal boring, roadwork, 144" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	840.00 lf	596.42 /lf	142.23 /lf	875.00 /lf	-	-	1,613.65 /lf	1,355,463	2,552.73 /lf	2,144,290
						Carrier Pipe Spacers	172.00 ea	14.91 /ea	4.74 /ea	500.00 /ea	0.00 /ea	0.00 /ea	519.65 /ea	89,380	837.89 /ea	144,117
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 126" diameter	840.00 LF	596.41 /LF	28.45 /LF	1,385.00 /LF	-	-	2,009.86 /LF	1,688,282	3,200.92 /LF	2,688,773
						Dewatering Allowance	1.00 ls				500,000.00 /ls		500,000.00 /ls	500,000	771,324.18 /ls	771,324
						33.60.01.09 Pipeline Specials, Tunneling, 126" Piping in 144" Casing	840.00 LF	1,502.39 /LF	226.26 /LF	2,461.69 /LF	900.95 /LF	/LF	5,091.30 /LF	4,276,691	8,032.56 /LF	6,747,348
						33.60 Trenchless Technology, Tunneling	840.00 LF	1,502.39 /LF	226.26 /LF	2,461.69 /LF	900.95 /LF	/LF	5,091.30 /LF	4,276,691	8,032.56 /LF	6,747,348
						33.0 Pipelines	840.00 LF	1,502.39 /LF	226.26 /LF	2,461.69 /LF	900.95 /LF	/LF	5,091.30 /LF	4,276,691	8,032.56 /LF	6,747,348
						33.00.106 Dunnigan Pipeline, Trenchless Pipe Installation, at CBD	840.00 LF	1,502.39 /LF	226.26 /LF	2,461.69 /LF	900.95 /LF	/LF	5,091.30 /LF	4,276,691	8,032.56 /LF	6,747,348
						02.01 Dunnigan Pipeline - Sac River	**49,464.00 LF**	**699.41 /LF**	**284.92 /LF**	**1,674.07 /LF**	**161.73 /LF**	**/LF**	**2,820.12 /LF**	**139,494,437**	**4,471.82 /LF**	**221,194,303**
	02.02					**Dunnigan - TCC Intake Structure**										
		02.00.100				Dunnigan - TCC Intake Structure, Partial Demolition of Existing Canal Lining										
			02.0			Existing Conditions										
				02.40		Demolition										
					02.01.01.00	General Site Demolition										
						Patial Demolition of Existing Canal Lining	940.00 SF	1.79 /SF	0.37 /SF	1.06 /SF	-	-	3.22 /SF	3,025	5.04 /SF	4,739
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	30.00 cy	7.24 /cy	6.00 /cy	-	-	-	13.24 /cy	397	20.42 /cy	613
						Load excavated spoils	30.00 cy	1.03 /cy	0.77 /cy	-	-	-	1.80 /cy	54	2.77 /cy	83
						02.01.01.00 General Site Demolition	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	/SF	3.70 /SF	3,476	5.78 /SF	5,435
						02.40 Demolition	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	/SF	3.70 /SF	3,476	5.78 /SF	5,435
						02.0 Existing Conditions	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	/SF	3.70 /SF	3,476	5.78 /SF	5,435
						02.00.100 Dunnigan - TCC Intake Structure, Partial Demolition of Existing Canal Lining	940.00 SF	2.05 /SF	0.58 /SF	1.06 /SF	/SF	/SF	3.70 /SF	3,476	5.78 /SF	5,435
		03.00.100				Dunnigan - TCC Intake Structure, Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.24	Cast-In-Place Concrete, Slabs on Grade, 24" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	550.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	4,859	13.70 /sfca	7,535
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	23.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	61,060	4,053.06 /ton	96,260
						Reinforcing in place, unloading & sorting, add to above - slabs	23.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.70 /ton	1,323	85.93 /ton	2,041
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	280.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	36,680	211.58 /cy	59,244
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	271.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	7,859	44.74 /CY	12,124
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	3,524.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	3,301	1.44 /sf	5,092
						Curing, sprayed membrane curing compound	35.24 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	812	36.46 /csf	1,285
						Fine grading, fine grade for slab on grade, machine	391.56 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	734	2.89 /sy	1,132
						03.10.05.24 Cast-In-Place Concrete, Slabs on Grade, 24" thick	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	/CY	430.36 /CY	116,628	681.60 /CY	184,713
						03.18 Cast-In-Place Concrete, Slabs on Grade	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	/CY	430.36 /CY	116,628	681.60 /CY	184,713
						03.0 Concrete Work	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	/CY	430.36 /CY	116,628	681.60 /CY	184,713
						03.00.100 Dunnigan - TCC Intake Structure, Foundation Slab	271.00 CY	178.82 /CY	7.44 /CY	244.10 /CY	/CY	/CY	430.36 /CY	116,628	681.60 /CY	184,713
		03.00.102				Dunnigan - TCC Intake Structure, Concrete Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.24	Cast-In-Place Concrete, Straight Walls, 24" thick										
						C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	30.00 lf	23.48 /lf	-	2.45 /lf	-	-	25.93 /lf	778	40.18 /lf	1,205
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	7,440.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	109,647	23.13 /sfca	172,087
						Form oil, coverage varies greatly, maximum, includes material only	20.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	470	37.96 /gal	759
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	24.25 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	62,345	4,053.06 /ton	98,287
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	24.25 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	1,351	85.93 /ton	2,084
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	24.25 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	1,468	93.41 /ton	2,265
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	285.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	37,335	211.58 /cy	60,302
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	276.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	12,340	68.97 /CY	19,036
						Finishing: break ties & patch voids (walls, cols or beams)	7,440.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	7,507	1.56 /sf	11,596
						03.10.06.24 Cast-In-Place Concrete, Straight Walls, 24" thick	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	/CY	845.08 /CY	233,241	1,331.96 /CY	367,621
						03.20 Cast-In-Place Concrete, Straight Walls	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	/CY	845.08 /CY	233,241	1,331.96 /CY	367,621
						03.0 Concrete Work	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	/CY	845.08 /CY	233,241	1,331.96 /CY	367,621
						03.00.102 Dunnigan - TCC Intake Structure, Concrete Walls	276.00 CY	444.94 /CY	9.74 /CY	390.40 /CY	/CY	/CY	845.08 /CY	233,241	1,331.96 /CY	367,621
		03.00.104				Dunnigan - TCC Intake Structure, Elevated Slab										
			03.0			Concrete Work										
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.14	Cast-In-Place Concrete, Elevated Decks, 14" thick										
						Slab shoring	3,250.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	2,225	1.06 /cf	3,445
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	325.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	2,885	13.79 /sf	4,482
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	145.00 lf	5.41 /lf	-	0.22 /lf	-	-	5.63 /lf	817	8.70 /lf	1,262
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	1.25 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	3,214	4,053.07 /ton	5,066
						Reinforcing in place, unloading & sorting, add to above - decks	1.25 ton	49.21 /ton	6.50 /ton	-	-	-	55.70 /ton	70	85.93 /ton	107
						Reinforcing steel, crane cost for handling, maximum, add	1.25 ton	140.59 /ton	18.56 /ton	-	-	-	159.15 /ton	199	245.51 /ton	307
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	14.75 cy	-	-	131.00 /cy	-	-	131.00 /cy	1,932	211.59 /cy	3,121
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	14.25 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	425	45.98 /CY	655
						Finishing elev slab, bull float, manual float & manual steel trowel	325.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	401	1.90 /sf	619
						Curing, sprayed membrane curing compound, elevated decks	3.25 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	75	36.46 /csf	118
						03.10.10.14 Cast-In-Place Concrete, Elevated Decks, 14" thick	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	/CY	859.09 /CY	12,242	1,346.12 /CY	19,182
						03.24 Cast-In-Place Concrete, Elevated Slabs	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	/CY	859.09 /CY	12,242	1,346.12 /CY	19,182
						03.0 Concrete Work	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	/CY	859.09 /CY	12,242	1,346.12 /CY	19,182
						03.00.104 Dunnigan - TCC Intake Structure, Elevated Slab	14.25 CY	563.51 /CY	7.90 /CY	287.67 /CY	/CY	/CY	859.09 /CY	12,242	1,346.12 /CY	19,182
		26.00.100				Dunnigan - TCC Intake Structure, Electrical										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Electrical Allowance	1.00 LS	19,782.96 /LS	2,800.00 /LS	82,000.00 /LS	-	-	104,582.96 /LS	104,583	167,279.74 /LS	167,280
						26.00.99.00 Electrical, Other	**3,524.00** SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	/SF	29.68 /SF	104,583	47.47 /SF	167,280
						26.00 Electrical	**3,524.00** SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	/SF	29.68 /SF	104,583	47.47 /SF	167,280
						26.0 Electrical Work	**3,524.00** SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	/SF	29.68 /SF	104,583	47.47 /SF	167,280
						26.00.100 Dunnigan - TCC Intake Structure, Electrical	**3,524.00** SF	5.61 /SF	0.80 /SF	23.27 /SF	/SF	/SF	29.68 /SF	104,583	47.47 /SF	167,280
		31.00.100				Dunnigan - TCC Intake Structure, Excavation and Backfill										
			31.0			Earthwork										
				31.25		Earthworks, Structural										
					31.25.01.00	Earthworks, Structural, Excavation										
						Structural Excavation, excludes sheeting or dewatering	4,360.00 CY	2.65 /CY	2.21 /CY	-	-	-	4.85 /CY	21,161	7.49 /CY	32,644
						Stockpile Excavated Spoils	3,780.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	-	2.84 /cy	10,725	4.39 /cy	16,613

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						31.25.01.00 Earthworks, Structural, Excavation	*4,360.00 CY*	*3.72 /CY*	*3.38 /CY*	*0.22 /CY*	*/CY*	*/CY*	*7.31 /CY*	*31,885*	*11.30 /CY*	*49,257*
					31.25.02.00	*Earthworks, Structural, Import Aggregates (Slab)*										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	150.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	-	-	48.26 /CY	7,238	76.98 /CY	11,547
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	*150.00 CY*	*12.50 /CY*	*0.76 /CY*	*35.00 /CY*	*/CY*	*/CY*	*48.26 /CY*	*7,238*	*76.98 /CY*	*11,547*
					31.25.03.00	*Earthworks, Structural, Backfill*										
						Backfill, Native material	3,780.00 CY	6.18 /CY	1.15 /CY		-	-	7.33 /CY	27,723	11.31 /CY	42,766
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	2,780.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	4,578	2.54 /cy	7,063
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	1,000.00 cy	1.29 /cy	0.10 /cy	-	-	-	1.39 /cy	1,391	2.15 /cy	2,146
						Compaction, water for, 6000 gallon wagon, 6 mile haul	3,780.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	6,645	2.80 /cy	10,580
						31.25.03.00 Earthworks, Structural, Backfill	*3,780.00 CY*	*7.48 /CY*	*1.99 /CY*	*1.20 /CY*	*/CY*	*/CY*	*10.67 /CY*	*40,337*	*16.55 /CY*	*62,555*
					31.25.05.00	*Earthworks, Structural, Hauling and Disposal*										
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	580.00 CY	7.24 /CY	6.00 /CY	-	-	-	13.24 /CY	7,677	20.42 /CY	11,843
						Load excavated spoils	580.00 cy	1.03 /cy	0.77 /cy		-	-	1.80 /cy	1,043	2.77 /cy	1,609
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	*580.00 CY*	*8.27 /CY*	*6.77 /CY*	*/CY*	*/CY*	*/CY*	*15.03 /CY*	*8,720*	*23.19 /CY*	*13,452*
						31.25 Earthworks, Structural	*8,870.00 CY*	*5.77 /CY*	*2.96 /CY*	*1.21 /CY*	*/CY*	*/CY*	*9.94 /CY*	*88,181*	*15.42 /CY*	*136,810*
						31.0 Earthwork	*8,870.00 CY*	*5.77 /CY*	*2.96 /CY*	*1.21 /CY*	*/CY*	*/CY*	*9.94 /CY*	*88,181*	*15.42 /CY*	*136,810*
						31.00.100 Dunnigan - TCC Intake Structure, Excavation and Backfill	*8,870.00 CY*	*5.77 /CY*	*2.96 /CY*	*1.21 /CY*	*/CY*	*/CY*	*9.94 /CY*	*88,181*	*15.42 /CY*	*136,810*
		40.00.100				*Dunnigan - TCC Intake Structure, Water Control Gates*										
			46.0			*Water and Wastewater Equipment*										
				40.55		*Water Control Gates, Other Gates*										
					40.30.06.01	*Other Gates*										
						Furnish and Install Water Control Gates	2.00 EA	3,605.56 /EA	1,453.15 /EA	25,000.00 /EA	-	-	30,058.71 /EA	60,117	48,182.50 /EA	96,365
						40.30.06.01 Other Gates	*2.00 EA*	*3,605.56 /EA*	*1,453.15 /EA*	*25,000.00 /EA*	*/EA*	*/EA*	*30,058.71 /EA*	*60,117*	*48,182.50 /EA*	*96,365*
						40.55 Water Control Gates, Other Gates	*2.00 EA*	*3,605.56 /EA*	*1,453.15 /EA*	*25,000.00 /EA*	*/EA*	*/EA*	*30,058.71 /EA*	*60,117*	*48,182.50 /EA*	*96,365*
						46.0 Water and Wastewater Equipment	*2.00 EA*	*3,605.56 /EA*	*1,453.15 /EA*	*25,000.00 /EA*	*/EA*	*/EA*	*30,058.71 /EA*	*60,117*	*48,182.50 /EA*	*96,365*
						40.00.100 Dunnigan - TCC Intake Structure, Water Control Gates	*2.00 EA*	*3,605.56 /EA*	*1,453.15 /EA*	*25,000.00 /EA*	*/EA*	*/EA*	*30,058.71 /EA*	*60,117*	*48,182.50 /EA*	*96,365*
		40.90.100				*Dunnigan - TCC Intake Structure, I&C*										
			40.9			*Instrumentation & Controls*										
				40.90		*Instrumentation & Controls*										
					40.90.99.01	*I&C, Other*										
						I&C Allowance	1.00 LS	6,594.32 /LS	1,400.00 /LS	40,000.00 /LS	-	-	47,994.32 /LS	47,994	76,938.37 /LS	76,938
						40.90.99.01 I&C, Other	***3,524.00** SF*	*1.87 /SF*	*0.40 /SF*	*11.35 /SF*	*/SF*	*/SF*	*13.62 /SF*	*47,994*	*21.83 /SF*	*76,938*
						40.90 Instrumentation & Controls	***3,524.00** SF*	*1.87 /SF*	*0.40 /SF*	*11.35 /SF*	*/SF*	*/SF*	*13.62 /SF*	*47,994*	*21.83 /SF*	*76,938*
						40.9 Instrumentation & Controls	***3,524.00** SF*	*1.87 /SF*	*0.40 /SF*	*11.35 /SF*	*/SF*	*/SF*	*13.62 /SF*	*47,994*	*21.83 /SF*	*76,938*
						40.90.100 Dunnigan - TCC Intake Structure, I&C	***3,524.00** SF*	*1.87 /SF*	*0.40 /SF*	*11.35 /SF*	*/SF*	*/SF*	*13.62 /SF*	*47,994*	*21.83 /SF*	*76,938*
						02.02 Dunnigan - TCC Intake Structure	***3,524.00** SF*	**75.48 /SF**	**10.99 /SF**	**102.65 /SF**	**/SF**	**/SF**	**189.12 /SF**	**666,463**	**299.19 /SF**	**1,054,344**
	02.03					**Dunnigan - CBD Discharge Structure**										
		01.00.200				*Dunnigan - CBD Discharge Structure, Removal and Control of Water*										
			01.0			*General Requirements*										
				01.01		*Construction Operations*										
					31.15.02.00	*Dewatering*										
						CBD Discharge Structure, Removal and Control of Water	2.00 MO		-		45,000.00 /MO	-	45,000.00 /MO	90,000	69,419.18 /MO	138,838
						31.15.02.00 Dewatering	*2.00 MO*	*/MO*	*/MO*	*/MO*	*45,000.00 /MO*	*/MO*	*45,000.00 /MO*	*90,000*	*69,419.18 /MO*	*138,838*
						01.01 Construction Operations	*2.00 MO*	*/MO*	*/MO*	*/MO*	*45,000.00 /MO*	*/MO*	*45,000.00 /MO*	*90,000*	*69,419.18 /MO*	*138,838*
						01.0 General Requirements	*2.00 MO*	*/MO*	*/MO*	*/MO*	*45,000.00 /MO*	*/MO*	*45,000.00 /MO*	*90,000*	*69,419.18 /MO*	*138,838*
						01.00.200 Dunnigan - CBD Discharge Structure, Removal and Control of Water	*2.00 MO*	*/MO*	*/MO*	*/MO*	*45,000.00 /MO*	*/MO*	*45,000.00 /MO*	*90,000*	*69,419.18 /MO*	*138,838*
		02.00.200				*Dunnigan - CBD Discharge Structure, Partial Demolition of Existing Canal Lining*										
			02.0			*Existing Conditions*										
				02.40		*Demolition*										
					02.01.01.00	*General Site Demolition*										
						Partial Demolition of Existing Canal Lining	770.00 SF	1.38 /SF	0.28 /SF	0.97 /SF	-	-	2.64 /SF	2,030	4.14 /SF	3,186
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	24.00 cy	7.24 /cy	6.00 /cy	-	-	-	13.24 /cy	318	20.42 /cy	490
						Load excavated spoils	24.00 cy	1.03 /cy	0.77 /cy		-	-	1.80 /cy	43	2.77 /cy	67
						02.01.01.00 General Site Demolition	*770.00 SF*	*1.64 /SF*	*0.49 /SF*	*0.97 /SF*	*/SF*	*/SF*	*3.11 /SF*	*2,391*	*4.86 /SF*	*3,743*
						02.40 Demolition	*770.00 SF*	*1.64 /SF*	*0.49 /SF*	*0.97 /SF*	*/SF*	*/SF*	*3.11 /SF*	*2,391*	*4.86 /SF*	*3,743*
						02.0 Existing Conditions	*770.00 SF*	*1.64 /SF*	*0.49 /SF*	*0.97 /SF*	*/SF*	*/SF*	*3.11 /SF*	*2,391*	*4.86 /SF*	*3,743*
						02.00.200 Dunnigan - CBD Discharge Structure, Partial Demolition of Existing Canal Lining	*770.00 SF*	*1.64 /SF*	*0.49 /SF*	*0.97 /SF*	*/SF*	*/SF*	*3.11 /SF*	*2,391*	*4.86 /SF*	*3,743*
		03.00.106				*Dunnigan - CBD Discharge Structure, Foundation Slab*										
			03.0			*Concrete Work*										
				03.18		*Cast-In-Place Concrete, Slabs on Grade*										
					03.10.05.36	*Cast-In-Place Concrete, Slabs on Grade, 36" thick*										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	972.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	8,588	13.70 /sfca	13,317
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	30.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	77,128	4,053.06 /ton	121,592
						Reinforcing in place, unloading & sorting, add to above - slabs	30.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	1,671	85.93 /ton	2,578
						Struct concrete,ready mix,normal wt,4500 osi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	348.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	45,588	211.58 /cy	73,631
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	338.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	9,802	44.74 /CY	15,121
						Cfnsh,firs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,765.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	2,590	1.44 /sf	3,995
						Curing, sprayed membrane curing compound	27.65 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	637	36.46 /csf	1,008
						Fine grading, fine grade for slab on grade, machine	307.22 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	576	2.89 /sy	888
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	*338.00 CY*	*181.52 /CY*	*6.96 /CY*	*245.19 /CY*	*/CY*	*/CY*	*433.67 /CY*	*146,581*	*686.78 /CY*	*232,131*
						03.18 Cast-In-Place Concrete, Slabs on Grade	*338.00 CY*	*181.52 /CY*	*6.96 /CY*	*245.19 /CY*	*/CY*	*/CY*	*433.67 /CY*	*146,581*	*686.78 /CY*	*232,131*
						03.0 Concrete Work	*338.00 CY*	*181.52 /CY*	*6.96 /CY*	*245.19 /CY*	*/CY*	*/CY*	*433.67 /CY*	*146,581*	*686.78 /CY*	*232,131*
						03.00.106 Dunnigan - CBD Discharge Structure, Foundation Slab	*338.00 CY*	*181.52 /CY*	*6.96 /CY*	*245.19 /CY*	*/CY*	*/CY*	*433.67 /CY*	*146,581*	*686.78 /CY*	*232,131*
		03.00.108				*Dunnigan - CBD Discharge Structure, Concrete Walls*										
			03.0			*Concrete Work*										
				03.20		*Cast-In-Place Concrete, Straight Walls*										
					03.10.06.24	*Cast-In-Place Concrete, Straight Walls, 24" thick*										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	8,206.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	120,936	23.13 /sfca	189,805
						Form oil, coverage varies greatly, maximum, includes material only	22.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	517	37.96 /gal	835
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	26.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	68,773	4,053.06 /ton	108,419
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	26.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	1,490	85.93 /ton	2,299
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	26.75 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	1,620	93.41 /ton	2,499
						Struct concrete,ready mix,normal wt,4500 osi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	314.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	41,134	211.58 /cy	66,438
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	304.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	13,592	68.97 /CY	20,967
						Finishing: break ties & patch voids (walls, cols or beams)	8,206.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	8,280	1.56 /sf	12,790
						03.10.06.24 Cast-In-Place Concrete, Straight Walls, 24" thick	*304.00 CY*	*442.96 /CY*	*9.74 /CY*	*390.53 /CY*	*/CY*	*/CY*	*843.23 /CY*	*256,341*	*1,329.12 /CY*	*404,052*
					03.10.06.91	*Cast-In-Place Concrete, Straight Walls, 5" thick*										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	286.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	4,215	23.13 /sfca	6,615
						Form oil, coverage varies greatly, maximum, includes material only	0.80 gal	-	-	23.50 /gal	-	-	23.50 /gal	19	37.96 /gal	30
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	2.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	6,427	4,053.06 /ton	10,133
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	2.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.70 /ton	139	85.93 /ton	215
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	2.50 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	151	93.40 /ton	234

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.06.91	Cast-In-Place Concrete, Straight Walls, 5' thick										
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	28.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	3,668	211.59 /cy	5,924
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	27.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	1,207	68.97 /CY	1,862
						Finishing; break ties & patch voids (walls, cols or beams)	286.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	289	1.56 /sf	446
						03.10.06.91 Cast-In-Place Concrete, Straight Walls, 5' thick	27.00 CY	281.36 /CY	9.81 /CY	305.71 /CY	/CY	/CY	596.87 /CY	16,115	942.92 /CY	25,459
						03.20 Cast-In-Place Concrete, Straight Walls	331.00 CY	429.78 /CY	9.75 /CY	383.61 /CY	/CY	/CY	823.13 /CY	272,457	1,297.61 /CY	429,510
						03.0 Concrete Work	331.00 CY	429.78 /CY	9.75 /CY	383.61 /CY	/CY	/CY	823.13 /CY	272,457	1,297.61 /CY	429,510
						03.00.108 Dunnigan - CBD Discharge Structure, Concrete Walls	331.00 CY	429.78 /CY	9.75 /CY	383.61 /CY	/CY	/CY	823.13 /CY	272,457	1,297.61 /CY	429,510
		03.00.110				Dunnigan - CBD Discharge Structure, Concrete Coverging Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.99	Cast-In-Place Concrete, Straight Walls, Other										
						Concrete surface treatment, bonding agent, epoxy resin, 80 S.F. per gallon, 4 gallon case, includes material only	5.25 gal	-	-	69.00 /gal	-	-	69.00 /gal	362	111.45 /gal	585
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	420.00 sfca	9.34 /sfca	-	5.45 /sfca	-	-	14.79 /sfca	6,210	23.20 /sfca	9,746
						Form oil, coverage varies greatly, maximum, includes material only	1.20 gal	-	-	23.50 /gal	-	-	23.50 /gal	28	37.95 /gal	46
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	2.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	6,427	4,053.06 /ton	10,133
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	2.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.70 /ton	139	85.94 /ton	215
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	2.50 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	151	93.40 /ton	234
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	28.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	3,668	211.58 /cy	5,924
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	27.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	1,207	68.97 /CY	1,862
						Finishing; break ties & patch voids (walls, cols or beams)	420.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	424	1.56 /sf	655
						03.10.06.99 Cast-In-Place Concrete, Straight Walls, Other	27.00 CY	333.06 /CY	9.81 /CY	346.67 /CY	/CY	/CY	689.53 /CY	18,617	1,088.84 /CY	29,399
						03.20 Cast-In-Place Concrete, Straight Walls	27.00 CY	333.06 /CY	9.81 /CY	346.67 /CY	/CY	/CY	689.53 /CY	18,617	1,088.84 /CY	29,399
						03.0 Concrete Work	27.00 CY	333.06 /CY	9.81 /CY	346.67 /CY	/CY	/CY	689.53 /CY	18,617	1,088.84 /CY	29,399
						03.00.110 Dunnigan - CBD Discharge Structure, Concrete Coverging Walls	27.00 CY	333.06 /CY	9.81 /CY	346.67 /CY	/CY	/CY	689.53 /CY	18,617	1,088.84 /CY	29,399
		31.00.102				Dunnigan - CBD Discharge Structure, Excavation and Backfill										
			31.0			Earthwork										
				31.25		Earthworks, Structural										
					31.25.01.00	Earthworks, Structural, Excavation										
						Structural Excavation, excludes sheeting or dewatering	5,400.00 CY	2.65 /CY	2.21 /CY	-	-	-	4.85 /CY	26,208	7.49 /CY	40,430
						Stockpile Excavated Spoils	5,400.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	-	2.84 /cy	15,321	4.39 /cy	23,732
						31.25.01.00 Earthworks, Structural, Excavation	5,400.00 CY	3.89 /CY	3.56 /CY	0.25 /CY	/CY	/CY	7.69 /CY	41,529	11.88 /CY	64,163
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	118.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	-	-	48.26 /CY	5,694	76.98 /CY	9,083
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	118.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	/CY	/CY	48.26 /CY	5,694	76.98 /CY	9,083
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	4,670.00 CY	6.18 /CY	1.15 /CY	0.00 /CY	-	-	7.33 /CY	34,250	11.31 /CY	52,836
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	3,730.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	6,143	2.54 /cy	9,476
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	940.00 cy	1.29 /cy	0.10 /cy	-	-	-	1.39 /cy	1,307	2.15 /cy	2,017
						Compaction, water for, 6000 gallon wagon, 6 mile haul	4,670.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	8,210	2.80 /cy	13,071
						31.25.03.00 Earthworks, Structural, Backfill	4,670.00 CY	7.45 /CY	2.03 /CY	1.20 /CY	/CY	/CY	10.69 /CY	49,910	16.57 /CY	77,400
					31.25.05.00	Earthworks, Structural, Hauling and Disposal										
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	730.00 CY	7.24 /CY	6.00 /CY	-	-	-	13.24 /CY	9,662	20.42 /CY	14,906
						Load excavated spoils	730.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	-	1.80 /cy	1,312	2.77 /cy	2,025
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	730.00 CY	8.27 /CY	6.77 /CY	/CY	/CY	/CY	15.03 /CY	10,975	23.19 /CY	16,930
						31.25 Earthworks, Structural	10,918.00 CY	5.80 /CY	3.09 /CY	1.02 /CY	/CY	/CY	9.90 /CY	108,108	15.35 /CY	167,577
						31.0 Earthwork	10,918.00 CY	5.80 /CY	3.09 /CY	1.02 /CY	/CY	/CY	9.90 /CY	108,108	15.35 /CY	167,577
						31.00.102 Dunnigan - CBD Discharge Structure, Excavation and Backfill	10,918.00 CY	5.80 /CY	3.09 /CY	1.02 /CY	/CY	/CY	9.90 /CY	108,108	15.35 /CY	167,577
		33.00.108				Dunnigan - CBD Discharge Structure, CBD Pipeline Connection										
			33.2			Pipeline Specialties										
				33.01		Pipeline Specialties										
					33.10.99.01	Buried Pipe Specials, Other										
						Elbow, 45 deg, steel, butt weld, 36' Dia	1.00 ea	5,757.16 /ea	171.37 /ea	3,425.00 /ea	-	-	9,353.53 /ea	9,354	14,677.51 /ea	14,678
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	1,570.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	6,926	6.81 /cy	10,685
						Pipe bedding and zone, CLSM	7.00 cy	4.52 /cy	0.71 /cy	35.00 /cy	-	-	40.23 /cy	282	64.60 /cy	452
						Backfill native material	1,570.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	12,358	12.14 /cy	19,064
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	1,570.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	3,188	3.13 /cy	4,918
						Compaction, water for, 6000 gallon wagon, 6 mile haul	1,570.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	2,910	2.95 /cy	4,626
						Piping, pipe, WSP, plain end, welded, 36" diameter, excludes excavation or backfill	20.00 LF	174.60 /LF	76.19 /LF	305.00 /LF	-	-	555.79 /LF	11,116	879.50 /LF	17,590
						Outlet Connection from 126" Dia Pipeline	1.00 ls	2,500.91 /ls	280.00 /ls	5,000.00 /ls	-	-	7,780.91 /ls	7,781	12,365.71 /ls	12,366
						Erosion Controls Allowance	40.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	0.00 /lf	55.00 /lf	2,200	84.85 /lf	3,394
						Dewatering Allowance	0.20 msf	0.00 /msf	0.00 /msf	0.00 /msf	9,000.00 /msf	0.00 /msf	9,000.00 /msf	1,800	13,883.95 /msf	2,777
						33.10.99.01 Buried Pipe Specials, Other	20.00 LF	1,322.81 /LF	540.23 /LF	832.70 /LF	200.00 /LF	/LF	2,895.73 /LF	57,915	4,527.47 /LF	90,549
						33.01 Pipeline Specialties	**1.00** LS	26,456.12 /LS	10,804.54 /LS	16,654.00 /LS	4,000.00 /LS	/LS	57,914.66 /LS	57,915	90,549.37 /LS	90,549
						33.2 Pipeline Specialties	**1.00** LS	26,456.12 /LS	10,804.54 /LS	16,654.00 /LS	4,000.00 /LS	/LS	57,914.66 /LS	57,915	90,549.37 /LS	90,549
						33.00.108 Dunnigan - CBD Discharge Structure, CBD Pipeline Connection	20.00 LF	1,322.81 /LF	540.23 /LF	832.70 /LF	200.00 /LF	/LF	2,895.73 /LF	57,915	4,527.47 /LF	90,549
		33.00.110				Dunnigan - CBD Discharge Structure, Above Grade Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.36	Process Pipe, Carbon Steel, 36"										
						Elbow, 45 deg, steel, butt weld, 36' Dia	2.00 ea	5,757.16 /ea	171.37 /ea	3,425.00 /ea	-	-	9,353.53 /ea	18,707	14,677.52 /ea	29,355
						Piping, pipe, WSP, plain end, welded, 36" diameter, excludes excavation or backfill	55.00 LF	174.60 /LF	76.19 /LF	305.00 /LF	-	-	555.79 /LF	30,568	879.50 /LF	48,373
						Isolation Valves	1.00 ea	1,458.48 /ea	1,040.00 /ea	16,000.00 /ea	-	-	18,498.48 /ea	18,498	29,696.63 /ea	29,697
						Energy Dissipating Valves W/ Hood	1.00 ea	1,458.48 /ea	1,040.00 /ea	14,000.00 /ea	-	-	16,498.48 /ea	16,498	26,466.36 /ea	26,466
						40.10.02.36 Process Pipe, Carbon Steel, 36"	55.00 LF	436.99 /LF	120.24 /LF	975.00 /LF	/LF	/LF	1,532.23 /LF	84,273	2,434.38 /LF	133,891
						40.11 Process Pipe, Carbon Steel	55.00 LF	436.99 /LF	120.24 /LF	975.00 /LF	/LF	/LF	1,532.23 /LF	84,273	2,434.38 /LF	133,891
						40.0 Process Pipe	55.00 LF	436.99 /LF	120.24 /LF	975.00 /LF	/LF	/LF	1,532.23 /LF	84,273	2,434.38 /LF	133,891
						33.00.110 Dunnigan - CBD Discharge Structure, Above Grade Piping	55.00 LF	436.99 /LF	120.24 /LF	975.00 /LF	/LF	/LF	1,532.23 /LF	84,273	2,434.38 /LF	133,891
						02.03 Dunnigan - CBD Discharge Structure	**2,765.00** SF	118.50 /SF	20.75 /SF	108.98 /SF	34.00 /SF	/SF	282.22 /SF	780,341	443.27 /SF	1,225,638
	02.04					**Dunnigan - Sac River Discharge Structure**										
		01.00.202				Dunnigan - Sac River Discharge Structure, Removal and Control of Water										
			01.0			General Requirements										
				01.01		Construction Operations										
					31.15.02.00	Dewatering										
						CBD Discharge Structure, Removal and Control of Water	3.00 MO		-		45,000.00 /MO	-	45,000.00 /MO	135,000	69,419.18 /MO	208,258
						31.15.02.00 Dewatering	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	/MO	45,000.00 /MO	135,000	69,419.18 /MO	208,258
						01.01 Construction Operations	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	/MO	45,000.00 /MO	135,000	69,419.18 /MO	208,258
						01.0 General Requirements	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	/MO	45,000.00 /MO	135,000	69,419.18 /MO	208,258
						01.00.202 Dunnigan - Sac River Discharge Structure, Removal and Control of Water	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	/MO	45,000.00 /MO	135,000	69,419.18 /MO	208,258
		03.00.112				Dunnigan - Sac River Discharge Structure, Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.48	Cast-In-Place Concrete, Slabs on Grade, 48" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,336.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	11,804	13.70 /sfca	18,303

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.05.48	Cast-In-Place Concrete, Slabs on Grade, 48" thick										
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	44.54 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	114,510	4,053.06 /ton	180,523
						Reinforcing in place, unloading & sorting, add to above - slabs	44.54 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,481	85.93 /ton	3,827
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	44.54 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,481	85.93 /ton	3,827
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	525.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	68,775	211.58 /cy	111,082
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	509.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	14,761	44.74 /CY	22,772
						Clnsh,firs,for spcf rndm accs firs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn fltkstl trwl (wlk-bhn),excl plcn,strkn	3,432.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	3,215	1.44 /sf	4,959
						Curing, sprayed membrane curing compound	34.32 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	791	36.46 /csf	1,251
						Fine grading, fine grade for slab on grade, machine	381.33 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	715	2.89 /sy	1,103
						03.10.05.48 Cast-In-Place Concrete, Slabs on Grade, 48" thick	509.00 CY	180.42 /CY	7.37 /CY	243.51 /CY	/CY	/CY	431.30 /CY	219,533	683.00 /CY	347,648
						03.18 Cast-In-Place Concrete, Slabs on Grade	509.00 CY	180.42 /CY	7.37 /CY	243.51 /CY	/CY	/CY	431.30 /CY	219,533	683.00 /CY	347,648
						03.0 Concrete Work	509.00 CY	180.42 /CY	7.37 /CY	243.51 /CY	/CY	/CY	431.30 /CY	219,533	683.00 /CY	347,648
						03.00.112 Dunnigan - Sac River Discharge Structure, Foundation Slab	509.00 CY	180.42 /CY	7.37 /CY	243.51 /CY	/CY	/CY	431.30 /CY	219,533	683.00 /CY	347,648
		03.00.114				Dunnigan - Sac River Discharge Structure, Concrete Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.48	Cast-In-Place Concrete, Straight Walls, 48" thick										
						C.I.P. concrete forms, wall, box out for opening, includes erecting, bracing, stripping and cleaning	581.00 lf	27.09 /lf	-	2.45 /lf	-	-	29.54 /lf	17,163	45.75 /lf	26,579
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	22,344.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	329,296	23.13 /sfca	516,816
						Form oil, coverage varies greatly, maximum, includes material only	59.60 gal	-	-	23.50 /gal	-	-	23.50 /gal	1,401	37.96 /gal	2,262
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	142.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	365,074	4,053.06 /ton	575,535
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	142.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	7,910	85.93 /ton	12,202
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	142.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	8,598	93.41 /ton	13,264
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	1,670.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	218,770	211.58 /cy	353,346
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	1,622.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	72,519	68.97 /CY	111,871
						Finishing: break ties & patch voids (walls, cols or beams)	21,888.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	22,084	1.56 /sf	34,116
						03.10.06.48 Cast-In-Place Concrete, Straight Walls, 48" thick	1,622.00 CY	316.03 /CY	9.74 /CY	317.16 /CY	/CY	/CY	642.92 /CY	1,042,814	1,014.79 /CY	1,645,991
						03.20 Cast-In-Place Concrete, Straight Walls	1,622.00 CY	316.03 /CY	9.74 /CY	317.16 /CY	/CY	/CY	642.92 /CY	1,042,814	1,014.79 /CY	1,645,991
						03.0 Concrete Work	1,622.00 CY	316.03 /CY	9.74 /CY	317.16 /CY	/CY	/CY	642.92 /CY	1,042,814	1,014.79 /CY	1,645,991
						03.00.114 Dunnigan - Sac River Discharge Structure, Concrete Walls	1,622.00 CY	316.03 /CY	9.74 /CY	317.16 /CY	/CY	/CY	642.92 /CY	1,042,814	1,014.79 /CY	1,645,991
		03.00.116				Dunnigan - Sac River Discharge Structure, Discharge Pipes Support Wall										
			03.0			Concrete Work										
				03.13		Cast-In-Place Concrete, Continuous Footings										
					03.10.02.24	Cast-In-Place Concrete, Continuous Footings, 24" thick										
						C.I.P. concrete forms, footing, keyway, tapered wood, 2" x 6", 4 use, includes erecting, bracing, stripping and cleaning	124.00 lf	9.08 /lf	-	0.34 /lf	-	-	9.42 /lf	1,168	14.56 /lf	1,806
						Reinforcing Steel, in place, footings, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.90 ton	1,094.90 /ton	-	1,125.00 /ton	-	-	2,219.90 /ton	10,878	3,506.09 /ton	17,180
						Reinforcing steel, unload and sort, add to base	4.90 ton	40.02 /ton	6.50 /ton	-	-	-	46.51 /ton	228	71.75 /ton	352
						Reinforcing steel, crane cost for handling, average, add	4.90 ton	43.50 /ton	7.06 /ton	-	-	-	50.56 /ton	248	77.99 /ton	382
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	58.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	7,598	211.58 /cy	12,272
						Structural concrete, placing, continuous footing, deep, pumped, includes strike off & consolidation, excludes material	56.00 CY	23.33 /CY	6.41 /CY	-	-	-	29.74 /CY	1,666	45.88 /CY	2,569
						03.10.02.24 Cast-In-Place Concrete, Continuous Footings, 24" thick	56.00 CY	146.55 /CY	7.60 /CY	234.87 /CY	/CY	/CY	389.02 /CY	21,785	617.15 /CY	34,560
						03.13 Cast-In-Place Concrete, Continuous Footings	56.00 CY	146.55 /CY	7.60 /CY	234.87 /CY	/CY	/CY	389.02 /CY	21,785	617.15 /CY	34,560
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick										
						C.I.P. concrete forms, wall, box out for opening, includes erecting, bracing, stripping and cleaning	189.00 lf	49.60 /lf	-	2.45 /lf	-	-	52.05 /lf	9,838	80.47 /lf	15,210
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	3,596.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	52,996	23.13 /sfca	83,175
						Form oil, coverage varies greatly, maximum, includes material only	9.60 gal	-	-	23.50 /gal	-	-	23.50 /gal	226	37.96 /gal	364
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.40 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	21,596	4,053.06 /ton	34,046
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	8.40 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	468	85.94 /ton	722
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	8.40 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	509	93.40 /ton	785
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	99.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	12,969	211.58 /cy	20,947
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	96.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	4,292	68.97 /CY	6,621
						Finishing: break ties & patch voids (walls, cols or beams)	3,454.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	3,485	1.56 /sf	5,384
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	96.00 CY	645.87 /CY	9.74 /CY	452.49 /CY	/CY	/CY	1,108.11 /CY	106,378	1,742.22 /CY	167,253
						03.20 Cast-In-Place Concrete, Straight Walls	96.00 CY	645.87 /CY	9.74 /CY	452.49 /CY	/CY	/CY	1,108.11 /CY	106,378	1,742.22 /CY	167,253
						03.0 Concrete Work	152.00 CY	461.91 /CY	8.95 /CY	372.32 /CY	/CY	/CY	843.18 /CY	128,163	1,327.72 /CY	201,814
						03.00.116 Dunnigan - Sac River Discharge Structure, Discharge Pipes Support Wall	152.00 CY	461.91 /CY	8.95 /CY	372.32 /CY	/CY	/CY	843.18 /CY	128,163	1,327.72 /CY	201,814
		03.00.118				Dunnigan - Sac River Discharge Structure, Stilling Basin and Apron										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.00.18	Concrete, Cast-in-Place, Grade Walls, 18" Wide										
						Reinforcing Steel, in place, footings, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.30 ton	1,149.65 /ton	-	1,200.00 /ton	-	-	2,349.65 /ton	10,103	3,711.69 /ton	15,960
						Reinforcing steel, unload and sort, add to base	4.30 ton	40.02 /ton	6.50 /ton	-	-	-	46.51 /ton	200	71.75 /ton	309
						Reinforcing steel, crane cost for handling, average, add	4.30 ton	43.50 /ton	7.06 /ton	-	-	-	50.56 /ton	217	77.99 /ton	335
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	51.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	6,681	211.58 /cy	10,791
						Structural concrete, placing, continuous footing, deep, pumped, includes strike off & consolidation, excludes material	49.00 CY	23.33 /CY	6.41 /CY	-	-	-	29.74 /CY	1,457	45.88 /CY	2,248
						Excavating, trench or continuous footing, common earth, 1/2 C.Y. excavator, 4' to 6' deep, excludes sheeting or dewatering	49.00 bcy	5.06 /bcy	2.12 /bcy	-	-	-	7.17 /bcy	352	11.07 /bcy	542
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	49.00 lcy	6.50 /lcy	8.80 /lcy	-	-	-	15.30 /lcy	750	23.60 /lcy	1,156
						03.10.00.18 Concrete, Cast-in-Place, Grade Walls, 18" Wide	49.00 CY	143.10 /CY	18.52 /CY	241.65 /CY	/CY	/CY	403.28 /CY	19,760	639.63 /CY	31,342
					03.10.02.24	Cast-In-Place Concrete, Continuous Footings, 24" thick										
						C.I.P. concrete forms, footing, keyway, tapered wood, 2" x 6", 4 use, includes erecting, bracing, stripping and cleaning	130.00 lf	9.08 /lf	-	0.34 /lf	-	-	9.42 /lf	1,225	14.56 /lf	1,893
						Reinforcing Steel, in place, footings, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	5.10 ton	1,094.90 /ton	-	1,125.00 /ton	-	-	2,219.90 /ton	11,322	3,506.09 /ton	17,881
						Reinforcing steel, unload and sort, add to base	5.10 ton	40.02 /ton	6.50 /ton	-	-	-	46.51 /ton	237	71.75 /ton	366
						Reinforcing steel, crane cost for handling, average, add	5.10 ton	43.50 /ton	7.06 /ton	-	-	-	50.56 /ton	258	77.99 /ton	398
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	60.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	7,860	211.58 /cy	12,695
						Structural concrete, placing, continuous footing, deep, pumped, includes strike off & consolidation, excludes material	58.00 CY	23.33 /CY	6.41 /CY	-	-	-	29.74 /CY	1,725	45.88 /CY	2,661
						03.10.02.24 Cast-In-Place Concrete, Continuous Footings, 24" thick	58.00 CY	147.31 /CY	7.61 /CY	235.20 /CY	/CY	/CY	390.11 /CY	22,627	618.86 /CY	35,894
					03.10.05.12	Cast-In-Place Concrete, Slabs on Grade, 12" thick										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.05.12	Cast-In-Place Concrete, Slabs on Grade, 12" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	298.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	2,633	13.70 /sfca	4,083
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	34.92 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	89,777	4,053.06 /ton	141,533
						Reinforcing in place, unloading & sorting, add to above - slabs	34.92 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	1,945	85.93 /ton	3,001
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	34.92 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	1,945	85.93 /ton	3,001
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	411.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	53,841	211.58 /cy	86,961
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	399.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	11,571	44.74 /CY	17,850
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	10,757.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	10,076	1.44 /sf	15,543
						Curing, sprayed membrane curing compound	107.57 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	2,479	36.46 /csf	3,922
						Fine grading, fine grade for slab on grade, machine	1,195.22 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	2,240	2.89 /sy	3,456
						03.10.05.12 Cast-In-Place Concrete, Slabs on Grade, 12" thick	399.00 CY	188.90 /CY	9.44 /CY	244.04 /CY	/CY	/CY	442.38 /CY	176,508	700.12 /CY	279,350
						03.18 Cast-In-Place Concrete, Slabs on Grade	506.00 CY	179.70 /CY	10.11 /CY	242.80 /CY	/CY	/CY	432.60 /CY	218,895	684.95 /CY	346,585
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.12	Cast-In-Place Concrete, Straight Walls, 12" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	2,606.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	38,406	23.13 /sfca	60,277
						Form oil, coverage varies greatly, maximum, includes material only	7.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	165	37.95 /gal	266
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	11,569	4,053.06 /ton	18,239
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	4.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.70 /ton	251	85.93 /ton	387
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	51.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	6,681	211.58 /cy	10,791
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	49.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	2,191	68.97 /CY	3,380
						Finishing: break ties & patch voids (walls, cols or beams)	2,606.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	2,629	1.56 /sf	4,062
						03.10.06.12 Cast-In-Place Concrete, Straight Walls, 12" thick	49.00 CY	712.59 /CY	9.15 /CY	541.36 /CY	/CY	/CY	1,263.09 /CY	61,892	1,987.76 /CY	97,400
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	2,340.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	34,486	23.13 /sfca	54,124
						Form oil, coverage varies greatly, maximum, includes material only	6.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	147	37.96 /gal	237
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	5.70 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	14,654	4,053.06 /ton	23,102
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	5.70 ton	49.21 /ton	6.50 /ton	-	-	-	55.70 /ton	318	85.93 /ton	490
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	5.70 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	345	93.40 /ton	532
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	67.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	8,777	211.58 /cy	14,176
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	65.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	2,906	68.97 /CY	4,483
						Finishing: break ties & patch voids (walls, cols or beams)	2,340.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	2,361	1.56 /sf	3,647
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	65.00 CY	534.98 /CY	9.74 /CY	439.80 /CY	/CY	/CY	984.52 /CY	63,994	1,550.66 /CY	100,793
						03.20 Cast-In-Place Concrete, Straight Walls	114.00 CY	611.32 /CY	9.49 /CY	483.45 /CY	/CY	/CY	1,104.26 /CY	125,885	1,738.53 /CY	198,193
						03.0 Concrete Work	620.00 CY	259.06 /CY	9.99 /CY	287.05 /CY	/CY	/CY	556.10 /CY	344,781	878.67 /CY	544,778
						03.00.118 Dunnigan - Sac River Discharge Structure, Stilling Basin and Apron	620.00 CY	259.06 /CY	9.99 /CY	287.05 /CY	/CY	/CY	556.10 /CY	344,781	878.67 /CY	544,778
		05.00.004				Dunnigan - Sac River Discharge Structure, Metal Grating										
			05.0			Metals										
				05.00		Metals										
					05.50.05.00	Metals, Gratings										
						Grating frame, aluminum, 1" to 1-1/2" D, field fabricated	282.00 lf	8.93 /lf	-	3.82 /lf	-	-	12.75 /lf	3,595	19.94 /lf	5,624
						Grating frame, aluminum, 1" to 1-1/2" D, field fabricated, for each corner, add	4.00 ea	-	-	5.70 /ea	-	-	5.70 /ea	23	9.21 /ea	37
						Floor grating, steel, galv, 2-1/4" x 3/16" bearing bars @ 1-3/16" O.C., cross bars @ 2" O.C., over 300 S.F., field fabricated from panels	1,310.00 SF	9.45 /SF	4.12 /SF	26.00 /SF	-	-	39.58 /SF	51,845	62.94 /SF	82,447
						05.50.05.00 Metals, Gratings	1,310.00 SF	11.37 /SF	4.12 /SF	26.84 /SF	/SF	/SF	42.34 /SF	55,462	67.26 /SF	88,108
						05.00 Metals	1,310.00 SF	11.37 /SF	4.12 /SF	26.84 /SF	/SF	/SF	42.34 /SF	55,462	67.26 /SF	88,108
						05.0 Metals	1,310.00 SF	11.37 /SF	4.12 /SF	26.84 /SF	/SF	/SF	42.34 /SF	55,462	67.26 /SF	88,108
						05.00.004 Dunnigan - Sac River Discharge Structure, Metal Grating	1,310.00 SF	11.37 /SF	4.12 /SF	26.84 /SF	/SF	/SF	42.34 /SF	55,462	67.26 /SF	88,108
		31.00.104				Dunnigan - Sac River Discharge Structure, Excavation and Backfill										
			31.0			Earthwork										
				31.25		Earthworks, Structural										
					31.16.01.00	Earthworks, Sheeting and Shoring										
						Three Sided Shoring of Excavation	10,380.00 SF				45.00 /SF		45.00 /SF	467,100	69.42 /SF	720,571
						31.16.01.00 Earthworks, Sheeting and Shoring	10,380.00 SF	/SF	/SF	/SF	45.00 /SF	/SF	45.00 /SF	467,100	69.42 /SF	720,571
					31.25.01.00	Earthworks, Structural, Excavation										
						Structural Excavation, excludes sheeting or dewatering	6,800.00 CY	2.65 /CY	2.21 /CY	-	-	-	4.85 /CY	33,003	7.49 /CY	50,912
						Stockpile Excavated Spoils	6,800.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	-	2.84 /cy	19,293	4.39 /cy	29,885
						31.25.01.00 Earthworks, Structural, Excavation	6,800.00 CY	3.89 /CY	3.56 /CY	0.25 /CY	/CY	/CY	7.69 /CY	52,296	11.88 /CY	80,798
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	605.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	-	-	48.26 /CY	29,194	76.98 /CY	46,572
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	605.00 CY	12.50 /CY	0.76 /CY	35.00 /CY	/CY	/CY	48.26 /CY	29,194	76.98 /CY	46,572
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	19,000.00 CY	6.18 /CY	1.15 /CY	0.00 /CY	-	-	7.33 /CY	139,347	11.31 /CY	214,964
						Purchase and Deliver Fill Material	12,200.00 cy			35.00 /cy	-	-	35.00 /cy	427,000	56.53 /cy	689,668
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	15,200.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	25,033	2.54 /cy	38,617
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	3,800.00 cy	1.29 /cy	0.10 /cy	-	-	-	1.39 /cy	5,285	2.15 /cy	8,153
						Compaction, water for, 6000 gallon wagon, 6 mile haul	19,000.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	33,402	2.80 /cy	53,180
						31.25.03.00 Earthworks, Structural, Backfill	19,000.00 CY	7.45 /CY	2.03 /CY	23.67 /CY	/CY	/CY	33.16 /CY	630,067	52.87 /CY	1,004,582
						31.25 Earthworks, Structural	26,405.00 CY	6.65 /CY	2.40 /CY	17.90 /CY	17.69 /CY	/CY	44.64 /CY	1,178,657	70.16 /CY	1,852,523
						31.0 Earthwork	26,405.00 CY	6.65 /CY	2.40 /CY	17.90 /CY	17.69 /CY	/CY	44.64 /CY	1,178,657	70.16 /CY	1,852,523
						31.00.104 Dunnigan - Sac River Discharge Structure, Excavation and Backfill	26,405.00 CY	6.65 /CY	2.40 /CY	17.90 /CY	17.69 /CY	/CY	44.64 /CY	1,178,657	70.16 /CY	1,852,523
		33.00.112				Dunnigan - Sac River Discharge Structure, Above Grade Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.36	Process Pipe, Carbon Steel, 36"										
						Piping, pipe, WSP, plain end, welded, 36" diameter, excludes excavation or backfill	3,405.00 LF	31.40 /LF	13.70 /LF	305.00 /LF	-	-	350.11 /LF	1,192,117	562.21 /LF	1,914,311
						TideFlex Check Valves, 36" Dia	20.00 ea	729.24 /ea	520.00 /ea	22,000.00 /ea	-	-	23,249.24 /ea	464,985	37,460.40 /ea	749,208
						Miscellaneous Items Allowance	1.00 ls	62,150.00 /ls	62,150.00 /ls	124,300.00 /ls	-	-	248,600.00 /ls	248,600	392,514.11 /ls	392,514
						40.10.02.36 Process Pipe, Carbon Steel, 36"	3,405.00 LF	53.94 /LF	35.01 /LF	470.73 /LF	/LF	/LF	559.68 /LF	1,905,702	897.51 /LF	3,056,033
						40.11 Process Pipe, Carbon Steel	3,405.00 LF	53.94 /LF	35.01 /LF	470.73 /LF	/LF	/LF	559.68 /LF	1,905,702	897.51 /LF	3,056,033
						40.0 Process Pipe	3,405.00 LF	53.94 /LF	35.01 /LF	470.73 /LF	/LF	/LF	559.68 /LF	1,905,702	897.51 /LF	3,056,033
						33.00.112 Dunnigan - Sac River Discharge Structure, Above Grade Piping	3,405.00 LF	53.94 /LF	35.01 /LF	470.73 /LF	/LF	/LF	559.68 /LF	1,905,702	897.51 /LF	3,056,033
						02.04 Dunnigan - Sac River Discharge Structure	**1,848.00 SF**	**654.45 /SF**	**116.34 /SF**	**1,614.50 /SF**	**325.81 /SF**	**/SF**	**2,711.10 /SF**	**5,010,113**	**4,299.32 /SF**	**7,945,152**
						02 Dunnigan Pipelines - Alt 2 (Sac River)	***49,464.00 LF***	***735.86 /LF***	***291.21 /LF***	***1,747.79 /LF***	***175.80 /LF***	***/LF***	***2,950.66 /LF***	***145,951,353***	***4,678.54 /LF***	***231,419,438***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	36,398,608		457,651.370 hrs	
Material	86,452,688			
Allowance	8,695,760			
Equipment	14,404,297		166,952.089 hrs	
Other				
Subtotal Direct Costs	**145,951,353**	**145,951,353**		
Material Sales Tax, Dunnigan Ca	6,267,820			7.250 %
Subtotal W/ Sales Tax	**6,267,820**	**152,219,173**		
General Conditions	7,610,959			5.000 %
Subtotal W/ General Conditions	**7,610,959**	**159,830,132**		
Mobilization/Demobilization	4,794,904			3.000 %
Prime Contractor Overhead	16,462,504			10.000 %
Prime Contractor Profit	10,865,252			6.000 %
Bonds & Insurance	4,165,376			2.170 %
Subtotal W/ Prime Markups	**36,288,036**	**196,118,168**		
Contractor Contingency	5,883,545			3.000 %
Design Contingency	29,417,725			15.000 %
Subtotal W/ Contingency	**35,301,270**	**231,419,438**		
Total Construction Cost		**231,419,438**		
Non-Contract Costs	34,712,916			15.000 %
Total Project Costs	**34,712,916**	**266,132,354**		

Funks Reservoir

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Funks Reservoir Rev 3
Project Number: D3880600
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
06			Funks Reservoir									
	06.01		Funks Reservoir Admin and Operations BLDG									
		03.00.002	Funks Reservoir Admin and Operations BLDG, Concrete	220.00 CY	180.34 /CY	8.07 /CY	243.42 /CY	/CY	431.82 /CY	95,000	679.23 /CY	149,431
		04.00.002	Funks Reservoir Admin and Operations BLDG, Masonry	4,100.00 SF	12.87 /SF	0.11 /SF	8.10 /SF	/SF	21.08 /SF	86,445	37.11 /SF	152,137
		05.00.002	Funks Reservoir Admin and Operations BLDG, Metals	3,517.00 SF	5.52 /SF	0.24 /SF	4.43 /SF	/SF	10.19 /SF	35,846	17.98 /SF	63,219
		07.00.002	Funks Reservoir Admin and Operations BLDG, Metal Roofing	3,517.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.82 /SF	31,003	15.64 /SF	54,999
		08.00.002	Funks Reservoir Admin and Operations BLDG, Openings	19.00 EA	475.99 /EA	15.79 /EA	1,940.68 /EA	/EA	2,432.47 /EA	46,217	4,353.94 /EA	82,725
		09.00.002	Funks Reservoir Admin and Operations BLDG, Metal Stud Walls	3,939.00 SF	6.69 /SF	/SF	1.52 /SF	/SF	8.22 /SF	32,358	14.34 /SF	56,482
		09.00.004	Funks Reservoir Admin and Operations BLDG, Finishes	6,605.00 SF	3.01 /SF	0.09 /SF	2.72 /SF	/SF	5.82 /SF	38,463	10.28 /SF	67,926
		21.00.002	Funks Reservoir Admin and Operations BLDG, Fire Suppression System	3,414.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	51,210	25.98 /SF	88,700
		22.00.002	Funks Reservoir Admin and Operations BLDG, Plumbing	3,414.00 SF	3.63 /SF	0.29 /SF	5.23 /SF	/SF	9.15 /SF	31,241	16.23 /SF	55,406
		23.00.002	Funks Reservoir Admin and Operations BLDG, HVAC	3,414.00 SF	/SF	/SF	/SF	30.00 /SF	30.00 /SF	102,420	51.96 /SF	177,400
		26.01.PRI	Primary Feed 100A	1,000.00 LF	47.49 /LF	20.23 /LF	28.17 /LF	/LF	95.89 /LF	95,888	165.23 /LF	165,232
		26.03.XFMR	Pad Mounted Transformer, Meter, and Grounding	225.00 kVA	39.03 /kVA	1.31 /kVA	90.86 /kVA	/kVA	131.19 /kVA	29,519	240.39 /kVA	54,087
		26.05.GRDG	Facility Grounding	3,414.00 SF	3.27 /SF	0.14 /SF	1.52 /SF	/SF	4.92 /SF	16,798	8.88 /SF	30,311
		26.10.SEC	Secondary Power Feed 225A	500.00 LF	16.96 /LF	7.62 /LF	8.69 /LF	/LF	33.26 /LF	16,629	56.82 /LF	28,412
		26.20.DIST	Electrical Distribution Equipment	325.00 AMP	55.12 /AMP	1.10 /AMP	55.65 /AMP	/AMP	111.86 /AMP	36,354	203.38 /AMP	66,097
		26.25.LTG	Interior Lighting and Control	1.00 LS	27,739.43 /LS	/LS	13,527.42 /LS	/LS	41,266.85 /LS	41,267	74,521.83 /LS	74,522
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	1,162.52 /LS	/LS	90.58 /LS	/LS	1,253.10 /LS	1,253	2,239.69 /LS	2,240
		26.30.DEV	Device Outlets	1.00 LS	28,723.16 /LS	/LS	4,467.90 /LS	/LS	33,191.06 /LS	33,191	59,473.26 /LS	59,473
		26.40.EQCON	Facility Equipment Connections and Controls	8.00 ALO	1,035.37 /ALO	/ALO	615.73 /ALO	/ALO	1,651.10 /ALO	13,209	2,987.05 /ALO	23,896
		26.90.LPS	Facility Lightning Protection System	3,414.00 SF	3.04 /SF	/SF	1.67 /SF	1.47 /SF	6.17 /SF	21,078	11.12 /SF	37,977
		27.10.COMEQ	Communications Room Equipment	1.00 LS	28,011.60 /LS	/LS	21,023.71 /LS	/LS	49,035.31 /LS	49,035	88,909.37 /LS	88,909
		27.20.COMOUT	Comm Outlets	24.00 EA	827.91 /EA	/EA	151.71 /EA	/EA	979.61 /EA	23,511	1,710.54 /EA	41,053
		27.31.COMCDT	Comm Conduit to MH/HH	0.00	/LF	/LF	/LF	/LF	/LF	18,234	/LF	30,476
		28.10.FA	Fire Alarm System	3,414.00 SF	15.27 /SF	/SF	5.99 /SF	0.73 /SF	21.99 /SF	75,070	37.62 /SF	128,426
		28.20.AC	Access Control System	7.00 DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	2,356.77 /DOOR	16,497	3,668.77 /DOOR	25,681
		28.20.CCTV	Closed Circuit TV and Cameras	6.00 CAM	1,179.28 /CAM	/CAM	1,108.33 /CAM	333.33 /CAM	2,620.95 /CAM	15,726	4,392.27 /CAM	26,354
		28.20.ID	Intrusion Detection System	10.00 DOOR	2,010.83 /DOOR	/DOOR	1,300.00 /DOOR	150.00 /DOOR	3,460.83 /DOOR	34,608	5,396.53 /DOOR	53,965
			06.01 Funks Reservoir Admin and Operations BLDG	3,414.00 SF	149.20 /SF	10.50 /SF	110.79 /SF	48.22 /SF	318.71 /SF	1,088,072	552.30 /SF	1,885,537
	06.02		Funks Reservoir Maintenance and Storage BLDG									
		03.00.000	Funks Reservoir Maintenance and Storage BLDG, Concrete	180.00 CY	182.68 /CY	8.04 /CY	244.05 /CY	/CY	434.77 /CY	78,259	683.81 /CY	123,085
		04.00.000	Funks Reservoir Maintenance and Storage BLDG, Masonry	4,098.00 SF	18.86 /SF	0.19 /SF	10.08 /SF	/SF	29.13 /SF	119,389	51.19 /SF	209,787
		05.00.000	Funks Reservoir Maintenance and Storage BLDG, Metals	1.00 LS	15,636.95 /LS	682.03 /LS	12,526.00 /LS	/LS	28,844.98 /LS	28,845	50,870.15 /LS	50,870
		07.00.000	Funks Reservoir Maintenance and Storage BLDG, Roofing	2,813.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.81 /SF	24,775	15.62 /SF	43,950
		08.00.000	Funks Reservoir Maintenance and Storage BLDG, Openings	9.00 EA	619.23 /EA	13.33 /EA	2,097.85 /EA	/EA	2,730.42 /EA	24,574	4,881.42 /EA	43,933
		09.00.000	Funks Reservoir Maintenance and Storage BLDG, Finishes	2,731.00 SF	1.12 /SF	0.13 /SF	1.10 /SF	/SF	2.35 /SF	6,412	4.15 /SF	11,324
		21.00.000	Funks Reservoir Maintenance and Storage BLDG, Fire Suppression System	2,731.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	40,965	25.98 /SF	70,955
		22.00.000	Funks Reservoir Maintenance and Storage BLDG, Plumbing	2,731.00 SF	2.53 /SF	0.37 /SF	3.63 /SF	/SF	6.53 /SF	17,842	11.58 /SF	31,623
		23.00.000	Funks Reservoir Maintenance and Storage BLDG, HVAC	2,731.00 SF	/SF	/SF	/SF	20.00 /SF	20.00 /SF	54,620	34.64 /SF	94,607
		26.05.GRDG	Facility Grounding	2,731.00 SF	2.44 /SF	0.12 /SF	1.27 /SF	/SF	3.82 /SF	10,433	6.90 /SF	18,843
		26.11.SEC	Subfeed UG from Admin 100A	150.00 LF	56.88 /LF	38.08 /LF	26.60 /LF	/LF	121.56 /LF	18,234	203.17 /LF	30,476
		26.20.DIST	Electrical Distribution Equipment	200.00 AMP	36.05 /AMP	/AMP	32.27 /AMP	/AMP	68.32 /AMP	13,664	124.09 /AMP	24,818
		26.25.LTG	Interior Lighting and Control	1.00 LS	11,979.39 /LS	/LS	3,893.85 /LS	/LS	15,873.24 /LS	15,873	28,569.78 /LS	28,570
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	1,162.52 /LS	/LS	90.58 /LS	/LS	1,253.10 /LS	1,253	2,239.69 /LS	2,240
		26.30.DEV	Device Outlets	1.00 LS	8,723.44 /LS	/LS	1,559.54 /LS	/LS	10,282.98 /LS	10,283	18,438.24 /LS	18,438
		26.40.EQCON	Facility Equipment Connections and Controls	2.00 ALO	1,894.07 /ALO	/ALO	863.60 /ALO	/ALO	2,757.67 /ALO	5,515	4,977.01 /ALO	9,954
		26.90.LPS	Facility Lightning Protection System	2,731.00 SF	2.16 /SF	/SF	1.30 /SF	0.92 /SF	4.37 /SF	11,941	7.89 /SF	21,536
		27.30.COMCDT	Comm Conduit to Admin	0.00	/LF	/LF	/LF	/LF	/LF	22,890	/LF	38,920
		28.10.FA	Fire Alarm System	2,731.00 SF	5.14 /SF	/SF	3.89 /SF	0.37 /SF	9.40 /SF	25,660	15.64 /SF	42,707
		28.20.AC	Access Control System	4.00 DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	2,356.77 /DOOR	9,427	3,668.78 /DOOR	14,675
		28.20.CCTV	Closed Circuit TV and Cameras	0.00	/CAM	/CAM	/CAM	/CAM	/CAM	7,863	/CAM	13,058
		28.20.ID	Intrusion Detection System	6.00 DOOR	1,945.96 /DOOR	/DOOR	1,333.33 /DOOR	166.67 /DOOR	3,445.96 /DOOR	20,676	5,376.18 /DOOR	32,257
			06.02 Funks Reservoir Maintenance and Storage BLDG	2,731.00 SF	92.38 /SF	5.90 /SF	73.19 /SF	37.01 /SF	208.49 /SF	569,392	357.61 /SF	976,624
	06.03		Funks Reservoir Flow Meter Vault									
		01.00.102	Funks Reservoir FlowMeter Vault, Removal and Control of Water	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	135,000	68,943.90 /MO	206,832
		03.00.004	Funks Reservoir FlowMeter Vault, Concrete	903.00 CY	365.11 /CY	8.77 /CY	312.72 /CY	/CY	686.59 /CY	619,993	1,074.59 /CY	970,356
		05.00.004	Funks Reservoir FlowMeter Vault, Catwalk	260.00 SF	46.87 /SF	8.49 /SF	83.63 /SF	26.92 /SF	165.91 /SF	43,135	293.43 /SF	76,291
		08.00.003	Funks Reservoir FlowMeter Vault, Access Hatches	4.00 EA	623.04 /EA	/EA	2,400.00 /EA	/EA	3,023.04 /EA	12,092	5,410.16 /EA	21,641
		23.00.004	Funks Reservoir FlowMeter Vault, HVAC	3,096.00 SF	1.50 /SF	0.09 /SF	3.47 /SF	/SF	5.06 /SF	15,679	9.02 /SF	27,937
		27.30.COMCDT	Comm Conduit to Admin	300.00 LF	48.11 /LF	38.08 /LF	19.85 /LF	/LF	106.04 /LF	31,812	175.03 /LF	52,508
		31.00.106	Funks Reservoir FlowMeter Vault, Excavation and Backfill	16,833.00 CY	5.82 /CY	4.39 /CY	0.89 /CY	/CY	11.09 /CY	186,700	17.06 /CY	287,123
		40.00.000	Funks Reservoir FlowMeter Vault, Piping	144.00 LF	162.28 /LF	65.10 /LF	1,011.67 /LF	/LF	1,239.05 /LF	178,423	1,971.68 /LF	283,922
		40.90.102	Funks Reservoir FlowMeter Vault, I&C	3,096.00 SF	3.41 /SF	1.34 /SF	51.68 /SF	/SF	56.43 /SF	174,711	101.49 /SF	314,214
			06.03 Funks Reservoir Flow Meter Vault	3,096.00 SF	159.97 /SF	35.28 /SF	210.28 /SF	45.87 /SF	451.40 /SF	1,397,545	723.78 /SF	2,240,822
	06.04		Funks Reservoir									
		01.00.204	Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement	18.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,080,000	93,012.69 /MO	1,674,228
		31.00.107	Funks Reservoir, Prepare Access/Haul Roads and Stockpile Areas	184,000.00 CY	2.90 /CY	5.94 /CY	/CY	/CY	8.84 /CY	1,626,378	13.54 /CY	2,491,753
		31.00.108	Funks Reservoir, Sediment Removal	286,000.00 CY	11.47 /CY	7.18 /CY	1.00 /CY	/CY	19.66 /CY	5,622,092	30.19 /CY	8,634,266
		31.00.110	Funks Reservoir, Reservoir Excavation	358,000.00 CY	11.30 /CY	7.06 /CY	1.00 /CY	/CY	19.36 /CY	6,930,562	29.73 /CY	10,644,176
		31.00.112	Funks Reservoir, Construct Pipeline Cofferdam	145,000.00 CY	4.83 /CY	7.70 /CY	0.62 /CY	/CY	13.16 /CY	1,908,218	20.21 /CY	2,930,109
		31.00.114	Funks Reservoir, Construct PGP Cofferdam	59,000.00 CY	4.93 /CY	7.80 /CY	0.51 /CY	/CY	13.24 /CY	781,010	20.32 /CY	1,198,744

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Funks Reservoir Rev 3
Project Number: D3880600
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
		31.00.116	Funks Reservoir, Remove Pipeline Cofferdam	68,000.00 CY	2.61 /CY	6.45 /CY	/CY	/CY	9.06 /CY	616,292	13.89 /CY	944,212
		31.00.118	Funks Reservoir, Remove PGP Cofferdam	40,000.00 CY	2.45 /CY	6.22 /CY	/CY	/CY	8.67 /CY	346,751	13.28 /CY	531,253
			06.04 Funks Reservoir	132.73 AC	70,794.43 /AC	63,892.35 /AC	7,792.72 /AC	/AC	142,479.49 /AC	18,911,303	218,855.89 /AC	29,048,742
			06 Funks Reservoir	**1.00 LS**	**10,653,475.12 /LS**	**8,641,641.11 /LS**	**2,263,480.97 /LS**	**407,715.00 /LS**	**21,966,312.20 /LS**	**21,966,312**	**34,151,725.21 /LS**	**34,151,725**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	16,465,630		131,956.228 hrs	
Material	3,764,617			
Allowance	678,523			
Equipment	13,242,956		348,060.160 hrs	
Other				
Total Construction Cost	**34,151,726**	**34,151,726**		
Non-Contract Costs	5,805,793			17.000 %
Total Project Costs	**5,805,793**	**39,957,519**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Funks Reservoir Rev 3
Project Number: D3880600
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
06						Funks Reservoir									
	06.01					Funks Reservoir Admin and Operations BLDG									
		03.00.002				Funks Reservoir Admin and Operations BLDG, Concrete									
			03.0			Concrete Work									
				03.13		Cast-In-Place Concrete, Continuous Footings									
					03.10.02.24	Cast-In-Place Concrete, Continuous Footings, 24" thick									
						C.I.P. concrete forms, footing, keyway, tapered wood, 2" x 4", 4 use, includes erecting, bracing, stripping and cleaning	275.00 lf	3.16 /lf	-	0.25 /lf	-	3.41 /lf	939	5.25 /lf	1,443
						Reinforcing Steel, in place, footings, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.14 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	20,927	4,025.91 /ton	32,771
						Reinforcing steel, unload and sort, add to base	8.14 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	453	85.35 /ton	695
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	96.00 cy	-	-	131.00 /cy	-	131.00 /cy	12,576	210.20 /cy	20,179
						Structural concrete, placing, continuous footing, deep, pumped, includes strike off & consolidation, excludes material	93.00 CY	27.12 /CY	6.41 /CY	-	-	33.53 /CY	3,118	51.37 /CY	4,778
						03.10.02.24 Cast-In-Place Concrete, Continuous Footings, 24" thick	93.00 CY	160.78 /CY	6.98 /CY	241.00 /CY	/CY	408.76 /CY	38,014	643.72 /CY	59,866
						03.13 Cast-In-Place Concrete, Continuous Footings	93.00 CY	160.78 /CY	6.98 /CY	241.00 /CY	/CY	408.76 /CY	38,014	643.72 /CY	59,866
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.12	Cast-In-Place Concrete, Slabs on Grade, 12" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, 7" to 12" high, 4 use, includes erecting, bracing, stripping and cleaning	278.00 sfca	7.30 /sfca	-	0.75 /sfca	-	8.05 /sfca	2,238	12.39 /sfca	3,444
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	11.12 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	28,589	4,025.91 /ton	44,768
						Reinforcing in place, unloading & sorting, add to above - slabs	11.12 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	619	85.35 /ton	949
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	131.00 cy	-	-	131.00 /cy	-	131.00 /cy	17,161	210.20 /cy	27,536
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	127.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	3,683	44.43 /CY	5,643
						Cfnsh,ltrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	3,414.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	3,198	1.44 /sf	4,899
						Curing, sprayed membrane curing compound	34.14 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	787	36.21 /csf	1,236
						Fine grading, fine grade for slab on grade, machine	379.33 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	711	2.87 /sy	1,089
						03.10.05.12 Cast-In-Place Concrete, Slabs on Grade, 12" thick	127.00 CY	194.66 /CY	8.86 /CY	245.19 /CY	/CY	448.71 /CY	56,986	705.23 /CY	89,565
						03.18 Cast-In-Place Concrete, Slabs on Grade	127.00 CY	194.66 /CY	8.86 /CY	245.19 /CY	/CY	448.71 /CY	56,986	705.23 /CY	89,565
						03.0 Concrete Work	220.00 CY	180.34 /CY	8.07 /CY	243.42 /CY	/CY	431.82 /CY	95,000	679.23 /CY	149,431
						03.00.002 Funks Reservoir Admin and Operations BLDG, Concrete	220.00 CY	180.34 /CY	8.07 /CY	243.42 /CY	/CY	431.82 /CY	95,000	679.23 /CY	149,431
		04.00.002				Funks Reservoir Admin and Operations BLDG, Masonry									
			04.0			Masonry									
				04.21		Concrete Unit Masonry - Exterior									
					04.00.02.08	Masonry Concrete Masonry Units, 8"									
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	2.00 opng	41.31 /opng	2.13 /opng	13.40 /opng	-	56.84 /opng	114	99.41 /opng	199
						Grout, door frames, 6' x 7' opening, 3.5 C.F. per opening	1.00 opng	55.08 /opng	2.83 /opng	18.75 /opng	-	76.66 /opng	77	134.15 /opng	134
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	800.25 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	12.80 /cf	10,240	22.55 /cf	18,047
						Reinforcing, steel bars A615, placed horizontal, average #4 bar	1,088.34 lb	1.40 /lb	-	0.40 /lb	-	1.80 /lb	1,956	3.14 /lb	3,419
						Masonry reinforcing bars, #3 and #4 reinforcing steel bars, placed vertically, ASTM A615	800.25 lb	1.80 /lb	-	0.56 /lb	-	2.36 /lb	1,885	4.12 /lb	3,298
						Masonry reinforcing bars, truss type steel joint reinforcing, mill standard galvanized, 12" wide	27.50 clf	31.43 /clf	-	29.50 /clf	-	60.93 /clf	1,676	107.68 /clf	2,961
						Concrt block,high strngt,hollow,3500 psi,8"8"16",includs mortar and horzntl joint rnfrcng every other course,excluds scffldn,grout and verticl rnfrcng	3,201.00 SF	8.50 /SF	-	4.07 /SF	-	12.57 /SF	40,248	22.07 /SF	70,658
						Channel framing, structural steel, field fabricated, C6x8.2, incl cutting & welding	22.00 lf	40.69 /lf	1.97 /lf	6.85 /lf	-	49.51 /lf	1,089	86.25 /lf	1,897
						Silicone water repellants, sprayed on CMU, 2 coat	6,402.00 sf	0.21 /sf	-	0.79 /sf	-	1.00 /sf	6,371	1.78 /sf	11,403
						Reglet, zinc and copper alloy, 20 ounce	275.00 lf	3.26 /lf	-	2.87 /lf	-	6.13 /lf	1,687	10.83 /lf	2,979
						Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	275.00 lf	5.27 /lf	-	5.25 /lf	-	10.52 /lf	2,894	18.61 /lf	5,117
						04.00.02.08 Masonry Concrete Masonry Units, 8"	3,201.00 SF	12.94 /SF	0.11 /SF	8.28 /SF	/SF	21.32 /SF	68,236	37.52 /SF	120,112
						04.21 Concrete Unit Masonry - Exterior	3,201.00 SF	12.94 /SF	0.11 /SF	8.28 /SF	/SF	21.32 /SF	68,236	37.52 /SF	120,112
				04.23		Concrete Unit Masonry - Interior									
					04.00.02.08	Masonry Concrete Masonry Units, 8"									
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	3.00 opng	41.31 /opng	2.12 /opng	13.40 /opng	-	56.83 /opng	171	99.41 /opng	298
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	224.75 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	12.80 /cf	2,876	22.55 /cf	5,068
						Reinforcing, steel bars A615, placed horizontal, average #4 bar	305.66 lb	1.40 /lb	-	0.40 /lb	-	1.80 /lb	549	3.14 /lb	960
						Masonry reinforcing bars, #3 and #4 reinforcing steel bars, placed vertically, ASTM A615	224.75 lb	1.80 /lb	-	0.56 /lb	-	2.36 /lb	530	4.12 /lb	926
						Concrt block,high strngt,hollow,3500 psi,8"8"16",includs mortar and horzntl joint rnfrcng every other course,excluds scffldn,grout and verticl rnfrcng	899.00 SF	8.50 /SF	-	4.07 /SF	-	12.57 /SF	11,304	22.07 /SF	19,844
						Channel framing, structural steel, field fabricated, C6x8.2, incl cutting & welding	20.00 lf	40.69 /lf	1.97 /lf	6.85 /lf	-	49.51 /lf	990	86.25 /lf	1,725
						Silicone water repellants, sprayed on CMU, 2 coat	1,798.00 sf	0.21 /sf	-	0.79 /sf	-	1.00 /sf	1,789	1.78 /sf	3,202
						04.00.02.08 Masonry Concrete Masonry Units, 8"	899.00 SF	12.65 /SF	0.14 /SF	7.46 /SF	/SF	20.25 /SF	18,208	35.62 /SF	32,025
						04.23 Concrete Unit Masonry - Interior	899.00 SF	12.65 /SF	0.14 /SF	7.46 /SF	/SF	20.25 /SF	18,208	35.62 /SF	32,025
						04.0 Masonry	4,100.00 SF	12.87 /SF	0.11 /SF	8.10 /SF	/SF	21.08 /SF	86,445	37.11 /SF	152,137
						04.00.002 Funks Reservoir Admin and Operations BLDG, Masonry	4,100.00 SF	12.87 /SF	0.11 /SF	8.10 /SF	/SF	21.08 /SF	86,445	37.11 /SF	152,137
		05.00.002				Funks Reservoir Admin and Operations BLDG, Metals									
			05.0			Metals									
				05.40		Cold-formed Metal Framing									
					05.10.01.10	Metals, Steel Trusses									
						Roof truss,using galv metal studs,fink (w) king post type,3:12 pitch,18 x 6"chrds,32'span,excl erectn,bridgng&bracing,fabrication only trusses on-site	57.00 ea	175.54 /ea	-	150.00 /ea	-	325.54 /ea	18,556	574.74 /ea	32,760
						Roof truss, using galv LB metal studs, to 3:12 pitch, 32' span, excl truss materials, bridging & bracing, erection only	57.00 ea	84.60 /ea	14.83 /ea	-	-	99.43 /ea	5,667	172.21 /ea	9,816
						Underlayment, plywood, underlayment grade, 1/2" thick	3,517.00 SF	1.31 /SF	-	2.00 /SF	-	3.31 /SF	11,623	5.87 /SF	20,642
						05.10.01.10 Metals, Steel Trusses	3,517.00 SF	5.52 /SF	0.24 /SF	4.43 /SF	/SF	10.19 /SF	35,846	17.98 /SF	63,219
						05.40 Cold-formed Metal Framing	3,517.00 SF	5.52 /SF	0.24 /SF	4.43 /SF	/SF	10.19 /SF	35,846	17.98 /SF	63,219
						05.0 Metals	3,517.00 SF	5.52 /SF	0.24 /SF	4.43 /SF	/SF	10.19 /SF	35,846	17.98 /SF	63,219
						05.00.002 Funks Reservoir Admin and Operations BLDG, Metals	3,517.00 SF	5.52 /SF	0.24 /SF	4.43 /SF	/SF	10.19 /SF	35,846	17.98 /SF	63,219
		07.00.002				Funks Reservoir Admin and Operations BLDG, Metal Roofing									
			07.0			Thermal and Moisture Protection									
				07.00		Thermal & Moisture Protection									
					07.60.02.00	Thermal & Moisture Protection, Metal Roofing									
						Steel roofing panels, on steel frame, flat profile, zinc aluminum alloy finish, 1-3/4" standing seams, 10" wide, 22 gauge	3,517.00 SF	2.88 /SF	-	4.47 /SF	-	7.35 /SF	25,838	13.05 /SF	45,894

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					07.60.02.00	Thermal & Moisture Protection, Metal Roofing									
						Aluminum downspouts, enameled, 3" x 4", .024" thick	56.00 lf	5.65 /lf	-	2.29 /lf	-	7.94 /lf	445	13.92 /lf	779
						Aluminum gutters, stock units, enameled, 5" box, .032" thick	214.00 lf	6.33 /lf	-	3.58 /lf	-	9.91 /lf	2,120	17.42 /lf	3,728
						Miscellaneous Items Allowance	1.00 ls	1,300.00 /ls	0.00 /ls	1,300.00 /ls	0.00 /ls	2,600.00 /ls	2,600	4,597.66 /ls	4,598
						07.60.02.00 Thermal & Moisture Protection, Metal Roofing	3,517.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.82 /SF	31,003	15.64 /SF	54,999
						07.00 Thermal & Moisture Protection	3,517.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.82 /SF	31,003	15.64 /SF	54,999
						07.0 Thermal and Moisture Protection	3,517.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.82 /SF	31,003	15.64 /SF	54,999
						07.00.002 Funks Reservoir Admin and Operations BLDG, Metal Roofing	3,517.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.82 /SF	31,003	15.64 /SF	54,999
		08.00.002				Funks Reservoir Admin and Operations BLDG, Openings									
			08.0			Openings									
				08.10		Doors and Frames									
					08.10.01.00	Openings, Doors, Frames and Hardware									
						Steel frames, knock down, 14 ga., to 6-3/4" throat, to 3070, single	13.00 EA	97.88 /EA	-	320.00 /EA	-	417.88 /EA	5,432	747.00 /EA	9,711
						Steel frms, knock down, 14 ga., to 8-3/4" throat, to 3'-0" x 7'-0", single	5.00 EA	137.64 /EA	-	430.00 /EA	-	567.64 /EA	2,838	1,014.38 /EA	5,072
						Steel frames, knock down, 14 ga., to 8-3/4" throat, to 6070, pair	1.00 EA	183.52 /EA	-	455.00 /EA	-	638.52 /EA	639	1,138.95 /EA	1,139
						Doors, commercial, steel, insulated, full panel, 18 ga., 3'-0" x 7'-0" x 1-3/4" thick	20.00 ea	97.88 /ea	-	520.00 /ea	-	617.88 /ea	12,358	1,107.92 /ea	22,158
						Add for baked enamel finish, average cost per leaf	20.00 leaf	12.94 /leaf	-	50.40 /leaf	-	63.34 /leaf	1,267	113.36 /leaf	2,267
						Average Door Hardware	20.00 ea	91.76 /ea	15.00 /ea	500.00 /ea		606.76 /ea	12,135	1,087.21 /ea	21,744
						08.10.01.00 Openings, Doors, Frames and Hardware	19.00 EA	326.09 /EA	15.79 /EA	1,482.79 /EA	/EA	1,824.67 /EA	34,669	3,267.99 /EA	62,092
						08.10 Doors and Frames	19.00 EA	326.09 /EA	15.79 /EA	1,482.79 /EA	/EA	1,824.67 /EA	34,669	3,267.99 /EA	62,092
				08.50		Windows									
					08.50.01.00	Windows									
						Aluminum punched window, 1" insulating glass, fixed, standard colors	290.00 sf	9.82 /sf	-	30.00 /sf	-	39.82 /sf	11,548	71.15 /sf	20,633
						08.50.01.00 Windows	0.00	/EA	/EA	/EA	/EA	/EA	11,548	/EA	20,633
						08.50 Windows	0.00	/EA	/EA	/EA	/EA	/EA	11,548	/EA	20,633
						08.0 Openings	19.00 EA	475.99 /EA	15.79 /EA	1,940.68 /EA	/EA	2,432.47 /EA	46,217	4,353.94 /EA	82,725
						08.00.002 Funks Reservoir Admin and Operations BLDG, Openings	19.00 EA	475.99 /EA	15.79 /EA	1,940.68 /EA	/EA	2,432.47 /EA	46,217	4,353.94 /EA	82,725
		09.00.002				Funks Reservoir Admin and Operations BLDG, Metal Stud Walls									
			09.0			Finishes									
				09.20		Plaster and Gypsum Board									
					09.20.01.00	Finishes, Plaster & Gypsum Board									
						Blanket insulation, for walls or ceilings, unfaced fiberglass, 3-1/2" thick, R13, 15" wide	3,939.00 sf	0.54 /sf	-	0.33 /sf	-	0.87 /sf	3,442	1.54 /sf	6,056
						3-5/8" Metal studs, galv, 20 ga., 16" oc, non load bearing, >10' ht.	3,939.00 SF	2.80 /SF	-	0.29 /SF	-	3.09 /SF	12,154	5.37 /SF	21,134
						18 to 16 ga x 1-1/2" channel bridging, studs 16"oc	3.03 clf	242.28 /clf	-	51.50 /clf	-	293.78 /clf	890	512.58 /clf	1,553
						Studs, drive pins & studs, 1/4" & 3/8" diameter	1.30 c	-	-	4.48 /c	-	4.48 /c	6	8.09 /c	11
						Gypsum wallboard, on walls, fire resistant, taped & finished (level 4 finish), 5/8" thick	7,878.00 sf	1.58 /sf	-	0.43 /sf	-	2.01 /sf	15,867	3.52 /sf	27,729
						09.20.01.00 Finishes, Plaster & Gypsum Board	3,939.00 SF	6.69 /SF	/SF	1.52 /SF	/SF	8.22 /SF	32,358	14.34 /SF	56,482
						09.20 Plaster and Gypsum Board	3,939.00 SF	6.69 /SF	/SF	1.52 /SF	/SF	8.22 /SF	32,358	14.34 /SF	56,482
						09.0 Finishes	3,939.00 SF	6.69 /SF	/SF	1.52 /SF	/SF	8.22 /SF	32,358	14.34 /SF	56,482
						09.00.002 Funks Reservoir Admin and Operations BLDG, Metal Stud Walls	3,939.00 SF	6.69 /SF	/SF	1.52 /SF	/SF	8.22 /SF	32,358	14.34 /SF	56,482
		09.00.004				Funks Reservoir Admin and Operations BLDG, Finishes									
			09.0			Finishes									
				09.00		Finishes									
					09.00.99.00	Finishes, Other									
						Finishes Allowance	3,414.00 SF	2.24 /SF	0.18 /SF	2.34 /SF		4.75 /SF	16,230	8.40 /SF	28,692
						09.00.99.00 Finishes, Other	3,414.00 SF	2.24 /SF	0.18 /SF	2.34 /SF	/SF	4.75 /SF	16,230	8.40 /SF	28,692
					09.50.01.00	Finishes, Suspended Ceilings									
						Blanket insulation, for walls or ceilings, kraft faced mineral fiber, 6" thick, R19	2,765.00 sf	0.46 /sf	-	1.29 /sf	-	1.75 /sf	4,835	3.12 /sf	8,634
						Suspended Acoustic Ceiling Tiles, mineral Fiber Tile, lay-in, fine texture, 2' x 2' or 2' x 4', 5/8" thick	2,765.00 SF	1.18 /SF	-	0.85 /SF	-	2.03 /SF	5,598	3.57 /SF	9,866
						Ceiling Suspension System, class A, 15/16" T bar, 2' x 4' grid	2,765.00 sf	0.92 /sf	-	0.93 /sf	-	1.85 /sf	5,109	3.27 /sf	9,035
						Hanging wire, 8' long, 12 gauge	27.65 csf	11.29 /csf	-	6.20 /csf	-	17.49 /csf	484	30.75 /csf	850
						Seismic bracing, 2-1/2" compression post with 4 bracing wires	19.00 ea	14.68 /ea	-	2.88 /ea	-	17.56 /ea	334	30.63 /ea	582
						09.50.01.00 Finishes, Suspended Ceilings	2,765.00 SF	2.77 /SF	/SF	3.15 /SF	/SF	5.92 /SF	16,359	10.48 /SF	28,968
					09.50.01.02	Finishes, Gypsum Board Ceilings									
						Blanket insulation, for walls or ceilings, kraft faced mineral fiber, 6" thick, R19	426.00 sf	0.46 /sf	-	1.29 /sf	-	1.75 /sf	745	3.12 /sf	1,330
						Ceilings, gypsum board, fire rated, finished, screwed to grid, channel or joists, over 8' high, 5/8" thick	426.00 SF	3.45 /SF	-	0.36 /SF	-	3.81 /SF	1,622	6.62 /SF	2,820
						Ceiling/soffit framing to 6" 18 ga. stud, 24" oc., flat	426.00 sf	6.89 /sf	-	1.34 /sf	-	8.23 /sf	3,507	14.36 /sf	6,116
						09.50.01.02 Finishes, Gypsum Board Ceilings	426.00 SF	10.80 /SF	/SF	2.99 /SF	/SF	13.79 /SF	5,874	24.10 /SF	10,266
						09.00 Finishes	6,605.00 SF	3.01 /SF	0.09 /SF	2.72 /SF	/SF	5.82 /SF	38,463	10.28 /SF	67,926
						09.0 Finishes	6,605.00 SF	3.01 /SF	0.09 /SF	2.72 /SF	/SF	5.82 /SF	38,463	10.28 /SF	67,926
						09.00.004 Funks Reservoir Admin and Operations BLDG, Finishes	6,605.00 SF	3.01 /SF	0.09 /SF	2.72 /SF	/SF	5.82 /SF	38,463	10.28 /SF	67,926
		21.00.002				Funks Reservoir Admin and Operations BLDG, Fire Suppression System									
			21.0			Fire Suppression									
				21.00		Fire Suppression									
					21.00.10.10	Water-Based Fire-Suppression Systems									
						Fire Suppression System Allowance	3,414.00 SF				15.00 /SF	15.00 /SF	51,210	25.98 /SF	88,700
						21.00.10.10 Water-Based Fire-Suppression Systems	3,414.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	51,210	25.98 /SF	88,700
						21.00 Fire Suppression	3,414.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	51,210	25.98 /SF	88,700
						21.0 Fire Suppression	3,414.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	51,210	25.98 /SF	88,700
						21.00.002 Funks Reservoir Admin and Operations BLDG, Fire Suppression System	3,414.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	51,210	25.98 /SF	88,700
		22.00.002				Funks Reservoir Admin and Operations BLDG, Plumbing									
			22.0			Plumbing									
				22.00		Plumbing									
					22.00.01.00	Mechanical, Plumbing									
						Lavatory, vanity top, rough-in, supply, waste and vent	2.00 ea	720.97 /ea	-	278.00 /ea	-	998.97 /ea	1,998	1,750.46 /ea	3,501
						Lavatory, wall hung, porcelain enamel on cast iron, white, single bowl, includes trim	2.00 ea	180.24 /ea	-	246.00 /ea	-	426.24 /ea	852	756.12 /ea	1,512
						Water closet, bowl only, wall hung, includes flush valve and seat	2.00 ea	248.61 /ea	-	1,100.00 /ea	-	1,348.61 /ea	2,697	2,415.67 /ea	4,831
						Water closet, bowl only, wall hung, rough-in, supply, waste and vent	2.00 ea	720.97 /ea	-	1,300.00 /ea	-	2,020.97 /ea	4,042	3,594.74 /ea	7,189
						Kitchenette Equipment and Rough-in	1.00 ls	1,441.94 /ls		2,000.00 /ls		3,441.94 /ls	3,442	6,106.75 /ls	6,107
						Supply, Waste and Vent Allowance	1.00 ls	7,209.64 /ls	1,000.00 /ls	10,000.00 /ls	0.00 /ls	18,209.64 /ls	18,210	32,265.67 /ls	32,266
						22.00.01.00 Mechanical, Plumbing	**3,414.00** SF	3.63 /SF	0.29 /SF	5.23 /SF	/SF	9.15 /SF	31,241	16.23 /SF	55,406
						22.00 Plumbing	**3,414.00** SF	3.63 /SF	0.29 /SF	5.23 /SF	/SF	9.15 /SF	31,241	16.23 /SF	55,406
						22.0 Plumbing	**3,414.00** SF	3.63 /SF	0.29 /SF	5.23 /SF	/SF	9.15 /SF	31,241	16.23 /SF	55,406
						22.00.002 Funks Reservoir Admin and Operations BLDG, Plumbing	**3,414.00** SF	3.63 /SF	0.29 /SF	5.23 /SF	/SF	9.15 /SF	31,241	16.23 /SF	55,406
		23.00.002				Funks Reservoir Admin and Operations BLDG, HVAC									
			23.0			HVAC									
				23.00		HVAC									
					23.00.02.00	Mechanical, HVAC									
						HVAC Allowance	3,414.00 SF				30.00 /SF	30.00 /SF	102,420	51.96 /SF	177,400
						23.00.02.00 Mechanical, HVAC	3,414.00 SF	/SF	/SF	/SF	30.00 /SF	30.00 /SF	102,420	51.96 /SF	177,400
						23.00 HVAC	3,414.00 SF	/SF	/SF	/SF	30.00 /SF	30.00 /SF	102,420	51.96 /SF	177,400
						23.0 HVAC	3,414.00 SF	/SF	/SF	/SF	30.00 /SF	30.00 /SF	102,420	51.96 /SF	177,400

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						23.00.002 Funks Reservoir Admin and Operations BLDG, HVAC	3,414.00 SF	/SF	/SF	/SF	30.00 /SF	30.00 /SF	102,420	51.96 /SF	177,400
		26.01.PRI				Primary Feed 100A									
			26.0			Electrical Work									
				26.00		Electrical									
					01.01.06.03	GC Equip, Tools, & Consumables									
						Roadway steel plates, 8' x 20' x 1"thick, avg cost per sf, monthly	160.00 sf	-	1.00 /sf	-	-	1.00 /sf	160	1.78 /sf	285
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	160.00 /LS	/LS	/LS	160.00 /LS	160	285.13 /LS	285
						26.00 Electrical	3,414.00 SF	/SF	0.05 /SF	/SF	/SF	0.05 /SF	160	0.08 /SF	285
				26.10		Site Electrical									
					26.10.02.00	Site Electrical, Buried Conduit									
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	3.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	2,586.67 /ton	7,760	4,691.23 /ton	14,074
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	1,000.00 LF	12.97 /LF	-	3.72 /LF	-	16.69 /LF	16,693	30.02 /LF	30,018
						26.10.02.00 Site Electrical, Buried Conduit	1,000.00 LF	17.36 /LF	/LF	7.10 /LF	/LF	24.45 /LF	24,453	44.09 /LF	44,092
					26.10.04.00	Site Electrical, Manholes/Handholes									
						Elctrc undrgr ducts and manhls,man holes,precast w/iron racks&pulling irons,ci frame and cover,6'x8'7',excluds excavtn,backfll and cast place concrete	3.00 EA	3,001.22 /EA	341.95 /EA	3,375.00 /EA	-	6,718.17 /EA	20,155	12,217.04 /EA	36,651
						26.10.04.00 Site Electrical, Manholes/Handholes	3.00 EA	3,001.22 /EA	341.95 /EA	3,375.00 /EA	/EA	6,718.17 /EA	20,155	12,217.04 /EA	36,651
						26.10 Site Electrical	1.00 LS	26,361.74 /LS	1,025.85 /LS	17,220.00 /LS	/LS	44,607.59 /LS	44,608	80,743.03 /LS	80,743
				26.15		Process Electrical									
					26.15.01.00	Process Electrical, Wire/Cable									
						Cable terminations, indoor, insulation diameter range, 15 kV, .525" to 1.025", pad mount	6.00 ea	162.16 /ea	-	109.00 /ea	-	271.16 /ea	1,627	491.14 /ea	2,947
						Medium-cable single cable, copper, XLP shielding, ungrounded neutral, 15 kV, #1, in conduit, excl splicing & terminations	15.45 clf	518.92 /clf	-	365.00 /clf	-	883.92 /clf	13,657	1,601.69 /clf	24,746
						26.15.01.00 Process Electrical, Wire/Cable	1,545.00 LF	5.82 /LF	/LF	4.07 /LF	/LF	9.89 /LF	15,284	17.92 /LF	27,693
					26.15.11.00	Process Electrical, Grounding									
						Grounding rod, copper clad, 8' long, 3/4" diameter	1.00 ea	195.82 /ea	-	36.00 /ea	-	231.82 /ea	232	415.74 /ea	416
						Ground wire, copper wire, bare stranded, 4/0	5.15 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	4,038	1,427.88 /clf	7,354
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	5.00 ea	129.73 /ea	-	31.00 /ea	-	160.73 /ea	804	288.68 /ea	1,443
						26.15.11.00 Process Electrical, Grounding	515.00 LF	5.28 /LF	/LF	4.57 /LF	/LF	9.85 /LF	5,074	17.89 /LF	9,213
						26.15 Process Electrical	3,414.00 SF	3.43 /SF	/SF	2.53 /SF	/SF	5.96 /SF	20,357	10.81 /SF	36,906
						26.0 Electrical Work	3,414.00 SF	11.15 /SF	0.35 /SF	7.58 /SF	/SF	19.08 /SF	65,125	34.54 /SF	117,934
			31.0			Earthwork									
				26.10		Site Electrical									
					31.20.07.15	Earthworks, Sitework, Borrow									
						Concrete (red) envelope/encasement, poured neat	29.67 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	273.89 /CY	8,127	425.24 /CY	12,618
						End bulkheads, plywood, concrete envelope/encasement	3.55 sf	13.49 /sf	-	0.73 /sf	-	14.22 /sf	51	21.83 /sf	78
						31.20.07.15 Earthworks, Sitework, Borrow	29.67 CY	196.24 /CY	1.76 /CY	77.59 /CY	/CY	275.59 /CY	8,178	427.85 /CY	12,696
					31.20.09.10	Earthworks, Sitework, Backfill									
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	386.82 CY	1.94 /CY	23.32 /CY	-	-	25.26 /CY	9,772	38.71 /CY	14,972
						31.20.09.10 Earthworks, Sitework, Backfill	386.82 CY	1.94 /CY	23.32 /CY	/CY	/CY	25.26 /CY	9,772	38.71 /CY	14,972
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees									
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	32.91 CY	10.88 /CY	9.31 /CY	-	-	20.19 /CY	664	30.94 /CY	1,018
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	32.91 CY	10.88 /CY	9.31 /CY	/CY	/CY	20.19 /CY	664	30.94 /CY	1,018
					31.25.01.00	Earthworks, Structural, Excavation									
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	419.72 CY	5.93 /CY	23.02 /CY	-	-	28.95 /CY	12,149	44.35 /CY	18,613
						31.25.01.00 Earthworks, Structural, Excavation	419.72 CY	5.93 /CY	23.02 /CY	/CY	/CY	28.95 /CY	12,149	44.35 /CY	18,613
						26.10 Site Electrical	1.00 LS	9,420.17 /LS	19,040.64 /LS	2,302.25 /LS	/LS	30,763.06 /LS	30,763	47,298.59 /LS	47,299
						31.0 Earthwork	869.12 CY	10.84 /CY	21.91 /CY	2.65 /CY	/CY	35.40 /CY	30,763	54.42 /CY	47,299
						26.01.PRI Primary Feed 100A	1,000.00 LF	47.49 /LF	20.23 /LF	28.17 /LF	/LF	95.89 /LF	95,888	165.23 /LF	165,232
		26.03.XFMR				Pad Mounted Transformer, Meter, and Grounding									
			26.0			Electrical Work									
				26.10		Site Electrical									
					03.05.00.00	Concrete Pad									
						Concrete in place, curbs and pads, including formwork & resteel	36.00 sf	22.91 /sf	1.00 /sf	2.00 /sf	-	25.91 /sf	933	46.31 /sf	1,667
						03.05.00.00 Concrete Pad	0.00	/CY	/CY	/CY	/CY	/CY	933	/CY	1,667
						26.10 Site Electrical	1.00 LS	824.62 /LS	36.00 /LS	72.00 /LS	/LS	932.62 /LS	933	1,667.25 /LS	1,667
				26.15		Process Electrical									
					26.15.11.00	Process Electrical, Grounding									
						Grounding rod, copper clad, 10' long, 3/4" diameter	4.00 ea	235.88 /ea	-	53.00 /ea	-	288.88 /ea	1,156	518.64 /ea	2,075
						Ground wire, copper wire, bare stranded, 4/0	1.00 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	784	1,427.89 /clf	1,428
						Exothermic weld, 4/0 wire to 4/0 wire	6.00 ea	148.26 /ea	-	9.45 /ea	-	157.71 /ea	946	281.74 /ea	1,690
						Exothermic weld, mold reusable for above	2.00 ea	-	-	141.00 /ea	-	141.00 /ea	282	261.51 /ea	523
						26.15.11.00 Process Electrical, Grounding	100.00 LF	21.97 /LF	/LF	9.71 /LF	/LF	31.68 /LF	3,168	57.16 /LF	5,716
					26.25.03.00	Electrical Equipment, Switchgear - General									
						Allowance for metering at transformer	1.00 EA	1,037.85 /EA	-	2,500.00 /EA	-	3,537.85 /EA	3,538	6,485.99 /EA	6,486
						26.25.03.00 Electrical Equipment, Switchgear - General	1.00 EA	1,037.85 /EA	/EA	2,500.00 /EA	/EA	3,537.85 /EA	3,538	6,485.99 /EA	6,486
						26.15 Process Electrical	3,414.00 SF	0.95 /SF	/SF	1.02 /SF	/SF	1.96 /SF	6,706	3.57 /SF	12,202
				26.25		Facility Electrical									
					26.25.06.00	Transformers, Dry Type									
						Transformer, oil-filled, 15 kV with taps, 480 V secondary 3 phase, 225 kVA, pad mounted	1.00 EA	4,721.29 /EA	259.04 /EA	16,900.00 /EA	-	21,880.33 /EA	21,880	40,217.90 /EA	40,218
						26.25.06.00 Transformers, Dry Type	1.00 EA	4,721.29 /EA	259.04 /EA	16,900.00 /EA	/EA	21,880.33 /EA	21,880	40,217.90 /EA	40,218
						26.25 Facility Electrical	1.00 LS	4,721.29 /LS	259.04 /LS	16,900.00 /LS	/LS	21,880.33 /LS	21,880	40,217.90 /LS	40,218
						26.0 Electrical Work	3,414.00 SF	2.57 /SF	0.09 /SF	5.99 /SF	/SF	8.65 /SF	29,519	15.84 /SF	54,087
						26.03.XFMR Pad Mounted Transformer, Meter, and Grounding	225.00 kVA	39.03 /kVA	1.31 /kVA	90.86 /kVA	/kVA	131.19 /kVA	29,519	240.39 /kVA	54,087
		26.05.GRDG				Facility Grounding									
			26.0			Electrical Work									
				26.00		Electrical									
					01.01.06.03	GC Equip, Tools, & Consumables									
						Rent trencher chain boom gas oper walking 12 HP	3.00 day	-	156.95 /day	-	-	156.95 /day	471	279.70 /day	839
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	470.85 /LS	/LS	/LS	470.85 /LS	471	839.10 /LS	839
						26.00 Electrical	3,414.00 SF	/SF	0.14 /SF	/SF	/SF	0.14 /SF	471	0.25 /SF	839
				26.15		Process Electrical									
					26.15.11.00	Process Electrical, Grounding									
						Copper Bus Bar .25"x 3.0"	4.00 lf	30.36 /lf	-	52.90 /lf	-	83.26 /lf	333	152.21 /lf	609
						Copper Bus Bar Supports	6.00 E	121.44 /E	-	48.30 /E	-	169.74 /E	1,018	305.98 /E	1,836
						Grounding rod, copper clad, 15' long, 3/4" diameter	8.00 ea	259.46 /ea	-	55.00 /ea	-	314.46 /ea	2,516	564.38 /ea	4,515
						Ground wire, copper wire, bare stranded, 4/0	5.00 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	3,921	1,427.89 /clf	7,139
						Water pipe ground clamps, heavy duty, bronze, 2-1/2" to 3" diameter	2.00 ea	172.98 /ea	-	60.50 /ea	-	233.48 /ea	467	420.46 /ea	841
						Exothermic weld, 4/0 wire to 4/0 wire	40.00 ea	148.26 /ea	-	9.45 /ea	-	157.71 /ea	6,309	281.74 /ea	11,270
						Exothermic weld, mold reusable for above	10.00 ea	-	-	141.00 /ea	-	141.00 /ea	1,410	261.50 /ea	2,615
						Protective boxes at grade level, round, concrete, 12" long, incl breather slots	2.00 ea	64.87 /ea	-	112.00 /ea	-	176.87 /ea	354	323.31 /ea	647

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						26.15.11.00 Process Electrical, Grounding	500.00 LF	22.31 /LF	/LF	10.35 /LF	/LF	32.65 /LF	16,327	58.94 /LF	29,472
						26.15 Process Electrical	3,414.00 SF	3.27 /SF	/SF	1.52 /SF	/SF	4.78 /SF	16,327	8.63 /SF	29,472
						26.0 Electrical Work	3,414.00 SF	3.27 /SF	0.14 /SF	1.52 /SF	/SF	4.92 /SF	16,798	8.88 /SF	30,311
						26.05.GRDG Facility Grounding	3,414.00 SF	3.27 /SF	0.14 /SF	1.52 /SF	/SF	4.92 /SF	16,798	8.88 /SF	30,311
		26.10.SEC				Secondary Power Feed 225A									
			26.0			Electrical Work									
				26.10		Site Electrical									
					26.10.02.00	Site Electrical, Buried Conduit									
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.60 ton	1,461.67 /ton	-	1,125.00 /ton	-	2,586.67 /ton	1,552	4,691.23 /ton	2,815
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	220.00 lf	12.97 /lf	-	3.72 /lf	-	16.69 /lf	3,672	30.02 /lf	6,604
						26.10.02.00 Site Electrical, Buried Conduit	220.00 LF	16.96 /LF	/LF	6.79 /LF	/LF	23.75 /LF	5,224	42.81 /LF	9,419
						26.10 Site Electrical	1.00 LS	3,731.07 /LS	/LS	1,493.40 /LS	/LS	5,224.47 /LS	5,224	9,418.74 /LS	9,419
				26.15		Process Electrical									
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	5.00 clf	471.75 /clf	-	385.00 /clf	-	856.75 /clf	4,284	1,554.71 /clf	7,774
						26.15.01.00 Process Electrical, Wire/Cable	500.00 LF	4.72 /LF	/LF	3.85 /LF	/LF	8.57 /LF	4,284	15.55 /LF	7,774
					26.15.11.00	Process Electrical, Grounding									
						Ground wire, copper wire, bare stranded, 4/0	1.03 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	808	1,427.86 /clf	1,471
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	1.00 ea	129.73 /ea	-	31.00 /ea	-	160.73 /ea	161	288.69 /ea	289
						26.15.11.00 Process Electrical, Grounding	103.00 LF	4.90 /LF	/LF	4.50 /LF	/LF	9.40 /LF	968	17.08 /LF	1,759
						26.15 Process Electrical	3,414.00 SF	0.84 /SF	/SF	0.70 /SF	/SF	1.54 /SF	5,252	2.79 /SF	9,533
						26.0 Electrical Work	3,414.00 SF	1.93 /SF	/SF	1.14 /SF	/SF	3.07 /SF	10,477	5.55 /SF	18,952
			31.0			Earthwork									
				26.10		Site Electrical									
					31.20.07.15	Earthworks, Sitework, Borrow									
						Concrete (red) envelope/encasement, poured neat	5.94 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	273.89 /CY	1,626	425.24 /CY	2,524
						End bulkheads, plywood, concrete envelope/encasement	0.71 sf	13.49 /sf	-	0.73 /sf	-	14.22 /sf	10	21.83 /sf	16
						31.20.07.15 Earthworks, Sitework, Borrow	5.94 CY	196.24 /CY	1.76 /CY	77.59 /CY	/CY	275.59 /CY	1,636	427.85 /CY	2,539
					31.20.09.10	Earthworks, Sitework, Backfill									
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	77.36 CY	1.94 /CY	23.32 /CY	-	-	25.26 /CY	1,954	38.70 /CY	2,994
						31.20.09.10 Earthworks, Sitework, Backfill	77.36 CY	1.94 /CY	23.32 /CY	/CY	/CY	25.26 /CY	1,954	38.70 /CY	2,994
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees									
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	6.58 CY	10.88 /CY	9.31 /CY	-	-	20.19 /CY	133	30.94 /CY	204
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	6.58 CY	10.88 /CY	9.31 /CY	/CY	/CY	20.19 /CY	133	30.94 /CY	204
					31.25.01.00	Earthworks, Structural, Excavation									
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	83.94 CY	5.93 /CY	23.02 /CY	-	-	28.95 /CY	2,430	44.35 /CY	3,723
						31.25.01.00 Earthworks, Structural, Excavation	83.94 CY	5.93 /CY	23.02 /CY	/CY	/CY	28.95 /CY	2,430	44.35 /CY	3,723
						26.10 Site Electrical	1.00 LS	1,884.11 /LS	3,808.12 /LS	460.48 /LS	/LS	6,152.71 /LS	6,153	9,459.86 /LS	9,460
						31.0 Earthwork	173.82 CY	10.84 /CY	21.91 /CY	2.65 /CY	/CY	35.40 /CY	6,153	54.42 /CY	9,460
						26.10.SEC Secondary Power Feed 225A	500.00 LF	16.96 /LF	7.62 /LF	8.69 /LF	/LF	33.26 /LF	16,629	56.82 /LF	28,412
		26.20.DIST				Electrical Distribution Equipment									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 1-1/2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	40.00 lf	11.53 /lf	-	3.46 /lf	-	14.99 /lf	600	26.97 /lf	1,079
						Flexible metallic conduit, steel, 1-1/2" diameter	3.00 lf	20.76 /lf	-	2.55 /lf	-	23.31 /lf	70	41.72 /lf	125
						Flexible metallic conduit, steel, 2" diameter	3.00 lf	25.95 /lf	-	3.23 /lf	-	29.18 /lf	88	52.23 /lf	157
						Flexible metallic conduit, steel, connectors, insulated, 1-1/2" diameter	1.00 ea	32.43 /ea	-	24.50 /ea	-	56.93 /ea	57	103.23 /ea	103
						Flexible metallic conduit, steel, connectors, insulated, 2" diameter	1.00 ea	45.12 /ea	-	26.00 /ea	-	71.12 /ea	71	128.62 /ea	129
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 1-1/2" diameter	1.00 ea	45.12 /ea	-	46.00 /ea	-	91.12 /ea	91	165.72 /ea	166
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 2" diameter	1.00 ea	57.66 /ea	-	67.00 /ea	-	124.66 /ea	125	227.01 /ea	227
						Panelboards, 3 phase 4 wire, main lugs, 277/480 V, 100 amp, 20 circuits, NEHB, incl 20 A 1 pole plug-in breakers	1.00 ea	1,729.74 /ea	-	2,200.00 /ea	-	3,929.74 /ea	3,930	7,162.64 /ea	7,163
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 100 amp, 30 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	2,594.61 /ea	-	2,125.00 /ea	-	4,719.61 /ea	4,720	8,564.84 /ea	8,565
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 225 amp, 42 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	4,125.00 /ea	-	7,831.59 /ea	7,832	14,255.64 /ea	14,256
						26.00.99.00 Electrical, Other	3,414.00 SF	2.58 /SF	/SF	2.57 /SF	/SF	5.15 /SF	17,582	9.36 /SF	31,968
					26.10.03.00	UG Conduit									
						Uninterruptible power supply, charger, inverter, and alarm 1 phase, 120 V, 5 kVA, incl 10 minutes battery	1.00 ea	6,182.64 /ea	356.18 /ea	7,100.00 /ea	-	13,638.82 /ea	13,639	24,820.28 /ea	24,820
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	13,639	/LF	24,820
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #6, type XHHW, in raceway	0.25 clf	159.68 /clf	-	54.50 /clf	-	214.20 /clf	54	385.68 /clf	96
						Wire, copper, stranded, 600 volt, #4, type XHHW, in raceway	0.15 clf	195.80 /clf	-	77.50 /clf	-	273.30 /clf	41	492.73 /clf	74
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	1.00 clf	259.46 /clf	-	159.00 /clf	-	418.46 /clf	418	757.26 /clf	757
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	0.60 clf	471.75 /clf	-	385.00 /clf	-	856.75 /clf	514	1,554.72 /clf	933
						26.15.01.00 Process Electrical, Wire/Cable	200.00 LF	3.06 /LF	/LF	2.08 /LF	/LF	5.14 /LF	1,027	9.30 /LF	1,860
						26.15 Process Electrical	3,414.00 SF	4.57 /SF	0.10 /SF	4.77 /SF	/SF	9.45 /SF	32,248	17.18 /SF	58,649
				26.25		Facility Electrical									
					26.25.06.00	Transformers, Dry Type									
						Transformer, dry-type, ventilated, 3 phase 480 V primary 120/208 V secondary, 30 kVA	1.00 ea	2,306.32 /ea	-	1,800.00 /ea	-	4,106.32 /ea	4,106	7,448.33 /ea	7,448
						26.25.06.00 Transformers, Dry Type	1.00 EA	2,306.32 /EA	/EA	1,800.00 /EA	/EA	4,106.32 /EA	4,106	7,448.33 /EA	7,448
						26.25 Facility Electrical	1.00 LS	2,306.32 /LS	/LS	1,800.00 /LS	/LS	4,106.32 /LS	4,106	7,448.33 /LS	7,448
						26.0 Electrical Work	3,414.00 SF	5.25 /SF	0.10 /SF	5.30 /SF	/SF	10.65 /SF	36,354	19.36 /SF	66,097
						26.20.DIST Electrical Distribution Equipment	325.00 AMP	55.12 /AMP	1.10 /AMP	55.65 /AMP	/AMP	111.86 /AMP	36,354	203.38 /AMP	66,097
		26.25.LTG				Interior Lighting and Control									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	870.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	7,876	16.21 /lf	14,104
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	58.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	3,205	98.73 /ea	5,726
						Outlet boxes, pressed steel, covers, blank, 4" square	36.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	612	30.33 /ea	1,092
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	22.00 ea	16.22 /ea	-	1.66 /ea	-	17.88 /ea	393	31.98 /ea	704
						26.00.99.00 Electrical, Other	3,414.00 SF	3.19 /SF	/SF	0.35 /SF	/SF	3.54 /SF	12,086	6.33 /SF	21,625
					26.10.03.00	UG Conduit									
						Toggle switch, quiet type, single pole, 20 amp	2.00 ea	38.44 /ea	-	3.46 /ea	-	41.90 /ea	84	74.92 /ea	150
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	84	/LF	150
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	34.00 clf	94.35 /clf	-	13.70 /clf	-	108.05 /clf	3,674	193.55 /clf	6,581

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	3.50 clf	103.79 /clf	-	20.50 /clf	-	124.29 /clf	435	222.98 /clf	780
						26.15.01.00 Process Electrical, Wire/Cable	3,750.00 LF	0.95 /LF	/LF	0.14 /LF	/LF	1.10 /LF	4,109	1.96 /LF	7,361
						26.15 Process Electrical	3,414.00 SF	4.26 /SF	/SF	0.51 /SF	/SF	4.77 /SF	16,279	8.53 /SF	29,136
				26.20		Facility Electrical									
					26.20.03.00	Facility Electrical, Lighting									
						LED Strip Light, hdwe	9.00 ea	182.08 /ea	-	110.00 /ea	-	292.08 /ea	2,629	528.48 /ea	4,756
						LED Lay-in, hdwe	38.00 ea	207.57 /ea	-	150.00 /ea	-	357.57 /ea	13,588	648.09 /ea	24,628
						LED Downlight, hdwe	5.00 ea	129.73 /ea	-	80.00 /ea	-	209.73 /ea	1,049	379.56 /ea	1,898
						LED Foyer Indirect, hdwe	2.00 ea	207.57 /ea	-	250.00 /ea	-	457.57 /ea	915	833.55 /ea	1,667
						Emergency ballast, material only, interior, factory installed in fixture	19.00 ea	-	-	152.00 /ea	-	152.00 /ea	2,888	281.90 /ea	5,356
						Exit lighting, L.E.D. standard, single face, ceiling or wall mount	4.00 ea	129.73 /ea	-	70.00 /ea	-	199.73 /ea	799	361.01 /ea	1,444
						Automatic wall switches	16.00 ea	43.24 /ea	-	50.00 /ea	-	93.24 /ea	1,492	169.79 /ea	2,717
						Fixture whips, 3/8" greenfield, 2 connectors, THHN wire, three #14, 6' long	43.00 ea	32.43 /ea	-	5.45 /ea	-	37.88 /ea	1,629	67.91 /ea	2,920
						26.20.03.00 Facility Electrical, Lighting	3,414.00 SF	3.87 /SF	/SF	3.45 /SF	/SF	7.32 /SF	24,988	13.29 /SF	45,386
						26.20 Facility Electrical	3,414.00 SF	3.87 /SF	/SF	3.45 /SF	/SF	7.32 /SF	24,988	13.29 /SF	45,386
						26.0 Electrical Work	3,414.00 SF	8.13 /SF	/SF	3.96 /SF	/SF	12.09 /SF	41,267	21.83 /SF	74,522
						26.25.LTG Interior Lighting and Control	1.00 LS	27,739.43 /LS	/LS	13,527.42 /LS	/LS	41,266.85 /LS	41,267	74,521.83 /LS	74,522
		26.26.EXTLTG				Exterior Lighting and Control									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	50.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	453	16.21 /lf	811
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	3.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	166	98.73 /ea	296
						Outlet boxes, pressed steel, covers, blank, 4" square	3.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	51	30.33 /ea	91
						26.00.99.00 Electrical, Other	3,414.00 SF	0.18 /SF	/SF	0.02 /SF	/SF	0.20 /SF	669	0.35 /SF	1,198
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	1.80 clf	94.35 /clf	-	13.70 /clf	-	108.05 /clf	194	193.53 /clf	348
						26.15.01.00 Process Electrical, Wire/Cable	180.00 LF	0.94 /LF	/LF	0.14 /LF	/LF	1.08 /LF	194	1.94 /LF	348
					26.15.07.00	Lighting									
						LED Area Light	3.00 E	97.30 /E	-		-	97.30 /E	292	173.39 /E	520
						Wallpack Photocell	3.00 E	32.43 /E	-		-	32.43 /E	97	57.80 /E	173
						26.15.07.00 Lighting	1.00 LS	389.19 /LS	/LS	/LS	/LS	389.19 /LS	389	693.58 /LS	694
						26.15 Process Electrical	3,414.00 SF	0.34 /SF	/SF	0.03 /SF	/SF	0.37 /SF	1,253	0.66 /SF	2,240
						26.0 Electrical Work	3,414.00 SF	0.34 /SF	/SF	0.03 /SF	/SF	0.37 /SF	1,253	0.66 /SF	2,240
						26.26.EXTLTG Exterior Lighting and Control	1.00 LS	1,162.52 /LS	/LS	90.58 /LS	/LS	1,253.10 /LS	1,253	2,239.69 /LS	2,240
		26.30.DEV				Device Outlets									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,820.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	16,477	16.21 /lf	29,505
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	91.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	5,029	98.73 /ea	8,984
						Outlet boxes, pressed steel, covers, blank, 4" square	20.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	340	30.33 /ea	607
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	71.00 ea	16.22 /ea	-	1.66 /ea	-	17.88 /ea	1,269	31.98 /ea	2,270
						Duplex receptacle, grounded, 120 volt, 20 amp	61.00 ea	38.44 /ea	-	10.65 /ea	-	49.09 /ea	2,994	88.25 /ea	5,383
						Duplex receptacle, ground fault interrupting, 20 amp	10.00 ea	38.44 /ea	-	45.00 /ea	-	83.44 /ea	834	151.96 /ea	1,520
						26.00.99.00 Electrical, Other	3,414.00 SF	6.87 /SF	/SF	1.02 /SF	/SF	7.89 /SF	26,944	14.14 /SF	48,269
					26.10.03.00	UG Conduit									
						WP cover	5.00 ea	17.30 /ea	-	42.50 /ea	-	59.80 /ea	299	109.65 /ea	548
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	299	/LF	548
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	51.60 clf	94.35 /clf	-	13.70 /clf	-	108.05 /clf	5,575	193.55 /clf	9,987
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	3.00 clf	103.78 /clf	-	20.50 /clf	-	124.28 /clf	373	222.97 /clf	669
						26.15.01.00 Process Electrical, Wire/Cable	5,460.00 LF	0.95 /LF	/LF	0.14 /LF	/LF	1.09 /LF	5,948	1.95 /LF	10,656
						26.15 Process Electrical	3,414.00 SF	8.41 /SF	/SF	1.31 /SF	/SF	9.72 /SF	33,191	17.42 /SF	59,473
						26.0 Electrical Work	3,414.00 SF	8.41 /SF	/SF	1.31 /SF	/SF	9.72 /SF	33,191	17.42 /SF	59,473
						26.30.DEV Device Outlets	1.00 LS	28,723.16 /LS	/LS	4,467.90 /LS	/LS	33,191.06 /LS	33,191	59,473.26 /LS	59,473
		26.40.EQCON				Facility Equipment Connections and Controls									
			26.0			Electrical Work									
				26.10		Site Electrical									
					26.00.99.00	Electrical, Other									
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 5 HP motor	4.00 ea	129.73 /ea	-	6.35 /ea	-	136.08 /ea	544	242.97 /ea	972
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 10 HP motor	2.00 ea	129.73 /ea	-	6.35 /ea	-	136.08 /ea	272	242.96 /ea	486
						Motor connections, flexible conduit and fittings, 3 phase, sealtite, 460 volt, 10 HP motor	2.00 ea	129.73 /ea	-	9.30 /ea	-	139.03 /ea	278	248.44 /ea	497
						26.00.99.00 Electrical, Other	3,414.00 SF	0.30 /SF	/SF	0.02 /SF	/SF	0.32 /SF	1,095	0.57 /SF	1,955
						26.10 Site Electrical	1.00 LS	1,037.84 /LS	/LS	56.70 /LS	/LS	1,094.54 /LS	1,095	1,954.68 /LS	1,955
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	300.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	2,716	16.21 /lf	4,863
						Electric metallic tubing (EMT), 1" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	9.03 /lf	-	1.80 /lf	-	10.83 /lf	2,165	19.42 /lf	3,884
						26.00.99.00 Electrical, Other	3,414.00 SF	1.23 /SF	/SF	0.20 /SF	/SF	1.43 /SF	4,881	2.56 /SF	8,748
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	4.50 clf	94.35 /clf	-	13.70 /clf	-	108.05 /clf	486	193.55 /clf	871
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	9.00 clf	103.78 /clf	-	20.50 /clf	-	124.28 /clf	1,119	222.97 /clf	2,007
						Wire, copper, stranded, 600 volt, #8, type XHHW, in raceway	13.00 clf	129.73 /clf	-	34.00 /clf	-	163.73 /clf	2,129	294.25 /clf	3,825
						26.15.01.00 Process Electrical, Wire/Cable	2,650.00 LF	1.15 /LF	/LF	0.26 /LF	/LF	1.41 /LF	3,733	2.53 /LF	6,703
					26.20.05.00	Facility Electrical, HVAC									
						HVAC controls - electrical contractor scope	1.00 LS		-	3,500.00 /LS	-	3,500.00 /LS	3,500	6,491.06 /LS	6,491
						26.20.05.00 Facility Electrical, HVAC	3,414.00 SF	/SF	/SF	1.03 /SF	/SF	1.03 /SF	3,500	1.90 /SF	6,491
						26.15 Process Electrical	3,414.00 SF	2.12 /SF	/SF	1.43 /SF	/SF	3.55 /SF	12,114	6.43 /SF	21,942
						26.0 Electrical Work	3,414.00 SF	2.43 /SF	/SF	1.44 /SF	/SF	3.87 /SF	13,209	7.00 /SF	23,896
						26.40.EQCON Facility Equipment Connections and Controls	8.00 ALO	1,035.37 /ALO	/ALO	615.73 /ALO	/ALO	1,651.10 /ALO	13,209	2,987.05 /ALO	23,896
		26.90.LPS				Facility Lightning Protection System									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.15.10.00	Process Electrical, Lightning Protection									
						Air terminal and base, copper, 3/8" dia x 10", to 75' h	20.00 ea	129.73 /ea	-	26.00 /ea	-	155.73 /ea	3,115	279.41 /ea	5,588
						Lightning protection cable, copper, 220 lb per thousand feet, to 75' h	1,000.00 lf	3.24 /lf	-	3.18 /lf	-	6.42 /lf	6,423	11.68 /lf	11,677
						26.15.10.00 Process Electrical, Lightning Protection	3,414.00 SF	1.71 /SF	/SF	1.08 /SF	/SF	2.79 /SF	9,538	5.06 /SF	17,266
						26.15 Process Electrical	3,414.00 SF	1.71 /SF	/SF	1.08 /SF	/SF	2.79 /SF	9,538	5.06 /SF	17,266
				26.20		Facility Electrical									

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.10.00	Process Electrical, Lightning Protection									
						LPS design and certification, misc mat and labor	1.00 LS	4,540.57 /LS	-	2,000.00 /LS	5,000.00 /LS	11,540.57 /LS	11,541	20,711.30 /LS	20,711
						26.15.10.00 Process Electrical, Lightning Protection	3,414.00 SF	1.33 /SF	/SF	0.59 /SF	1.47 /SF	3.38 /SF	11,541	6.07 /SF	20,711
						26.20 Facility Electrical	3,414.00 SF	1.33 /SF	/SF	0.59 /SF	1.47 /SF	3.38 /SF	11,541	6.07 /SF	20,711
						26.0 Electrical Work	3,414.00 SF	3.04 /SF	/SF	1.67 /SF	1.47 /SF	6.17 /SF	21,078	11.12 /SF	37,977
						26.90.LPS Facility Lightning Protection System	3,414.00 SF	3.04 /SF	/SF	1.67 /SF	1.47 /SF	6.17 /SF	21,078	11.12 /SF	37,977
		27.10.COMEQ				Communications Room Equipment									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	1,811	16.21 /lf	3,242
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	4.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	221	98.72 /ea	395
						Outlet boxes, pressed steel, covers, blank, 4" square	4.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	68	30.33 /ea	121
						Duplex receptacle, grounded, 120 volt, 20 amp	4.00 ea	38.44 /ea	-	10.65 /ea	-	49.09 /ea	196	88.25 /ea	353
						26.00.99.00 Electrical, Other	3,414.00 SF	0.59 /SF	/SF	0.08 /SF	/SF	0.67 /SF	2,296	1.20 /SF	4,112
					26.15.01.00	Process Electrical, Wire/Cable									
						Closet Distribution Frame (CDF), 7 feet tall, 19 inches wide	1.00 E	364.31 /E	-	123.00 /E	-	487.31 /E	487	877.34 /E	877
						Network Equipment Allowance	1.00 LS	24,287.06 /LS	-	20,000.00 /LS	-	44,287.06 /LS	44,287	80,373.38 /LS	80,373
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	6.50 clf	94.35 /clf	-	13.70 /clf	-	108.05 /clf	702	193.54 /clf	1,258
						26.15.01.00 Process Electrical, Wire/Cable	350.00 LF	72.19 /LF	/LF	57.75 /LF	/LF	129.93 /LF	45,477	235.74 /LF	82,509
					26.15.03.00	Process Electrical, Cable Tray									
						Cable tray, ladder type, galvanized steel, 4" deep, 4" rung spacing, 12" wide, to 15' elevation, incl fittings & supports	30.00 lf	24.14 /lf	-	17.95 /lf	-	42.09 /lf	1,263	76.30 /lf	2,289
						26.15.03.00 Process Electrical, Cable Tray	30.00 LF	24.14 /LF	/LF	17.95 /LF	/LF	42.09 /LF	1,263	76.30 /LF	2,289
						26.15 Process Electrical	3,414.00 SF	8.21 /SF	/SF	6.16 /SF	/SF	14.36 /SF	49,035	26.04 /SF	88,909
						26.0 Electrical Work	3,414.00 SF	8.21 /SF	/SF	6.16 /SF	/SF	14.36 /SF	49,035	26.04 /SF	88,909
						27.10.COMEQ Communications Room Equipment	1.00 LS	28,011.60 /LS	/LS	21,023.71 /LS	/LS	49,035.31 /LS	49,035	88,909.37 /LS	88,909
		27.20.COMOUT				Comm Outlets									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 1" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,600.00 lf	9.03 /lf	-	1.80 /lf	-	10.83 /lf	17,320	19.42 /lf	31,074
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	24.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	1,326	98.73 /ea	2,369
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	24.00 ea	16.22 /ea	-	1.66 /ea	-	17.88 /ea	429	31.98 /ea	767
						26.00.99.00 Electrical, Other	3,414.00 SF	4.71 /SF	/SF	0.88 /SF	/SF	5.59 /SF	19,075	10.02 /SF	34,211
						26.15 Process Electrical	3,414.00 SF	4.71 /SF	/SF	0.88 /SF	/SF	5.59 /SF	19,075	10.02 /SF	34,211
						26.0 Electrical Work	3,414.00 SF	4.71 /SF	/SF	0.88 /SF	/SF	5.59 /SF	19,075	10.02 /SF	34,211
			27.0			Communications									
				27.00		Communications									
					27.30.01.00	Comm Cable									
						Unshielded twisted pair (UTP) cable, stranded, PVC jacket, #24, 4 pair, category 6	20.00 clf	148.26 /clf	-	15.45 /clf	-	163.71 /clf	3,274	251.94 /clf	5,039
						Shielded twisted pair (UTP) jack, RJ-45, category 6	48.00 ea	17.30 /ea	-	6.90 /ea	-	24.20 /ea	1,161	37.57 /ea	1,804
						27.30.01.00 Comm Cable	1.00 LS	3,795.55 /LS	/LS	640.20 /LS	/LS	4,435.75 /LS	4,436	6,842.37 /LS	6,842
						27.00 Communications	1.00 LS	3,795.55 /LS	/LS	640.20 /LS	/LS	4,435.75 /LS	4,436	6,842.37 /LS	6,842
						27.0 Communications	3,414.00 SF	1.11 /SF	/SF	0.19 /SF	/SF	1.30 /SF	4,436	2.00 /SF	6,842
						27.20.COMOUT Comm Outlets	24.00 EA	827.91 /EA	/EA	151.71 /EA	/EA	979.61 /EA	23,511	1,710.54 /EA	41,053
		27.31.COMCDT				Comm Conduit to MH/HH									
			26.0			Electrical Work									
				26.10		Site Electrical									
					26.10.02.00	Site Electrical, Buried Conduit									
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	2,586.67 /ton	2,328	4,691.22 /ton	4,222
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	150.00 lf	12.97 /lf	-	3.72 /lf	-	16.69 /lf	2,504	30.02 /lf	4,503
						26.10.02.00 Site Electrical, Buried Conduit	150.00 LF	21.74 /LF	/LF	10.47 /LF	/LF	32.21 /LF	4,832	58.17 /LF	8,725
						26.10 Site Electrical	1.00 LS	3,261.46 /LS	/LS	1,570.50 /LS	/LS	4,831.96 /LS	4,832	8,724.82 /LS	8,725
				26.15		Process Electrical									
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	6.50 clf	259.46 /clf	-	159.00 /clf	-	418.46 /clf	2,720	757.26 /clf	4,922
						26.15.01.00 Process Electrical, Wire/Cable	650.00 LF	2.60 /LF	/LF	1.59 /LF	/LF	4.19 /LF	2,720	7.57 /LF	4,922
					26.15.11.00	Process Electrical, Grounding									
						Ground wire, copper wire, bare stranded, 4/0	1.55 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	1,212	1,427.88 /clf	2,206
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	1.50 ea	129.73 /ea	-	31.00 /ea	-	160.73 /ea	241	288.69 /ea	433
						26.15.11.00 Process Electrical, Grounding	155.00 LF	4.89 /LF	/LF	4.49 /LF	/LF	9.37 /LF	1,453	17.03 /LF	2,639
						26.15 Process Electrical	3,414.00 SF	0.72 /SF	/SF	0.51 /SF	/SF	1.22 /SF	4,173	2.21 /SF	7,561
						26.0 Electrical Work	3,414.00 SF	1.67 /SF	/SF	0.97 /SF	/SF	2.64 /SF	9,005	4.77 /SF	16,286
			31.0			Earthwork									
				26.10		Site Electrical									
					31.20.07.15	Earthworks, Sitework, Borrow									
						Concrete (red) envelope/encasement, poured neat	8.90 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	273.89 /CY	2,438	425.24 /CY	3,786
						End bulkheads, plywood, concrete envelope/encasement	1.07 sf	13.49 /sf	-	0.73 /sf	-	14.22 /sf	15	21.82 /sf	23
						31.20.07.15 Earthworks, Sitework, Borrow	8.90 CY	196.24 /CY	1.76 /CY	77.59 /CY	/CY	275.59 /CY	2,454	427.85 /CY	3,809
					31.20.09.10	Earthworks, Sitework, Backfill									
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	116.05 CY	1.94 /CY	23.32 /CY	-	-	25.26 /CY	2,932	38.70 /CY	4,492
						31.20.09.10 Earthworks, Sitework, Backfill	116.05 CY	1.94 /CY	23.32 /CY	/CY	/CY	25.26 /CY	2,932	38.70 /CY	4,492
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees									
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	9.87 CY	10.88 /CY	9.31 /CY	-	-	20.19 /CY	199	30.94 /CY	305
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	9.87 CY	10.88 /CY	9.31 /CY	/CY	/CY	20.19 /CY	199	30.94 /CY	305
					31.25.01.00	Earthworks, Structural, Excavation									
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	125.92 CY	5.93 /CY	23.02 /CY	-	-	28.95 /CY	3,645	44.35 /CY	5,584
						31.25.01.00 Earthworks, Structural, Excavation	125.92 CY	5.93 /CY	23.02 /CY	/CY	/CY	28.95 /CY	3,645	44.35 /CY	5,584
						26.10 Site Electrical	1.00 LS	2,826.28 /LS	5,712.18 /LS	690.76 /LS	/LS	9,229.22 /LS	9,229	14,190.05 /LS	14,190
						31.0 Earthwork	260.74 CY	10.84 /CY	21.91 /CY	2.65 /CY	/CY	35.40 /CY	9,229	54.42 /CY	14,190
						27.31.COMCDT Comm Conduit to MH/HH	0.00	/LF	/LF	/LF	/LF	/LF	18,234	/LF	30,476
		28.10.FA				Fire Alarm System									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,820.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	16,477	16.21 /lf	29,505
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	60.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	3,316	98.73 /ea	5,924

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.00.99.00	Electrical, Other									
						Outlet boxes, pressed steel, covers, blank, 4" square	8.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	136	30.33 /ea	243
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	52.00 ea	16.22 /ea	-	1.66 /ea	-	17.88 /ea	930	31.98 /ea	1,663
						26.00.99.00 Electrical, Other	3,414.00 SF	5.45 /SF	/SF	0.66 /SF	/SF	6.11 /SF	20,858	10.94 /SF	37,334
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	300.00 clf	79.83 /clf	-	9.70 /clf	-	89.53 /clf	26,860	160.26 /clf	48,078
						26.15.01.00 Process Electrical, Wire/Cable	30,000.00 LF	0.80 /LF	/LF	0.10 /LF	/LF	0.90 /LF	26,860	1.60 /LF	48,078
						26.15 Process Electrical	3,414.00 SF	12.47 /SF	/SF	1.51 /SF	/SF	13.98 /SF	47,719	25.02 /SF	85,412
						26.0 Electrical Work	3,414.00 SF	12.47 /SF	/SF	1.51 /SF	/SF	13.98 /SF	47,719	25.02 /SF	85,412
			28.0			Electronic Safety and Security									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Detection Systems, fire alarm control panel, alarm device, excluding wires & conduits	24.00 ea	129.73 /ea	-	230.00 /ea	-	359.73 /ea	8,634	567.81 /ea	13,628
						Detection Systems, fire alarm control panel, actuating device, excluding wires & conduits	4.00 ea	129.73 /ea	-	340.00 /ea	-	469.73 /ea	1,879	744.32 /ea	2,977
						Detection Systems, fire alarm control panel, addressable without voice, up to 200 points, excluding wires & conduits, inluding vendor design, startup	1.00 ea	1,816.00 /ea	-	4,575.00 /ea	2,500.00 /ea	8,891.00 /ea	8,891	13,953.45 /ea	13,953
						Detection Systems, fire alarm control panel, battery & rack, excluding wires & conduits	1.00 ea	259.46 /ea	-	460.00 /ea	-	719.46 /ea	719	1,135.63 /ea	1,136
						Detection Systems, fire alarm control panel, battery & rack, automatic charger, excluding wires & conduits	1.00 ea	129.73 /ea	-	525.00 /ea	-	654.73 /ea	655	1,041.17 /ea	1,041
						Detection Systems, visual alarm, ADA type, excluding wires & conduits	24.00 ea	154.90 /ea	-	119.00 /ea	-	273.90 /ea	6,574	428.27 /ea	10,278
						28.35.01.00 Electronic Safety and Security	3,414.00 SF	2.80 /SF	/SF	4.48 /SF	0.73 /SF	8.01 /SF	27,351	12.60 /SF	43,014
						28.00 Electronic Safety and Security	3,414.00 SF	2.80 /SF	/SF	4.48 /SF	0.73 /SF	8.01 /SF	27,351	12.60 /SF	43,014
						28.0 Electronic Safety and Security	3,414.00 SF	2.80 /SF	/SF	4.48 /SF	0.73 /SF	8.01 /SF	27,351	12.60 /SF	43,014
						28.10.FA Fire Alarm System	3,414.00 SF	15.27 /SF	/SF	5.99 /SF	0.73 /SF	21.99 /SF	75,070	37.62 /SF	128,426
		28.20.AC				Access Control System									
			28.0			Electronic Safety and Security									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Card reader - all in allowance per each (incl circuit, cards, CX)	7.00 ea	1,556.77 /ea	-	800.00 /ea	-	2,356.77 /ea	16,497	3,668.77 /ea	25,681
						28.35.01.00 Electronic Safety and Security	3,414.00 SF	3.19 /SF	/SF	1.64 /SF	/SF	4.83 /SF	16,497	7.52 /SF	25,681
						28.00 Electronic Safety and Security	3,414.00 SF	3.19 /SF	/SF	1.64 /SF	/SF	4.83 /SF	16,497	7.52 /SF	25,681
						28.0 Electronic Safety and Security	3,414.00 SF	3.19 /SF	/SF	1.64 /SF	/SF	4.83 /SF	16,497	7.52 /SF	25,681
						28.20.AC Access Control System	7.00 DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	2,356.77 /DOOR	16,497	3,668.77 /DOOR	25,681
		28.20.CCTV				Closed Circuit TV and Cameras									
			26.0			Electrical Work									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Camera allowance (licenses, circuit, startup, CX)	1.00 LS	3,113.54 /LS	-	2,000.00 /LS	2,000.00 /LS	7,113.54 /LS	7,114	12,821.97 /LS	12,822
						28.35.01.00 Electronic Safety and Security	3,414.00 SF	0.91 /SF	/SF	0.59 /SF	0.59 /SF	2.08 /SF	7,114	3.76 /SF	12,822
						28.00 Electronic Safety and Security	3,414.00 SF	0.91 /SF	/SF	0.59 /SF	0.59 /SF	2.08 /SF	7,114	3.76 /SF	12,822
						26.0 Electrical Work	3,414.00 SF	0.91 /SF	/SF	0.59 /SF	0.59 /SF	2.08 /SF	7,114	3.76 /SF	12,822
			28.0			Electronic Safety and Security									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Closed circuit television system (CCTV), industrial quality, one station (camera & monitor)	1.00 totl	798.34 /totl	-	1,650.00 /totl	-	2,448.34 /totl	2,448	3,870.67 /totl	3,871
						Closed circuit television system (CCTV), industrial quality, for additional camera stations, add	2.00 ea	384.39 /ea	-	690.00 /ea	-	1,074.39 /ea	2,149	1,696.08 /ea	3,392
						Closed circuit television system (CCTV), industrial quality, for weatherproof camera station, add	3.00 ea	798.34 /ea	-	540.00 /ea	-	1,338.34 /ea	4,015	2,089.61 /ea	6,269
						28.35.01.00 Electronic Safety and Security	3,414.00 SF	1.16 /SF	/SF	1.36 /SF	/SF	2.52 /SF	8,612	3.96 /SF	13,532
						28.00 Electronic Safety and Security	3,414.00 SF	1.16 /SF	/SF	1.36 /SF	/SF	2.52 /SF	8,612	3.96 /SF	13,532
						28.0 Electronic Safety and Security	3,414.00 SF	1.16 /SF	/SF	1.36 /SF	/SF	2.52 /SF	8,612	3.96 /SF	13,532
						28.20.CCTV Closed Circuit TV and Cameras	6.00 CAM	1,179.28 /CAM	/CAM	1,108.33 /CAM	333.33 /CAM	2,620.95 /CAM	15,726	4,392.27 /CAM	26,354
		28.20.ID				Intrusion Detection System									
			28.0			Electronic Safety and Security									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Securitized door, all-in allowance per each (incl circuit, devices, CX)	7.00 ea	2,594.61 /ea	-	1,000.00 /ea	-	3,594.61 /ea	25,162	5,579.76 /ea	39,058
						Door controller (all-in cost including vendor program and startup)	3.00 ea	648.65 /ea	-	2,000.00 /ea	500.00 /ea	3,148.65 /ea	9,446	4,969.01 /ea	14,907
						28.35.01.00 Electronic Safety and Security	3,414.00 SF	5.89 /SF	/SF	3.81 /SF	0.44 /SF	10.14 /SF	34,608	15.81 /SF	53,965
						28.00 Electronic Safety and Security	3,414.00 SF	5.89 /SF	/SF	3.81 /SF	0.44 /SF	10.14 /SF	34,608	15.81 /SF	53,965
						28.0 Electronic Safety and Security	3,414.00 SF	5.89 /SF	/SF	3.81 /SF	0.44 /SF	10.14 /SF	34,608	15.81 /SF	53,965
						28.20.ID Intrusion Detection System	10.00 DOOR	2,010.83 /DOOR	/DOOR	1,300.00 /DOOR	150.00 /DOOR	3,460.83 /DOOR	34,608	5,396.53 /DOOR	53,965
						06.01 Funks Reservoir Admin and Operations BLDG	**3,414.00 SF**	**149.20 /SF**	**10.50 /SF**	**110.79 /SF**	**48.22 /SF**	**318.71 /SF**	**1,088,072**	**552.30 /SF**	**1,885,537**
	06.02					**Funks Reservoir Maintenance and Storage BLDG**									
		03.00.000				Funks Reservoir Maintenance and Storage BLDG, Concrete									
			03.0			Concrete Work									
				03.13		Cast-In-Place Concrete, Continuous Footings									
					03.10.02.24	Cast-In-Place Concrete, Continuous Footings, 24" thick									
						C.I.P. concrete forms, footing, keyway, tapered wood, 2" x 4", 4 use, includes erecting, bracing, stripping and cleaning	232.00 lf	3.16 /lf	-	0.25 /lf	-	3.41 /lf	792	5.25 /lf	1,218
						Reinforcing Steel, in place, footings, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	6.83 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	17,547	4,025.91 /ton	27,477
						Reinforcing steel, unload and sort, add to base	6.83 ton	49.21 /ton	6.50 /ton	-	-	55.70 /ton	380	85.34 /ton	582
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	81.00 cy	-	-	131.00 /cy	-	131.00 /cy	10,611	210.20 /cy	17,026
						Structural concrete, placing, continuous footing, deep, pumped, includes strike off & consolidation, excludes material	78.00 CY	27.12 /CY	6.41 /CY	-	-	33.53 /CY	2,616	51.37 /CY	4,007
						03.10.02.24 Cast-In-Place Concrete, Continuous Footings, 24" thick	78.00 CY	160.79 /CY	6.98 /CY	241.78 /CY	/CY	409.56 /CY	31,945	645.01 /CY	50,311
						03.13 Cast-In-Place Concrete, Continuous Footings	78.00 CY	160.79 /CY	6.98 /CY	241.78 /CY	/CY	409.56 /CY	31,945	645.01 /CY	50,311
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.12	Cast-In-Place Concrete, Slabs on Grade, 12" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, 7" to 12" high, 4 use, includes erecting, bracing, stripping and cleaning	234.00 sfca	8.67 /sfca	-	0.75 /sfca	-	9.42 /sfca	2,205	14.49 /sfca	3,391
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	9.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	23,139	4,025.91 /ton	36,233
						Reinforcing in place, unloading & sorting, add to above - slabs	9.00 ton	49.21 /ton	6.50 /ton	-	-	55.70 /ton	501	85.34 /ton	768
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	105.00 cy	-	-	131.00 /cy	-	131.00 /cy	13,755	210.20 /cy	22,071

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.05.12	Cast-In-Place Concrete, Slabs on Grade, 12" thick									
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	102.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	2,958	44.43 /CY	4,532
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,731.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	2,558	1.44 /sf	3,919
						Curing, sprayed membrane curing compound	27.31 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	629	36.21 /csf	989
						Fine grading, fine grade for slab on grade, machine	303.44 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	569	2.87 /sy	871
						03.10.05.12 Cast-In-Place Concrete, Slabs on Grade, 12" thick	102.00 CY	199.42 /CY	8.85 /CY	245.79 /CY	/CY	454.06 /CY	46,314	713.48 /CY	72,775
						03.18 Cast-In-Place Concrete, Slabs on Grade	102.00 CY	199.42 /CY	8.85 /CY	245.79 /CY	/CY	454.06 /CY	46,314	713.48 /CY	72,775
						03.0 Concrete Work	180.00 CY	182.68 /CY	8.04 /CY	244.05 /CY	/CY	434.77 /CY	78,259	683.81 /CY	123,085
						03.00.000 Funks Reservoir Maintenance and Storage BLDG, Concrete	180.00 CY	182.68 /CY	8.04 /CY	244.05 /CY	/CY	434.77 /CY	78,259	683.81 /CY	123,085
		04.00.000				Funks Reservoir Maintenance and Storage BLDG, Masonry									
			04.0			Masonry									
				04.21		Concrete Unit Masonry - Exterior									
					04.00.02.12	Masonry Concrete Masonry Units, 12"									
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	2.00 opng	41.31 /opng	2.13 /opng	13.40 /opng	-	56.84 /opng	114	99.42 /opng	199
						Grout, door frames, 6' x 7' opening, 3.5 C.F. per opening	1.00 opng	55.08 /opng	2.83 /opng	18.75 /opng	-	76.66 /opng	77	134.13 /opng	134
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	1,127.05 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	12.80 /cf	14,421	22.55 /cf	25,416
						Masonry reinforcing bars, #5 and #6 reinforcing steel bars, placed horizontally, ASTM A615	4,025.16 lb	0.79 /lb	-	0.56 /lb	-	1.35 /lb	5,417	2.37 /lb	9,546
						Masonry reinforcing bars, #5 and #6 reinforcing steel bars, placed vertically, ASTM A615	2,093.08 lb	0.97 /lb	-	0.56 /lb	-	1.53 /lb	3,196	2.69 /lb	5,621
						Masonry reinforcing bars, truss type steel joint reinforcing, mill standard galvanized, 12" wide	23.20 clf	31.43 /clf	-	29.50 /clf	-	60.93 /clf	1,414	107.68 /clf	2,498
						Concrt block,high strngt,hollow,3500 psi,12"8"16",inclds mortar and horzntl joint rnfrcng every other course,excluds scfffdn,grout and vertic l rnfrcng	2,684.00 SF	14.60 /SF	-	5.20 /SF	-	19.80 /SF	53,133	34.67 /SF	93,043
						Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	51.00 lf	62.16 /lf	3.01 /lf	9.90 /lf	-	75.07 /lf	3,829	130.75 /lf	6,668
						Silicone water repellants, sprayed on CMU, 2 coat	5,368.00 sf	0.21 /sf	-	0.79 /sf	-	1.00 /sf	5,342	1.78 /sf	9,561
						Reglet, zinc and copper alloy, 20 ounce	232.00 lf	3.26 /lf	-	2.87 /lf	-	6.13 /lf	1,423	10.83 /lf	2,513
						Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	232.00 lf	5.27 /lf	-	5.25 /lf	-	10.52 /lf	2,441	18.61 /lf	4,317
						04.00.02.12 Masonry Concrete Masonry Units, 12"	2,684.00 SF	22.16 /SF	0.21 /SF	11.47 /SF	/SF	33.83 /SF	90,807	59.43 /SF	159,516
						04.21 Concrete Unit Masonry - Exterior	2,684.00 SF	22.16 /SF	0.21 /SF	11.47 /SF	/SF	33.83 /SF	90,807	59.43 /SF	159,516
				04.23		Concrete Unit Masonry - Interior									
					04.00.02.08	Masonry Concrete Masonry Units, 8"									
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	5.00 opng	41.31 /opng	2.12 /opng	13.40 /opng	-	56.83 /opng	284	99.41 /opng	497
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	353.43 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	12.80 /cf	4,522	22.55 /cf	7,970
						Reinforcing, steel bars A615, placed horizontal, average #4 bar	480.67 lb	1.40 /lb	-	0.40 /lb	-	1.80 /lb	864	3.14 /lb	1,510
						Masonry reinforcing bars, #3 and #4 reinforcing steel bars, placed vertically, ASTM A615	353.43 lb	1.80 /lb	-	0.56 /lb	-	2.36 /lb	833	4.12 /lb	1,457
						Concrt block,high strngt,hollow,3500 psi,8"8"16",includs mortar and horzntl joint rnfrcng every other course,excluds scfffdn,grout and vertic l rnfrcng	1,414.00 SF	8.50 /SF	-	4.07 /SF	-	12.57 /SF	17,779	22.07 /SF	31,212
						Channel framing, structural steel, field fabricated, C6x8.2, incl cutting & welding	30.00 lf	40.69 /lf	1.97 /lf	6.85 /lf	-	49.51 /lf	1,485	86.25 /lf	2,587
						Silicone water repellants, sprayed on CMU, 2 coat	2,828.00 sf	0.21 /sf	-	0.79 /sf	-	1.00 /sf	2,814	1.78 /sf	5,037
						04.00.02.08 Masonry Concrete Masonry Units, 8"	1,414.00 SF	12.62 /SF	0.14 /SF	7.46 /SF	/SF	20.21 /SF	28,582	35.55 /SF	50,271
						04.23 Concrete Unit Masonry - Interior	1,414.00 SF	12.62 /SF	0.14 /SF	7.46 /SF	/SF	20.21 /SF	28,582	35.55 /SF	50,271
						04.0 Masonry	4,098.00 SF	18.86 /SF	0.19 /SF	10.08 /SF	/SF	29.13 /SF	119,389	51.19 /SF	209,787
						04.00.000 Funks Reservoir Maintenance and Storage BLDG, Masonry	4,098.00 SF	18.86 /SF	0.19 /SF	10.08 /SF	/SF	29.13 /SF	119,389	51.19 /SF	209,787
		05.00.000				Funks Reservoir Maintenance and Storage BLDG, Metals									
			05.0			Metals									
				05.40		Cold-formed Metal Framing									
					05.10.01.10	Metals, Steel Trusses									
						Roof truss,using galv metal studs,fink (w) king post type,3:12 pitch,18 x 6"chrds,32'span,excl erectn,bridgng&bracing,fabrication only trusses on-site	46.00 ea	175.54 /ea	-	150.00 /ea	-	325.54 /ea	14,975	574.74 /ea	26,438
						Roof truss, using galv LB metal studs, to 3:12 pitch, 32' span, excl truss materials, bridging & bracing, erection only	46.00 ea	84.60 /ea	14.83 /ea	-	-	99.43 /ea	4,574	172.21 /ea	7,922
						Underlayment, plywood, underlayment grade, 1/2" thick	2,813.00 SF	1.31 /SF	-	2.00 /SF	-	3.31 /SF	9,296	5.87 /SF	16,510
						05.10.01.10 Metals, Steel Trusses	2,813.00 SF	5.56 /SF	0.24 /SF	4.45 /SF	/SF	10.25 /SF	28,845	18.08 /SF	50,870
						05.40 Cold-formed Metal Framing	2,813.00 SF	5.56 /SF	0.24 /SF	4.45 /SF	/SF	10.25 /SF	28,845	18.08 /SF	50,870
						05.0 Metals	2,813.00 SF	5.56 /SF	0.24 /SF	4.45 /SF	/SF	10.25 /SF	28,845	18.08 /SF	50,870
						05.00.000 Funks Reservoir Maintenance and Storage BLDG, Metals	1.00 LS	15,636.95 /LS	682.03 /LS	12,526.00 /LS	/LS	28,844.98 /LS	28,845	50,870.15 /LS	50,870
		07.00.000				Funks Reservoir Maintenance and Storage BLDG, Roofing									
			07.0			Thermal and Moisture Protection									
				07.00		Thermal & Moisture Protection									
					07.60.02.00	Thermal & Moisture Protection, Metal Roofing									
						Steel roofing panels, on steel frame, flat profile, zinc aluminum alloy finish, 1-3/4" standing seams, 10" wide, 22 gauge	2,813.00 SF	2.88 /SF	-	4.47 /SF	-	7.35 /SF	20,666	13.05 /SF	36,707
						Aluminum downspouts, enameled, 3" x 4", .024" thick	56.00 lf	5.65 /lf	-	2.29 /lf	-	7.94 /lf	445	13.92 /lf	779
						Aluminum gutters, stock units, enameled, 5" box, .032" thick	168.00 lf	6.33 /lf	-	3.58 /lf	-	9.91 /lf	1,665	17.42 /lf	2,927
						Miscellaneous Items Allowance	1.00 ls	1,000.00 /ls		1,000.00 /ls		2,000.00 /ls	2,000	3,536.67 /ls	3,537
						07.60.02.00 Thermal & Moisture Protection, Metal Roofing	2,813.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.81 /SF	24,775	15.62 /SF	43,950
						07.00 Thermal & Moisture Protection	2,813.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.81 /SF	24,775	15.62 /SF	43,950
						07.0 Thermal and Moisture Protection	2,813.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.81 /SF	24,775	15.62 /SF	43,950
						07.00.000 Funks Reservoir Maintenance and Storage BLDG, Roofing	2,813.00 SF	3.72 /SF	/SF	5.09 /SF	/SF	8.81 /SF	24,775	15.62 /SF	43,950
		08.00.000				Funks Reservoir Maintenance and Storage BLDG, Openings									
			08.0			Openings									
				08.10		Doors and Frames									
					08.10.01.00	Openings, Doors, Frames and Hardware									
						Steel frms, knock down, 14 ga., to 8-3/4" throat, to 3'-0" x 7'-0", single	6.00 EA	137.64 /EA	-	430.00 /EA	-	567.64 /EA	3,406	1,014.38 /EA	6,086
						Steel frames, knock down, 14 ga., to 8-3/4" throat, to 6070, pair	1.00 EA	183.52 /EA	-	455.00 /EA	-	638.52 /EA	639	1,138.96 /EA	1,139
						Doors, commercial, steel, insulated, full panel, 18 ga., 3'-0" x 7'-0" x 1-3/4" thick	8.00 ea	97.88 /ea	-	520.00 /ea	-	617.88 /ea	4,943	1,107.92 /ea	8,863
						Add for baked enamel finish, average cost per leaf	8.00 leaf	12.94 /leaf	-	50.40 /leaf	-	63.34 /leaf	507	113.36 /leaf	907
						Average Door Hardware	8.00 ea	91.76 /ea	15.00 /ea	500.00 /ea		606.76 /ea	4,854	1,087.22 /ea	8,698
						08.10.01.00 Openings, Doors, Frames and Hardware	7.00 EA	375.71 /EA	17.14 /EA	1,656.89 /EA	/EA	2,049.74 /EA	14,348	3,670.46 /EA	25,693
					08.30.01.20	Specialty Doors and Frames, Coiling Doors									
						Doors, rolling service, steel, manual, 20 gauge, 12' x 12' high, incl. hardware	2.00 EA	1,186.74 /EA	-	1,250.00 /EA	-	2,436.74 /EA	4,873	4,311.26 /EA	8,623
						Doors, rolling service, steel, manual, for 18 gauge doors, add	288.00 sf	-	-	1.52 /sf	-	1.52 /sf	438	2.74 /sf	790
						Doors, rolling service, steel, manual, for enamel finish, add	288.00 sf	-	-	2.84 /sf	-	2.84 /sf	818	5.13 /sf	1,476
						Doors, rolling service, steel, manual, for weatherstripping, extruded rubber, jambs, add	48.00 lf	-	-	19.15 /lf	-	19.15 /lf	919	34.56 /lf	1,659
						Doors, rolling service, steel, manual, for weatherstripping, hood, extruded rubber, add	24.00 lf	-	-	8.65 /lf	-	8.65 /lf	208	15.61 /lf	375
						Doors, rolling service, steel, manual, motor operators for, to 14' x 14' opening	2.00 ea	284.82 /ea	-	1,200.00 /ea	-	1,484.82 /ea	2,970	2,658.83 /ea	5,318

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						08.30.01.20 Specialty Doors and Frames, Coiling Doors	2.00 EA	1,471.55 /EA	/EA	3,641.24 /EA	/EA	5,112.79 /EA	10,226	9,119.79 /EA	18,240
						08.10 Doors and Frames	9.00 EA	619.23 /EA	13.33 /EA	2,097.85 /EA	/EA	2,730.42 /EA	24,574	4,881.42 /EA	43,933
						08.0 Openings	9.00 EA	619.23 /EA	13.33 /EA	2,097.85 /EA	/EA	2,730.42 /EA	24,574	4,881.42 /EA	43,933
						08.00.000 Funks Reservoir Maintenance and Storage BLDG, Openings	9.00 EA	619.23 /EA	13.33 /EA	2,097.85 /EA	/EA	2,730.42 /EA	24,574	4,881.42 /EA	43,933
		09.00.000				Funks Reservoir Maintenance and Storage BLDG, Finishes									
			09.0			Finishes									
				09.00		Finishes									
					09.00.99.00	Finishes, Other									
						Finishes Allowance	2,731.00 SF	1.12 /SF	0.13 /SF	1.10 /SF		2.35 /SF	6,412	4.15 /SF	11,324
						09.00.99.00 Finishes, Other	2,731.00 SF	1.12 /SF	0.13 /SF	1.10 /SF	/SF	2.35 /SF	6,412	4.15 /SF	11,324
						09.00 Finishes	2,731.00 SF	1.12 /SF	0.13 /SF	1.10 /SF	/SF	2.35 /SF	6,412	4.15 /SF	11,324
						09.0 Finishes	2,731.00 SF	1.12 /SF	0.13 /SF	1.10 /SF	/SF	2.35 /SF	6,412	4.15 /SF	11,324
						09.00.000 Funks Reservoir Maintenance and Storage BLDG, Finishes	2,731.00 SF	1.12 /SF	0.13 /SF	1.10 /SF	/SF	2.35 /SF	6,412	4.15 /SF	11,324
		21.00.000				Funks Reservoir Maintenance and Storage BLDG, Fire Suppression System									
			21.0			Fire Suppression									
				21.00		Fire Suppression									
					21.00.10.10	Water-Based Fire-Suppression Systems									
						Fire Suppression System Allowance	2,731.00 SF				15.00 /SF	15.00 /SF	40,965	25.98 /SF	70,955
						21.00.10.10 Water-Based Fire-Suppression Systems	2,731.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	40,965	25.98 /SF	70,955
						21.00 Fire Suppression	2,731.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	40,965	25.98 /SF	70,955
						21.0 Fire Suppression	2,731.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	40,965	25.98 /SF	70,955
						21.00.000 Funks Reservoir Maintenance and Storage BLDG, Fire Suppression System	2,731.00 SF	/SF	/SF	/SF	15.00 /SF	15.00 /SF	40,965	25.98 /SF	70,955
		22.00.000				Funks Reservoir Maintenance and Storage BLDG, Plumbing									
			22.0			Plumbing									
				22.00		Plumbing									
					22.00.01.00	Mechanical, Plumbing									
						Lavatory, vanity top, rough-in, supply, waste and vent	1.00 ea	720.97 /ea	-	278.00 /ea	-	998.97 /ea	999	1,750.45 /ea	1,750
						Lavatory, wall hung, porcelain enamel on cast iron, white, single bowl, includes trim	1.00 ea	180.24 /ea	-	246.00 /ea	-	426.24 /ea	426	756.11 /ea	756
						Water closet, bowl only, wall hung, includes flush valve and seat	1.00 ea	248.61 /ea	-	1,100.00 /ea	-	1,348.61 /ea	1,349	2,415.66 /ea	2,416
						Water closet, bowl only, wall hung, rough-in, supply, waste and vent	1.00 ea	720.97 /ea	-	1,300.00 /ea	-	2,020.97 /ea	2,021	3,594.75 /ea	3,595
						Kitchenette Equipment and Rough-in	1.00 ls	1,441.94 /ls		2,000.00 /ls		3,441.94 /ls	3,442	6,106.75 /ls	6,107
						Supply, Waste and Vent Allowance	1.00 ls	3,604.84 /ls	1,000.00 /ls	5,000.00 /ls		9,604.84 /ls	9,605	16,998.89 /ls	16,999
						22.00.01.00 Mechanical, Plumbing	2,731.00 SF	2.53 /SF	0.37 /SF	3.63 /SF	/SF	6.53 /SF	17,842	11.58 /SF	31,623
						22.00 Plumbing	2,731.00 SF	2.53 /SF	0.37 /SF	3.63 /SF	/SF	6.53 /SF	17,842	11.58 /SF	31,623
						22.0 Plumbing	2,731.00 SF	2.53 /SF	0.37 /SF	3.63 /SF	/SF	6.53 /SF	17,842	11.58 /SF	31,623
						22.00.000 Funks Reservoir Maintenance and Storage BLDG, Plumbing	2,731.00 SF	2.53 /SF	0.37 /SF	3.63 /SF	/SF	6.53 /SF	17,842	11.58 /SF	31,623
		23.00.000				Funks Reservoir Maintenance and Storage BLDG, HVAC									
			23.0			HVAC									
				23.00		HVAC									
					23.00.02.00	Mechanical, HVAC									
						HVAC Allowance	2,731.00 SF				20.00 /SF	20.00 /SF	54,620	34.64 /SF	94,607
						23.00.02.00 Mechanical, HVAC	2,731.00 SF	/SF	/SF	/SF	20.00 /SF	20.00 /SF	54,620	34.64 /SF	94,607
						23.00 HVAC	2,731.00 SF	/SF	/SF	/SF	20.00 /SF	20.00 /SF	54,620	34.64 /SF	94,607
						23.0 HVAC	2,731.00 SF	/SF	/SF	/SF	20.00 /SF	20.00 /SF	54,620	34.64 /SF	94,607
						23.00.000 Funks Reservoir Maintenance and Storage BLDG, HVAC	2,731.00 SF	/SF	/SF	/SF	20.00 /SF	20.00 /SF	54,620	34.64 /SF	94,607
		26.05.GRDG				Facility Grounding									
			26.0			Electrical Work									
				26.00		Electrical									
					01.01.06.03	GC Equip, Tools, & Consumables									
						Rent trencher chain boom gas oper walking 12 HP	2.00 day	-	156.95 /day	-	-	156.95 /day	314	279.70 /day	559
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	313.90 /LS	/LS	/LS	313.90 /LS	314	559.40 /LS	559
						26.00 Electrical	2,731.00 SF	/SF	0.12 /SF	/SF	/SF	0.12 /SF	314	0.20 /SF	559
				26.15		Process Electrical									
					26.15.11.00	Process Electrical, Grounding									
						Copper Bus Bar .25"x 3.0"	2.00 lf	30.36 /lf	-	52.90 /lf	-	83.26 /lf	167	152.22 /lf	304
						Copper Bus Bar Supports	2.00 E	121.44 /E	-	48.30 /E	-	169.74 /E	339	305.98 /E	612
						Grounding rod, copper clad, 15' long, 3/4" diameter	4.00 ea	259.46 /ea	-	55.00 /ea	-	314.46 /ea	1,258	564.39 /ea	2,258
						Ground wire, copper wire, bare stranded, 4/0	4.00 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	3,137	1,427.89 /clf	5,712
						Water pipe ground clamps, heavy duty, bronze, 2-1/2" to 3" diameter	1.00 ea	172.97 /ea	-	60.50 /ea	-	233.47 /ea	233	420.44 /ea	420
						Exothermic weld, 4/0 wire to 4/0 wire	24.00 ea	148.26 /ea	-	9.45 /ea	-	157.71 /ea	3,785	281.75 /ea	6,762
						Exothermic weld, mold reusable for above	6.00 ea	-	-	141.00 /ea	-	141.00 /ea	846	261.50 /ea	1,569
						Protective boxes at grade level, round, concrete, 12" long, incl breather slots	2.00 ea	64.87 /ea	-	112.00 /ea	-	176.87 /ea	354	323.31 /ea	647
						26.15.11.00 Process Electrical, Grounding	400.00 LF	16.65 /LF	/LF	8.65 /LF	/LF	25.30 /LF	10,119	45.71 /LF	18,293
						26.15 Process Electrical	2,731.00 SF	2.44 /SF	/SF	1.27 /SF	/SF	3.71 /SF	10,119	6.69 /SF	18,293
						26.0 Electrical Work	2,731.00 SF	2.44 /SF	0.12 /SF	1.27 /SF	/SF	3.82 /SF	10,433	6.90 /SF	18,843
						26.05.GRDG Facility Grounding	2,731.00 SF	2.44 /SF	0.12 /SF	1.27 /SF	/SF	3.82 /SF	10,433	6.90 /SF	18,843
		26.11.SEC				Subfeed UG from Admin 100A									
			26.0			Electrical Work									
				26.10		Site Electrical									
					26.10.02.00	Site Electrical, Buried Conduit									
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	2,586.67 /ton	2,328	4,691.21 /ton	4,222
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	150.00 lf	12.97 /lf	-	3.72 /lf	-	16.69 /lf	2,504	30.02 /lf	4,503
						26.10.02.00 Site Electrical, Buried Conduit	150.00 LF	21.74 /LF	/LF	10.47 /LF	/LF	32.21 /LF	4,832	58.17 /LF	8,725
						26.10 Site Electrical	1.00 LS	3,261.46 /LS	/LS	1,570.50 /LS	/LS	4,831.96 /LS	4,832	8,724.84 /LS	8,725
				26.15		Process Electrical									
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	6.50 clf	259.46 /clf	-	159.00 /clf	-	418.46 /clf	2,720	757.26 /clf	4,922
						26.15.01.00 Process Electrical, Wire/Cable	650.00 LF	2.60 /LF	/LF	1.59 /LF	/LF	4.19 /LF	2,720	7.57 /LF	4,922
					26.15.11.00	Process Electrical, Grounding									
						Ground wire, copper wire, bare stranded, 4/0	1.55 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	1,212	1,427.88 /clf	2,206
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	1.50 ea	129.73 /ea	-	31.00 /ea	-	160.73 /ea	241	298.69 /ea	433
						26.15.11.00 Process Electrical, Grounding	155.00 LF	4.89 /LF	/LF	4.49 /LF	/LF	9.37 /LF	1,453	17.03 /LF	2,639
						26.15 Process Electrical	2,731.00 SF	0.90 /SF	/SF	0.63 /SF	/SF	1.53 /SF	4,173	2.77 /SF	7,561
						26.0 Electrical Work	2,731.00 SF	2.09 /SF	/SF	1.21 /SF	/SF	3.30 /SF	9,005	5.96 /SF	16,286
			31.0			Earthwork									
				26.10		Site Electrical									
					31.20.07.15	Earthworks, Sitework, Borrow									
						Concrete (red) envelope/encasement, poured neat	8.90 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	273.89 /CY	2,438	425.24 /CY	3,786
						End bulkheads, plywood, concrete envelope/encasement	1.07 sf	13.49 /sf	-	0.73 /sf	-	14.22 /sf	15	21.85 /sf	23
						31.20.07.15 Earthworks, Sitework, Borrow	8.90 CY	196.24 /CY	1.76 /CY	77.59 /CY	/CY	275.59 /CY	2,454	427.85 /CY	3,809
					31.20.09.10	Earthworks, Sitework, Backfill									
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	116.05 CY	1.94 /CY	23.32 /CY	-	-	25.26 /CY	2,932	38.71 /CY	4,492
						31.20.09.10 Earthworks, Sitework, Backfill	116.05 CY	1.94 /CY	23.32 /CY	/CY	/CY	25.26 /CY	2,932	38.71 /CY	4,492
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees									
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	9.87 CY	10.88 /CY	9.31 /CY	-	-	20.19 /CY	199	30.94 /CY	305

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	9.87 CY	10.88 /CY	9.31 /CY	/CY	/CY	20.19 /CY	199	30.94 /CY	305
					31.25.01.00	Earthworks, Structural, Excavation									
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	125.92 CY	5.93 /CY	23.02 /CY	-	-	28.95 /CY	3,645	44.35 /CY	5,584
						31.25.01.00 Earthworks, Structural, Excavation	125.92 CY	5.93 /CY	23.02 /CY	/CY	/CY	28.95 /CY	3,645	44.35 /CY	5,584
						26.10 Site Electrical	1.00 LS	2,826.28 /LS	5,712.18 /LS	690.76 /LS	/LS	9,229.22 /LS	9,229	14,190.03 /LS	14,190
						31.0 Earthwork	260.74 CY	10.84 /CY	21.91 /CY	2.65 /CY	/CY	35.40 /CY	9,229	54.42 /CY	14,190
						26.11.SEC Subfeed UG from Admin 100A	150.00 LF	56.88 /LF	38.08 /LF	26.60 /LF	/LF	121.56 /LF	18,234	203.17 /LF	30,476
		26.20.DIST				Electrical Distribution Equipment									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Flexible metallic conduit, steel, 1-1/2" diameter	6.00 lf	20.76 /lf	-	2.55 /lf	-	23.31 /lf	140	41.72 /lf	250
						Flexible metallic conduit, steel, connectors, insulated, 1-1/2" diameter	2.00 ea	32.44 /ea	-	24.50 /ea	-	56.94 /ea	114	103.24 /ea	206
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 1-1/2" diameter	2.00 ea	45.13 /ea	-	46.00 /ea	-	91.13 /ea	182	165.73 /ea	331
						Panelboards, 3 phase 4 wire, main lugs, 277/480 V, 100 amp, 20 circuits, NEHB, incl 20 A 1 pole plug-in breakers	1.00 ea	1,729.74 /ea	-	2,200.00 /ea	-	3,929.74 /ea	3,930	7,162.64 /ea	7,163
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 100 amp, 30 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	2,594.61 /ea	-	2,125.00 /ea	-	4,719.61 /ea	4,720	8,564.82 /ea	8,565
						26.00.99.00 Electrical, Other	2,731.00 SF	1.69 /SF	/SF	1.64 /SF	/SF	3.33 /SF	9,085	6.05 /SF	16,516
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #6, type XHHW, in raceway	0.25 clf	159.68 /clf	-	54.50 /clf	-	214.20 /clf	54	385.68 /clf	96
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	1.00 clf	259.46 /clf	-	159.00 /clf	-	418.46 /clf	418	757.27 /clf	757
						26.15.01.00 Process Electrical, Wire/Cable	125.00 LF	2.40 /LF	/LF	1.38 /LF	/LF	3.78 /LF	472	6.83 /LF	854
						26.15 Process Electrical	2,731.00 SF	1.80 /SF	/SF	1.70 /SF	/SF	3.50 /SF	9,557	6.36 /SF	17,369
				26.25		Facility Electrical									
					26.25.06.00	Transformers, Dry Type									
						Transformer, dry-type, ventilated, 3 phase 480 V primary 120/208 V secondary, 30 kVA	1.00 EA	2,306.32 /EA	-	1,800.00 /EA	-	4,106.32 /EA	4,106	7,448.32 /EA	7,448
						26.25.06.00 Transformers, Dry Type	1.00 EA	2,306.32 /EA	/EA	1,800.00 /EA	/EA	4,106.32 /EA	4,106	7,448.32 /EA	7,448
						26.25 Facility Electrical	1.00 LS	2,306.32 /LS	/LS	1,800.00 /LS	/LS	4,106.32 /LS	4,106	7,448.32 /LS	7,448
						26.0 Electrical Work	2,731.00 SF	2.64 /SF	/SF	2.36 /SF	/SF	5.00 /SF	13,664	9.09 /SF	24,818
						26.20.DIST Electrical Distribution Equipment	200.00 AMP	36.05 /AMP	/AMP	32.27 /AMP	/AMP	68.32 /AMP	13,664	124.09 /AMP	24,818
		26.25.LTG				Interior Lighting and Control									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	4,527	16.21 /lf	8,106
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	21.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	1,161	98.73 /ea	2,073
						Outlet boxes, pressed steel, covers, blank, 4" square	9.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	153	30.33 /ea	273
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	12.00 ea	16.22 /ea	-	1.66 /ea	-	17.88 /ea	215	31.98 /ea	384
						26.00.99.00 Electrical, Other	2,731.00 SF	1.99 /SF	/SF	0.23 /SF	/SF	2.22 /SF	6,055	3.97 /SF	10,836
					26.10.03.00	UG Conduit									
						Toggle switch, quiet type, single pole, 20 amp	8.00 ea	38.44 /ea	-	3.46 /ea	-	41.90 /ea	335	74.92 /ea	599
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	335	/LF	599
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	16.00 clf	94.35 /clf	-	13.70 /clf	-	108.05 /clf	1,729	193.55 /clf	3,097
						26.15.01.00 Process Electrical, Wire/Cable	1,600.00 LF	0.94 /LF	/LF	0.14 /LF	/LF	1.08 /LF	1,729	1.94 /LF	3,097
						26.15 Process Electrical	2,731.00 SF	2.65 /SF	/SF	0.32 /SF	/SF	2.97 /SF	8,119	5.32 /SF	14,532
				26.20		Facility Electrical									
					26.20.03.00	Facility Electrical, Lighting									
						LED Strip Light, hdwe	16.00 ea	182.08 /ea	-	110.00 /ea	-	292.08 /ea	4,673	528.48 /ea	8,456
						Emergency ballast, material only, interior, factory installed in fixture	5.00 ea	-	-	152.00 /ea	-	152.00 /ea	760	281.90 /ea	1,409
						Exit lighting, L.E.D. standard, single face, ceiling or wall mount	3.00 ea	129.73 /ea	-	70.00 /ea	-	199.73 /ea	599	361.01 /ea	1,083
						Automatic wall switches	1.00 ea	43.24 /ea	-	50.00 /ea	-	93.24 /ea	93	169.78 /ea	170
						Fixture whips, 3/8" greenfield, 2 connectors, THHN wire, three #14, 6' long	43.00 ea	32.43 /ea	-	5.45 /ea	-	37.88 /ea	1,629	67.91 /ea	2,920
						26.20.03.00 Facility Electrical, Lighting	2,731.00 SF	1.74 /SF	/SF	1.10 /SF	/SF	2.84 /SF	7,755	5.14 /SF	14,038
						26.20 Facility Electrical	2,731.00 SF	1.74 /SF	/SF	1.10 /SF	/SF	2.84 /SF	7,755	5.14 /SF	14,038
						26.0 Electrical Work	2,731.00 SF	4.39 /SF	/SF	1.43 /SF	/SF	5.81 /SF	15,873	10.46 /SF	28,570
						26.25.LTG Interior Lighting and Control	1.00 LS	11,979.39 /LS	/LS	3,893.85 /LS	/LS	15,873.24 /LS	15,873	28,569.78 /LS	28,570
		26.26.EXTLTG				Exterior Lighting and Control									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	50.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	453	16.21 /lf	811
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	3.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	166	98.73 /ea	296
						Outlet boxes, pressed steel, covers, blank, 4" square	3.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	51	30.33 /ea	91
						26.00.99.00 Electrical, Other	2,731.00 SF	0.22 /SF	/SF	0.02 /SF	/SF	0.25 /SF	669	0.44 /SF	1,198
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	1.80 clf	94.35 /clf	-	13.70 /clf	-	108.05 /clf	194	193.54 /clf	348
						26.15.01.00 Process Electrical, Wire/Cable	180.00 LF	0.94 /LF	/LF	0.14 /LF	/LF	1.08 /LF	194	1.94 /LF	348
					26.15.07.00	Lighting									
						LED Area Light	3.00 E	97.30 /E	-		-	97.30 /E	292	173.39 /E	520
						Wallpack Photocell	3.00 E	32.43 /E	-		-	32.43 /E	97	57.80 /E	173
						26.15.07.00 Lighting	1.00 LS	389.19 /LS	/LS	/LS	/LS	389.19 /LS	389	693.57 /LS	694
						26.15 Process Electrical	2,731.00 SF	0.43 /SF	/SF	0.03 /SF	/SF	0.46 /SF	1,253	0.82 /SF	2,240
						26.0 Electrical Work	2,731.00 SF	0.43 /SF	/SF	0.03 /SF	/SF	0.46 /SF	1,253	0.82 /SF	2,240
						26.26.EXTLTG Exterior Lighting and Control	1.00 LS	1,162.52 /LS	/LS	90.58 /LS	/LS	1,253.10 /LS	1,253	2,239.69 /LS	2,240
		26.30.DEV				Device Outlets									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	600.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	5,432	16.21 /lf	9,727
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	20.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	1,105	98.73 /ea	1,975
						Outlet boxes, pressed steel, covers, blank, 4" square	4.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	68	30.33 /ea	121
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	16.00 ea	16.22 /ea	-	1.66 /ea	-	17.88 /ea	286	31.98 /ea	512
						Duplex receptacle, grounded, 120 volt, 20 amp	10.00 ea	38.44 /ea	-	10.65 /ea	-	49.09 /ea	491	88.25 /ea	883
						Duplex receptacle, ground fault interrupting, 20 amp	6.00 ea	38.44 /ea	-	45.00 /ea	-	83.44 /ea	501	151.96 /ea	912
						26.00.99.00 Electrical, Other	2,731.00 SF	2.48 /SF	/SF	0.41 /SF	/SF	2.89 /SF	7,883	5.17 /SF	14,129
					26.10.03.00	UG Conduit									
						WP cover	4.00 ea	17.30 /ea	-	42.50 /ea	-	59.80 /ea	239	109.65 /ea	439
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	239	/LF	439
					26.15.01.00	Process Electrical, Wire/Cable									

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	20.00 clf	94.35 /clf	-	13.70 /clf	-	108.05 /clf	2,161	193.55 /clf	3,871
						26.15.01.00 Process Electrical, Wire/Cable	2,000.00 LF	0.94 /LF	/LF	0.14 /LF	/LF	1.08 /LF	2,161	1.94 /LF	3,871
						26.15 Process Electrical	2,731.00 SF	3.19 /SF	/SF	0.57 /SF	/SF	3.77 /SF	10,283	6.75 /SF	18,438
						26.0 Electrical Work	2,731.00 SF	3.19 /SF	/SF	0.57 /SF	/SF	3.77 /SF	10,283	6.75 /SF	18,438
						26.30.DEV Device Outlets	1.00 LS	8,723.44 /LS	/LS	1,559.54 /LS	/LS	10,282.98 /LS	10,283	18,438.24 /LS	18,438
		26.40.EQCON				Facility Equipment Connections and Controls									
			26.0			Electrical Work									
				26.10		Site Electrical									
					26.00.99.00	Electrical, Other									
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 5 HP motor	2.00 ea	129.73 /ea	-	6.35 /ea	-	136.08 /ea	272	242.97 /ea	486
						26.00.99.00 Electrical, Other	2,731.00 SF	0.10 /SF	/SF	0.01 /SF	/SF	0.10 /SF	272	0.18 /SF	486
						26.10 Site Electrical	1.00 LS	259.46 /LS	/LS	12.70 /LS	/LS	272.16 /LS	272	485.93 /LS	486
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	12.97 /lf	-	5.15 /lf	-	18.12 /lf	3,625	32.67 /lf	6,534
						26.00.99.00 Electrical, Other	2,731.00 SF	0.95 /SF	/SF	0.38 /SF	/SF	1.33 /SF	3,625	2.39 /SF	6,534
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	9.00 clf	103.78 /clf	-	20.50 /clf	-	124.28 /clf	1,119	222.97 /clf	2,007
						26.15.01.00 Process Electrical, Wire/Cable	900.00 LF	1.04 /LF	/LF	0.21 /LF	/LF	1.24 /LF	1,119	2.23 /LF	2,007
					26.20.05.00	Facility Electrical, HVAC									
						HVAC controls - electrical contractor scope	1.00 LS		-	500.00 /LS	-	500.00 /LS	500	927.30 /LS	927
						26.20.05.00 Facility Electrical, HVAC	2,731.00 SF	/SF	/SF	0.18 /SF	/SF	0.18 /SF	500	0.34 /SF	927
						26.15 Process Electrical	2,731.00 SF	1.29 /SF	/SF	0.63 /SF	/SF	1.92 /SF	5,243	3.47 /SF	9,468
						26.0 Electrical Work	2,731.00 SF	1.39 /SF	/SF	0.63 /SF	/SF	2.02 /SF	5,515	3.64 /SF	9,954
						26.40.EQCON Facility Equipment Connections and Controls	2.00 ALO	1,894.07 /ALO	/ALO	863.60 /ALO	/ALO	2,757.67 /ALO	5,515	4,977.01 /ALO	9,954
		26.90.LPS				Facility Lightning Protection System									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.15.10.00	Process Electrical, Lightning Protection									
						Air terminal and base, copper, 3/8" dia x 10", to 75' h	12.00 ea	129.73 /ea	-	26.00 /ea	-	155.73 /ea	1,869	279.41 /ea	3,353
						Lightning protection cable, copper, 220 lb per thousand feet, to 75' h	700.00 lf	3.24 /lf	-	3.18 /lf	-	6.42 /lf	4,496	11.68 /lf	8,174
						26.15.10.00 Process Electrical, Lightning Protection	2,731.00 SF	1.40 /SF	/SF	0.93 /SF	/SF	2.33 /SF	6,365	4.22 /SF	11,527
						26.15 Process Electrical	2,731.00 SF	1.40 /SF	/SF	0.93 /SF	/SF	2.33 /SF	6,365	4.22 /SF	11,527
				26.20		Facility Electrical									
					26.15.10.00	Process Electrical, Lightning Protection									
						LPS design and certification, misc mat and labor	1.00 LS	2,075.69 /LS	-	1,000.00 /LS	2,500.00 /LS	5,575.69 /LS	5,576	10,008.87 /LS	10,009
						26.15.10.00 Process Electrical, Lightning Protection	2,731.00 SF	0.76 /SF	/SF	0.37 /SF	0.92 /SF	2.04 /SF	5,576	3.66 /SF	10,009
						26.20 Facility Electrical	2,731.00 SF	0.76 /SF	/SF	0.37 /SF	0.92 /SF	2.04 /SF	5,576	3.66 /SF	10,009
						26.0 Electrical Work	2,731.00 SF	2.16 /SF	/SF	1.30 /SF	0.92 /SF	4.37 /SF	11,941	7.89 /SF	21,536
						26.90.LPS Facility Lightning Protection System	2,731.00 SF	2.16 /SF	/SF	1.30 /SF	0.92 /SF	4.37 /SF	11,941	7.89 /SF	21,536
		27.30.COMCDT				Comm Conduit to Admin									
			26.0			Electrical Work									
				26.10		Site Electrical									
					26.10.02.00	Site Electrical, Buried Conduit									
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	1.80 ton	1,461.67 /ton	-	1,125.00 /ton	-	2,586.67 /ton	4,656	4,691.24 /ton	8,444
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	2,586.67 /ton	2,328	4,691.21 /ton	4,222
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	150.00 lf	12.97 /lf	-	3.72 /lf	-	16.69 /lf	2,504	30.02 /lf	4,503
						26.10.02.00 Site Electrical, Buried Conduit	150.00 LF	39.28 /LF	/LF	23.97 /LF	/LF	63.25 /LF	9,488	114.46 /LF	17,169
						26.10 Site Electrical	1.00 LS	5,892.47 /LS	/LS	3,595.50 /LS	/LS	9,487.97 /LS	9,488	17,169.06 /LS	17,169
				26.15		Process Electrical									
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	6.50 clf	259.46 /clf	-	159.00 /clf	-	418.46 /clf	2,720	757.26 /clf	4,922
						26.15.01.00 Process Electrical, Wire/Cable	650.00 LF	2.60 /LF	/LF	1.59 /LF	/LF	4.19 /LF	2,720	7.57 /LF	4,922
					26.15.11.00	Process Electrical, Grounding									
						Ground wire, copper wire, bare stranded, 4/0	1.55 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	1,212	1,427.88 /clf	2,206
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	1.50 ea	129.73 /ea	-	31.00 /ea	-	160.73 /ea	241	288.69 /ea	433
						26.15.11.00 Process Electrical, Grounding	155.00 LF	4.89 /LF	/LF	4.49 /LF	/LF	9.37 /LF	1,453	17.03 /LF	2,639
						26.15 Process Electrical	2,731.00 SF	0.90 /SF	/SF	0.63 /SF	/SF	1.53 /SF	4,173	2.77 /SF	7,561
						26.0 Electrical Work	2,731.00 SF	3.05 /SF	/SF	1.95 /SF	/SF	5.00 /SF	13,661	9.06 /SF	24,730
			31.0			Earthwork									
				26.10		Site Electrical									
					31.20.07.15	Earthworks, Sitework, Borrow									
						Concrete (red) envelope/encasement, poured neat	8.90 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	273.89 /CY	2,438	425.24 /CY	3,786
						End bulkheads, plywood, concrete envelope/encasement	1.07 sf	13.49 /sf	-	0.73 /sf	-	14.22 /sf	15	21.84 /sf	23
						31.20.07.15 Earthworks, Sitework, Borrow	8.90 CY	196.24 /CY	1.76 /CY	77.59 /CY	/CY	275.59 /CY	2,454	427.85 /CY	3,809
					31.20.09.10	Earthworks, Sitework, Backfill									
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	116.05 CY	1.94 /CY	23.32 /CY	-	-	25.26 /CY	2,932	38.71 /CY	4,492
						31.20.09.10 Earthworks, Sitework, Backfill	116.05 CY	1.94 /CY	23.32 /CY	/CY	/CY	25.26 /CY	2,932	38.71 /CY	4,492
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees									
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	9.87 CY	10.88 /CY	9.31 /CY	-	-	20.19 /CY	199	30.94 /CY	305
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	9.87 CY	10.88 /CY	9.31 /CY	/CY	/CY	20.19 /CY	199	30.94 /CY	305
					31.25.01.00	Earthworks, Structural, Excavation									
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	125.92 CY	5.93 /CY	23.02 /CY	-	-	28.95 /CY	3,645	44.35 /CY	5,584
						31.25.01.00 Earthworks, Structural, Excavation	125.92 CY	5.93 /CY	23.02 /CY	/CY	/CY	28.95 /CY	3,645	44.35 /CY	5,584
						26.10 Site Electrical	1.00 LS	2,826.28 /LS	5,712.18 /LS	690.76 /LS	/LS	9,229.22 /LS	9,229	14,190.04 /LS	14,190
						31.0 Earthwork	260.74 CY	10.84 /CY	21.91 /CY	2.65 /CY	/CY	35.40 /CY	9,229	54.42 /CY	14,190
						27.30.COMCDT Comm Conduit to Admin	0.00	/LF	/LF	/LF	/LF	/LF	22,890	/LF	38,920
		28.10.FA				Fire Alarm System									
			26.0			Electrical Work									
				26.15		Process Electrical									
					26.00.99.00	Electrical, Other									
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	800.00 lf	7.98 /lf	-	1.07 /lf	-	9.05 /lf	7,243	16.21 /lf	12,969
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	20.00 ea	51.89 /ea	-	3.37 /ea	-	55.26 /ea	1,105	98.73 /ea	1,975
						Outlet boxes, pressed steel, covers, blank, 4" square	2.00 ea	16.22 /ea	-	0.77 /ea	-	16.99 /ea	34	30.32 /ea	61
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	18.00 ea	16.22 /ea	-	1.66 /ea	-	17.88 /ea	322	31.98 /ea	576
						26.00.99.00 Electrical, Other	2,731.00 SF	2.84 /SF	/SF	0.35 /SF	/SF	3.19 /SF	8,704	5.70 /SF	15,580
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	20.00 clf	79.84 /clf	-	9.70 /clf	-	89.54 /clf	1,791	160.26 /clf	3,205

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						26.15.01.00 Process Electrical, Wire/Cable	2,000.00 LF	0.80 /LF	/LF	0.10 /LF	/LF	0.90 /LF	1,791	1.60 /LF	3,205
						26.15 Process Electrical	2,731.00 SF	3.42 /SF	/SF	0.42 /SF	/SF	3.84 /SF	10,494	6.88 /SF	18,785
						26.0 Electrical Work	2,731.00 SF	3.42 /SF	/SF	0.42 /SF	/SF	3.84 /SF	10,494	6.88 /SF	18,785
			28.0			Electronic Safety and Security									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Detection Systems, fire alarm control panel, alarm device, excluding wires & conduits	8.00 ea	129.73 /ea	-	230.00 /ea	-	359.73 /ea	2,878	567.81 /ea	4,542
						Detection Systems, fire alarm control panel, actuating device, excluding wires & conduits	4.00 ea	129.73 /ea	-	340.00 /ea	-	469.73 /ea	1,879	744.32 /ea	2,977
						Detection Systems, fire alarm control panel, addressable without voice, up to 200 points, excluding wires & conduits, inluding vendor design, startup	1.00 ea	1,816.00 /ea	-	4,575.00 /ea	1,000.00 /ea	7,391.00 /ea	7,391	11,655.34 /ea	11,655
						Detection Systems, fire alarm control panel, battery & rack, excluding wires & conduits	1.00 ea	259.46 /ea	-	460.00 /ea	-	719.46 /ea	719	1,135.61 /ea	1,136
						Detection Systems, fire alarm control panel, battery & rack, automatic charger, excluding wires & conduits	1.00 ea	129.73 /ea	-	525.00 /ea	-	654.73 /ea	655	1,041.17 /ea	1,041
						Detection Systems, visual alarm, ADA type, excluding wires & conduits	6.00 ea	154.90 /ea	-	119.00 /ea	-	273.90 /ea	1,643	428.27 /ea	2,570
						28.35.01.00 Electronic Safety and Security	2,731.00 SF	1.72 /SF	/SF	3.47 /SF	0.37 /SF	5.55 /SF	15,165	8.76 /SF	23,922
						28.00 Electronic Safety and Security	2,731.00 SF	1.72 /SF	/SF	3.47 /SF	0.37 /SF	5.55 /SF	15,165	8.76 /SF	23,922
						28.0 Electronic Safety and Security	2,731.00 SF	1.72 /SF	/SF	3.47 /SF	0.37 /SF	5.55 /SF	15,165	8.76 /SF	23,922
						28.10.FA Fire Alarm System	2,731.00 SF	5.14 /SF	/SF	3.89 /SF	0.37 /SF	9.40 /SF	25,660	15.64 /SF	42,707
		28.20.AC				Access Control System									
			28.0			Electronic Safety and Security									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Card reader - all in allowance per each (incl circuit, cards, CX)	4.00 ea	1,556.77 /ea	-	800.00 /ea	-	2,356.77 /ea	9,427	3,668.78 /ea	14,675
						28.35.01.00 Electronic Safety and Security	2,731.00 SF	2.28 /SF	/SF	1.17 /SF	/SF	3.45 /SF	9,427	5.37 /SF	14,675
						28.00 Electronic Safety and Security	2,731.00 SF	2.28 /SF	/SF	1.17 /SF	/SF	3.45 /SF	9,427	5.37 /SF	14,675
						28.0 Electronic Safety and Security	2,731.00 SF	2.28 /SF	/SF	1.17 /SF	/SF	3.45 /SF	9,427	5.37 /SF	14,675
						28.20.AC Access Control System	4.00 DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	2,356.77 /DOOR	9,427	3,668.78 /DOOR	14,675
		28.20.CCTV				Closed Circuit TV and Cameras									
			26.0			Electrical Work									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Camera allowance (licenses, circuit, startup, CX)	1.00 LS	1,037.85 /LS	-	1,000.00 /LS	1,000.00 /LS	3,037.85 /LS	3,038	5,486.20 /LS	5,486
						28.35.01.00 Electronic Safety and Security	2,731.00 SF	0.38 /SF	/SF	0.37 /SF	0.37 /SF	1.11 /SF	3,038	2.01 /SF	5,486
						28.00 Electronic Safety and Security	2,731.00 SF	0.38 /SF	/SF	0.37 /SF	0.37 /SF	1.11 /SF	3,038	2.01 /SF	5,486
						26.0 Electrical Work	2,731.00 SF	0.38 /SF	/SF	0.37 /SF	0.37 /SF	1.11 /SF	3,038	2.01 /SF	5,486
			28.0			Electronic Safety and Security									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Closed circuit television system (CCTV), industrial quality, for additional camera stations, add	2.00 ea	384.39 /ea	-	690.00 /ea	-	1,074.39 /ea	2,149	1,696.08 /ea	3,392
						Closed circuit television system (CCTV), industrial quality, for weatherproof camera station, add	2.00 ea	798.35 /ea	-	540.00 /ea	-	1,338.35 /ea	2,677	2,089.61 /ea	4,179
						28.35.01.00 Electronic Safety and Security	2,731.00 SF	0.87 /SF	/SF	0.90 /SF	/SF	1.77 /SF	4,825	2.77 /SF	7,571
						28.00 Electronic Safety and Security	2,731.00 SF	0.87 /SF	/SF	0.90 /SF	/SF	1.77 /SF	4,825	2.77 /SF	7,571
						28.0 Electronic Safety and Security	2,731.00 SF	0.87 /SF	/SF	0.90 /SF	/SF	1.77 /SF	4,825	2.77 /SF	7,571
						28.20.CCTV Closed Circuit TV and Cameras	0.00	/CAM	/CAM	/CAM	/CAM	/CAM	7,863	/CAM	13,058
		28.20.ID				Intrusion Detection System									
			28.0			Electronic Safety and Security									
				28.00		Electronic Safety and Security									
					28.35.01.00	Electronic Safety and Security									
						Securitized door, all-in allowance per each (incl circuit, devices, CX)	4.00 ea	2,594.61 /ea	-	1,000.00 /ea	-	3,594.61 /ea	14,378	5,579.76 /ea	22,319
						Door controller (all-in cost including vendor program and startup)	2.00 ea	648.66 /ea	-	2,000.00 /ea	500.00 /ea	3,148.66 /ea	6,297	4,969.01 /ea	9,938
						28.35.01.00 Electronic Safety and Security	2,731.00 SF	4.28 /SF	/SF	2.93 /SF	0.37 /SF	7.57 /SF	20,676	11.81 /SF	32,257
						28.00 Electronic Safety and Security	2,731.00 SF	4.28 /SF	/SF	2.93 /SF	0.37 /SF	7.57 /SF	20,676	11.81 /SF	32,257
						28.0 Electronic Safety and Security	2,731.00 SF	4.28 /SF	/SF	2.93 /SF	0.37 /SF	7.57 /SF	20,676	11.81 /SF	32,257
						28.20.ID Intrusion Detection System	6.00 DOOR	1,945.96 /DOOR	/DOOR	1,333.33 /DOOR	166.67 /DOOR	3,445.96 /DOOR	20,676	5,376.18 /DOOR	32,257
						06.02 Funks Reservoir Maintenance and Storage BLDG	**2,731.00 SF**	**92.38 /SF**	**5.90 /SF**	**73.19 /SF**	**37.01 /SF**	**208.49 /SF**	**569,392**	**357.61 /SF**	**976,624**
	06.03					**Funks Reservoir Flow Meter Vault**									
		01.00.102				Funks Reservoir Flow Meter Vault, Removal and Control of Water									
			01.0			General Requirements									
				01.01		Construction Operations									
					31.15.02.00	Dewatering									
						CBD Discharge Structure, Removal and Control of Water	3.00 MO		-		45,000.00 /MO	45,000.00 /MO	135,000	68,943.90 /MO	206,832
						31.15.02.00 Dewatering	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	135,000	68,943.90 /MO	206,832
						01.01 Construction Operations	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	135,000	68,943.90 /MO	206,832
						01.0 General Requirements	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	135,000	68,943.90 /MO	206,832
						01.00.102 Funks Reservoir Flow Meter Vault, Removal and Control of Water	3.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	135,000	68,943.90 /MO	206,832
		03.00.004				Funks Reservoir Flow Meter Vault, Concrete									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.36	Cast-In-Place Concrete, Slabs on Grade, 36" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	732.00 sfca	8.32 /sfca	-	0.97 /sfca	-	9.29 /sfca	6,798	14.30 /sfca	10,466
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	30.10 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	77,385	4,025.91 /ton	121,180
						Reinforcing in place, unloading & sorting, add to above - slabs	30.10 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	1,677	85.34 /ton	2,569
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	30.10 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	1,823	92.77 /ton	2,792
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	355.00 cy	-	-	131.00 /cy	-	131.00 /cy	46,505	210.20 /cy	74,621
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	344.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	9,976	44.43 /CY	15,285
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	3,096.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	2,900	1.44 /sf	4,443
						Curing, sprayed membrane curing compound	30.96 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	714	36.21 /csf	1,121
						Fine grading, fine grade for slab on grade, machine	344.00 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	645	2.87 /sy	988
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	344.00 CY	180.43 /CY	7.65 /CY	243.37 /CY	/CY	431.46 /CY	148,422	678.68 /CY	233,465
						03.18 Cast-In-Place Concrete, Slabs on Grade	344.00 CY	180.43 /CY	7.65 /CY	243.37 /CY	/CY	431.46 /CY	148,422	678.68 /CY	233,465
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick									
						C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	304.00 lf	37.07 /lf	-	2.45 /lf	-	39.52 /lf	12,014	60.73 /lf	18,461
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	10,296.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	151,738	22.97 /sfca	236,544
						Form oil, coverage varies greatly, maximum, includes material only	27.50 gal	-	-	23.50 /gal	-	23.50 /gal	646	37.71 /gal	1,037

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick									
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	41.30 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	106,180	4,025.91 /ton	166,270
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	41.30 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	2,301	85.34 /ton	3,525
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	41.30 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	2,501	92.77 /ton	3,831
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	486.00 cy	-	-	131.00 /cy	-	131.00 /cy	63,666	210.20 /cy	102,158
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	472.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	21,103	68.50 /CY	32,331
						Concrete finishing, walls, includes breaking ties and patching voids	8,486.00 sf	0.98 /sf	-	0.04 /sf	-	1.02 /sf	8,650	1.56 /sf	13,277
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	472.00 CY	409.18 /CY	9.74 /CY	362.44 /CY	/CY	781.35 /CY	368,798	1,223.38 /CY	577,433
						03.20 Cast-In-Place Concrete, Straight Walls	472.00 CY	409.18 /CY	9.74 /CY	362.44 /CY	/CY	781.35 /CY	368,798	1,223.38 /CY	577,433
				03.24		Cast-In-Place Concrete, Elevated Slabs									
					03.10.10.12	Cast-In-Place Concrete, Elevated Decks, 12" thick									
						Slab shoring	59,400.00 cf	0.64 /cf	-	0.05 /cf	-	0.69 /cf	40,673	1.05 /cf	62,529
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	2,400.00 sf	7.55 /sf	-	1.33 /sf	-	8.88 /sf	21,304	13.70 /sf	32,870
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	220.00 lf	6.15 /lf	-	0.22 /lf	-	6.37 /lf	1,401	9.77 /lf	2,150
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	7.75 ton	1,370.95 /ton	-	1,200.00 /ton	-	2,570.95 /ton	19,925	4,025.91 /ton	31,201
						Reinforcing in place, unloading & sorting, add to above - decks	7.75 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	432	85.34 /ton	661
						Reinforcing steel, crane cost for handling, maximum, add	7.75 ton	140.59 /ton	18.56 /ton	-	-	159.16 /ton	1,233	243.84 /ton	1,890
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	90.00 cy	-	-	131.00 /cy	-	131.00 /cy	11,790	210.20 /cy	18,918
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	87.00 CY	24.11 /CY	5.70 /CY	-	-	29.81 /CY	2,593	45.67 /CY	3,973
						Finishing elev slab, bull float, manual float & manual steel trowel	2,337.00 sf	1.23 /sf	-	-	-	1.23 /sf	2,884	1.89 /sf	4,418
						Curing, sprayed membrane curing compound, elevated decks	23.37 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	539	36.21 /csf	846
						03.10.10.12 Cast-In-Place Concrete, Elevated Decks, 12" thick	87.00 CY	856.23 /CY	7.93 /CY	317.14 /CY	/CY	1,181.30 /CY	102,773	1,832.85 /CY	159,458
						03.24 Cast-In-Place Concrete, Elevated Slabs	87.00 CY	856.23 /CY	7.93 /CY	317.14 /CY	/CY	1,181.30 /CY	102,773	1,832.85 /CY	159,458
						03.0 Concrete Work	903.00 CY	365.11 /CY	8.77 /CY	312.72 /CY	/CY	686.59 /CY	619,993	1,074.59 /CY	970,356
						03.00.004 Funks Reservoir Flow Meter Vault, Concrete	903.00 CY	365.11 /CY	8.77 /CY	312.72 /CY	/CY	686.59 /CY	619,993	1,074.59 /CY	970,356
		05.00.004				Funks Reservoir Flow Meter Vault, Catwalk									
			05.0			Metals									
				05.50		Metal Fabrications									
					05.50.02.50	Metals, Elevated Platforms, Complete									
						Channel (C or MC), A36, floor or roof framing, average cost per ton	0.80 ton	1,848.90 /ton	863.43 /ton	2,400.00 /ton	-	5,112.33 /ton	4,090	9,029.00 /ton	7,223
						Ladder, shop fabricated, aluminum, 20" W, bolted to concrete, excl cage	151.00 vlf	34.15 /vlf	1.27 /vlf	51.00 /vlf	-	86.42 /vlf	13,049	153.38 /vlf	23,161
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	64.00 lf	21.19 /lf	0.79 /lf	90.50 /lf	-	112.48 /lf	7,198	201.38 /lf	12,888
						Handrail Gates, at Ladders	5.00 ea	181.40 /ea	13.53 /ea	200.00 /ea	-	394.93 /ea	1,975	698.55 /ea	3,493
						Floor grating, steel, 1-3/4" x 3/16" bearing bars @ 1-3/16" O.C., cross bars @ 4" O.C., up to 300 S.F., field fabricated from panels	260.00 SF	12.64 /SF	4.64 /SF	20.50 /SF	-	37.78 /SF	9,823	66.93 /SF	17,401
						Miscellaneous Consumables Allowance	1.00 ls		-		7,000.00 /ls	7,000.00 /ls	7,000	12,124.60 /ls	12,125
						05.50.02.50 Metals, Elevated Platforms, Complete	260.00 SF	46.87 /SF	8.49 /SF	83.63 /SF	26.92 /SF	165.91 /SF	43,135	293.43 /SF	76,291
						05.50 Metal Fabrications	260.00 SF	46.87 /SF	8.49 /SF	83.63 /SF	26.92 /SF	165.91 /SF	43,135	293.43 /SF	76,291
						05.0 Metals	260.00 SF	46.87 /SF	8.49 /SF	83.63 /SF	26.92 /SF	165.91 /SF	43,135	293.43 /SF	76,291
						05.00.004 Funks Reservoir Flow Meter Vault, Catwalk	260.00 SF	46.87 /SF	8.49 /SF	83.63 /SF	26.92 /SF	165.91 /SF	43,135	293.43 /SF	76,291
		08.00.003				Funks Reservoir Flow Meter Vault, Access Hatches									
			08.0			Openings									
				08.32		Specialty Doors and Frames - Floor Doors									
					08.30.01.10	Specialty Doors and Frames, Access Doors									
						Doors, specialty, access, floor, industrial, aluminum, 300 psf L.L., single leaf, 2.5' x 3', 100 lb	2.00 EA	534.03 /EA	-	1,200.00 /EA	-	1,734.03 /EA	3,468	3,090.50 /EA	6,181
						Doors, specialty, access, floor, industrial, aluminum, 300 psf L.L., double leaf, 4' x 6', 235 lb	2.00 EA	712.04 /EA	-	3,600.00 /EA	-	4,312.04 /EA	8,624	7,729.82 /EA	15,460
						08.30.01.10 Specialty Doors and Frames, Access Doors	4.00 EA	623.04 /EA	/EA	2,400.00 /EA	/EA	3,023.04 /EA	12,092	5,410.16 /EA	21,641
						08.32 Specialty Doors and Frames - Floor Doors	4.00 EA	623.04 /EA	/EA	2,400.00 /EA	/EA	3,023.04 /EA	12,092	5,410.16 /EA	21,641
						08.0 Openings	4.00 EA	623.04 /EA	/EA	2,400.00 /EA	/EA	3,023.04 /EA	12,092	5,410.16 /EA	21,641
						08.00.003 Funks Reservoir Flow Meter Vault, Access Hatches	4.00 EA	623.04 /EA	/EA	2,400.00 /EA	/EA	3,023.04 /EA	12,092	5,410.16 /EA	21,641
		23.00.004				Funks Reservoir Flow Meter Vault, HVAC									
			23.0			HVAC									
				23.00		HVAC									
					23.00.02.00	Mechanical, HVAC									
						Exhaust Fans	2.00 ea	2,187.71 /ea	140.00 /ea	5,000.00 /ea	-	7,327.71 /ea	14,655	13,054.74 /ea	26,109
						Exhaust and Air Vents	3.00 ea	91.16 /ea	-	250.00 /ea	-	341.16 /ea	1,023	609.03 /ea	1,827
						23.00.02.00 Mechanical, HVAC	3,096.00 SF	1.50 /SF	0.09 /SF	3.47 /SF	/SF	5.06 /SF	15,679	9.02 /SF	27,937
						23.00 HVAC	3,096.00 SF	1.50 /SF	0.09 /SF	3.47 /SF	/SF	5.06 /SF	15,679	9.02 /SF	27,937
						23.0 HVAC	3,096.00 SF	1.50 /SF	0.09 /SF	3.47 /SF	/SF	5.06 /SF	15,679	9.02 /SF	27,937
						23.00.004 Funks Reservoir Flow Meter Vault, HVAC	3,096.00 SF	1.50 /SF	0.09 /SF	3.47 /SF	/SF	5.06 /SF	15,679	9.02 /SF	27,937
		27.30.COMCDT				Comm Conduit to Admin									
			26.0			Electrical Work									
				26.10		Site Electrical									
					26.10.04.00	Site Electrical, Manholes/Handholes									
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	300.00 lf	12.97 /lf	-	3.72 /lf	-	16.69 /lf	5,008	30.02 /lf	9,005
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	5,008	/EA	9,005
						26.10 Site Electrical	1.00 LS	3,891.92 /LS	/LS	1,116.00 /LS	/LS	5,007.92 /LS	5,008	9,005.46 /LS	9,005
				26.15		Process Electrical									
					26.15.01.00	Process Electrical, Wire/Cable									
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	13.00 clf	259.46 /clf	-	159.00 /clf	-	418.46 /clf	5,440	757.26 /clf	9,844
						26.15.01.00 Process Electrical, Wire/Cable	1,300.00 LF	2.60 /LF	/LF	1.59 /LF	/LF	4.19 /LF	5,440	7.57 /LF	9,844
					26.15.11.00	Process Electrical, Grounding									
						Ground wire, copper wire, bare stranded, 4/0	3.09 clf	364.16 /clf	-	420.00 /clf	-	784.16 /clf	2,423	1,427.88 /clf	4,412
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	3.00 ea	129.73 /ea	-	31.00 /ea	-	160.73 /ea	482	288.68 /ea	866
						26.15.11.00 Process Electrical, Grounding	309.00 LF	4.90 /LF	/LF	4.50 /LF	/LF	9.40 /LF	2,905	17.08 /LF	5,278
						26.15 Process Electrical	3,096.00 SF	1.58 /SF	/SF	1.12 /SF	/SF	2.70 /SF	8,345	4.88 /SF	15,123
						26.0 Electrical Work	3,096.00 SF	2.84 /SF	/SF	1.48 /SF	/SF	4.31 /SF	13,353	7.79 /SF	24,128
			31.0			Earthwork									
				26.10		Site Electrical									
					31.20.07.15	Earthworks, Sitework, Borrow									
						Concrete (red) envelope/encasement, poured neat	17.81 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	273.89 /CY	4,877	425.24 /CY	7,572

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					31.20.07.15	Earthworks, Sitework, Borrow									
						End bulkheads, plywood, concrete envelope/encasement	2.13 sf	13.49 /sf	-	0.73 /sf	-	14.22 /sf	30	21.85 /sf	47
						31.20.07.15 Earthworks, Sitework, Borrow	17.81 CY	196.24 /CY	1.76 /CY	77.59 /CY	/CY	275.59 /CY	4,907	427.85 /CY	7,618
					31.20.09.10	Earthworks, Sitework, Backfill									
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	232.09 CY	1.94 /CY	23.32 /CY	-	-	25.26 /CY	5,863	38.71 /CY	8,983
						31.20.09.10 Earthworks, Sitework, Backfill	232.09 CY	1.94 /CY	23.32 /CY	/CY	/CY	25.26 /CY	5,863	38.71 /CY	8,983
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees									
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	19.74 CY	10.88 /CY	9.31 /CY	-	-	20.19 /CY	399	30.94 /CY	611
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	19.74 CY	10.88 /CY	9.31 /CY	/CY	/CY	20.19 /CY	399	30.94 /CY	611
					31.25.01.00	Earthworks, Structural, Excavation									
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	251.83 CY	5.93 /CY	23.02 /CY	-	-	28.95 /CY	7,289	44.35 /CY	11,168
						31.25.01.00 Earthworks, Structural, Excavation	251.83 CY	5.93 /CY	23.02 /CY	/CY	/CY	28.95 /CY	7,289	44.35 /CY	11,168
						26.10 Site Electrical	**1.00** LS	5,652.57 /LS	11,424.37 /LS	1,381.53 /LS	/LS	18,458.47 /LS	18,458	28,380.14 /LS	28,380
						31.0 Earthwork	521.47 CY	10.84 /CY	21.91 /CY	2.65 /CY	/CY	35.40 /CY	18,458	54.42 /CY	28,380
						27.30.COMCDT Comm Conduit to Admin	**300.00** LF	48.11 /LF	38.08 /LF	19.85 /LF	/LF	106.04 /LF	31,812	175.03 /LF	52,508
		31.00.106				Funks Reservoir Flow Meter Vault, Excavation and Backfill									
			31.0			Earthwork									
				31.25		Earthworks, Structural									
					31.25.01.00	Earthworks, Structural, Excavation									
						Structural Excavation, excludes sheeting or dewatering	8,350.00 CY	2.65 /CY	3.23 /CY	-	-	5.88 /CY	49,117	9.01 /CY	75,252
						Stockpile Excavated Spoils	8,350.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	2.84 /cy	23,690	4.36 /cy	36,447
						31.25.01.00 Earthworks, Structural, Excavation	8,350.00 CY	3.89 /CY	4.58 /CY	0.25 /CY	/CY	8.72 /CY	72,808	13.38 /CY	111,699
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)									
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	133.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	50.50 /CY	6,717	79.91 /CY	10,628
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	133.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	50.50 /CY	6,717	79.91 /CY	10,628
					31.25.03.00	Earthworks, Structural, Backfill									
						Backfill, Native material	6,820.00 CY	6.18 /CY	1.69 /CY	0.00 /CY	-	7.87 /CY	53,682	12.06 /CY	82,245
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	5,420.00 cy	0.82 /cy	1.21 /cy	-	-	2.03 /cy	11,007	3.11 /cy	16,863
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	1,400.00 cy	1.29 /cy	0.15 /cy	-	-	1.44 /cy	2,013	2.20 /cy	3,083
						Compaction, water for, 6000 gallon wagon, 6 mile haul	6,820.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	1.85 /cy	12,642	2.93 /cy	19,962
						31.25.03.00 Earthworks, Structural, Backfill	6,820.00 CY	7.46 /CY	2.98 /CY	1.20 /CY	/CY	11.63 /CY	79,343	17.91 /CY	122,154
					31.25.05.00	Earthworks, Structural, Hauling and Disposal									
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	1,530.00 CY	7.24 /CY	8.80 /CY	-	-	16.04 /CY	24,534	24.57 /CY	37,588
						Load excavated spoils	1,530.00 cy	1.03 /cy	1.13 /cy		-	2.16 /cy	3,299	3.30 /cy	5,054
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	1,530.00 CY	8.27 /CY	9.92 /CY	/CY	/CY	18.19 /CY	27,833	27.87 /CY	42,642
						31.25 Earthworks, Structural	16,833.00 CY	5.82 /CY	4.39 /CY	0.89 /CY	/CY	11.09 /CY	186,700	17.06 /CY	287,123
						31.0 Earthwork	16,833.00 CY	5.82 /CY	4.39 /CY	0.89 /CY	/CY	11.09 /CY	186,700	17.06 /CY	287,123
						31.00.106 Funks Reservoir Flow Meter Vault, Excavation and Backfill	16,833.00 CY	5.82 /CY	4.39 /CY	0.89 /CY	/CY	11.09 /CY	186,700	17.06 /CY	287,123
		40.00.000				Funks Reservoir Flow Meter Vault, Piping									
			40.0			Process Pipe									
				40.11		Process Pipe, Carbon Steel									
					40.10.02.85	Process Pipe, Carbon Steel, 144"									
						Piping, pipe, WSP, plain end, welded, 144" diameter, excludes excavation or backfill	144.00 LF	121.97 /LF	62.10 /LF	970.00 /LF	-	1,154.07 /LF	166,186	1,838.45 /LF	264,737
						Pipe Wall Anchor, 144" Dia Piping	8.00 ea	725.59 /ea	54.12 /ea	750.00 /ea	-	1,529.71 /ea	12,238	2,398.03 /ea	19,184
						40.10.02.85 Process Pipe, Carbon Steel, 144"	144.00 LF	162.28 /LF	65.10 /LF	1,011.67 /LF	/LF	1,239.05 /LF	178,423	1,971.68 /LF	283,922
						40.11 Process Pipe, Carbon Steel	144.00 LF	162.28 /LF	65.10 /LF	1,011.67 /LF	/LF	1,239.05 /LF	178,423	1,971.68 /LF	283,922
						40.0 Process Pipe	144.00 LF	162.28 /LF	65.10 /LF	1,011.67 /LF	/LF	1,239.05 /LF	178,423	1,971.68 /LF	283,922
						40.00.000 Funks Reservoir Flow Meter Vault, Piping	144.00 LF	162.28 /LF	65.10 /LF	1,011.67 /LF	/LF	1,239.05 /LF	178,423	1,971.68 /LF	283,922
		40.90.102				Funks Reservoir Flow Meter Vault, I&C									
			40.9			Instrumentation & Controls									
				40.90		Instrumentation & Controls									
					40.90.99.01	I&C, Other									
						Ultrasonic Flow Meter Transducer Sensor Array	4.00 ea	2,637.73 /ea	1,040.00 /ea	40,000.00 /ea	-	43,677.73 /ea	174,711	78,553.60 /ea	314,214
						40.90.99.01 I&C, Other	**3,096.00** SF	3.41 /SF	1.34 /SF	51.68 /SF	/SF	56.43 /SF	174,711	101.49 /SF	314,214
						40.90 Instrumentation & Controls	**3,096.00** SF	3.41 /SF	1.34 /SF	51.68 /SF	/SF	56.43 /SF	174,711	101.49 /SF	314,214
						40.9 Instrumentation & Controls	**3,096.00** SF	3.41 /SF	1.34 /SF	51.68 /SF	/SF	56.43 /SF	174,711	101.49 /SF	314,214
						40.90.102 Funks Reservoir Flow Meter Vault, I&C	**3,096.00** SF	3.41 /SF	1.34 /SF	51.68 /SF	/SF	56.43 /SF	174,711	101.49 /SF	314,214
						06.03 Funks Reservoir Flow Meter Vault	**3,096.00 SF**	**159.97 /SF**	**35.28 /SF**	**210.28 /SF**	**45.87 /SF**	**451.40 /SF**	**1,397,545**	**723.78 /SF**	**2,240,822**
	06.04					**Funks Reservoir**									
		01.00.204				Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement									
			01.0			General Requirements									
				01.01		Construction Operations									
					01.01.05.00	General Conditions, Other									
						Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement Allowance	18.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	-	60,000.00 /MO	1,080,000	93,012.69 /MO	1,674,228
						01.01.05.00 General Conditions, Other	18.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,080,000	93,012.69 /MO	1,674,228
						01.01 Construction Operations	18.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,080,000	93,012.69 /MO	1,674,228
						01.0 General Requirements	18.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,080,000	93,012.69 /MO	1,674,228
						01.00.204 Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement	**18.00** MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,080,000	93,012.69 /MO	1,674,228
		31.00.107				Funks Reservoir, Prepare Access/Haul Roads and Stockpile Areas									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.15.01.00	Site Preparation, Clearing and Grubbing									
						Topsoil stripping and stockpiling, loam or topsoil, remove and stockpile on site, 200 HP dozer, 6" deep, 200' haul per C.Y.	184,000.00 CY	1.14 /CY	1.62 /CY	-	-	2.76 /CY	508,317	4.23 /CY	778,785
						Load excavated spoils	184,000.00 cy	0.62 /cy	0.68 /cy	0.00 /cy	-	1.29 /cy	238,021	1.98 /cy	364,668
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	184,000.00 cy	0.96 /cy	3.45 /cy	-	-	4.41 /cy	811,400	6.76 /cy	1,243,135
						Stockpile Management	184,000.00 cy	0.18 /cy	0.20 /cy			0.37 /cy	68,641	0.57 /cy	105,164
						31.15.01.00 Site Preparation, Clearing and Grubbing	184,000.00 CY	2.90 /CY	5.94 /CY	/CY	/CY	8.84 /CY	1,626,378	13.54 /CY	2,491,753
						31.22 Earthworks, Site	184,000.00 CY	2.90 /CY	5.94 /CY	/CY	/CY	8.84 /CY	1,626,378	13.54 /CY	2,491,753
						31.0 Earthwork	184,000.00 CY	2.90 /CY	5.94 /CY	/CY	/CY	8.84 /CY	1,626,378	13.54 /CY	2,491,753
						31.00.107 Funks Reservoir, Prepare Access/Haul Roads and Stockpile Areas	184,000.00 CY	2.90 /CY	5.94 /CY	/CY	/CY	8.84 /CY	1,626,378	13.54 /CY	2,491,753
		31.00.108				Funks Reservoir, Sediment Removal									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.25.05.00	Earthworks, Structural, Hauling and Disposal									
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	29,000.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	465,026	24.57 /cy	712,460
						Load excavated spoils	29,000.00 cy	1.03 /cy	1.13 /cy		-	2.16 /cy	62,524	3.30 /cy	95,791
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	**29,000.00** CY	8.27 /CY	9.92 /CY	/CY	/CY	18.19 /CY	527,549	27.87 /CY	808,251
					35.00.20.04	Hydraulic Dredging									
						Dredging, mobilization and demobilization, add to below	1.00 ls	48,411.52 /ls	31,682.56 /ls	-	-	80,094.08 /ls	80,094	122,711.07 /ls	122,711
						Hydraulic dredging, pumped to shore dump, hydraulic method	286,000.00 CY	9.20 /CY	5.03 /CY	-	-	14.23 /CY	4,068,585	21.80 /CY	6,233,424

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					35.00.20.04	Hydraulic Dredging									
						Moving/Drying Dredging Spoils, Stockpile Area Construction and Maintenance Allowance	1.00 ls	362,736.00 /ls	297,127.60 /ls	286,000.00 /ls	-	945,863.60 /ls	945,864	1,469,879.90 /ls	1,469,880
						35.00.20.04 Hydraulic Dredging	286,000.00 CY	10.64 /CY	6.18 /CY	1.00 /CY	/CY	17.81 /CY	5,094,542	27.36 /CY	7,826,015
						31.22 Earthworks, Site	286,000.00 CY	11.47 /CY	7.18 /CY	1.00 /CY	/CY	19.66 /CY	5,622,092	30.19 /CY	8,634,266
						31.0 Earthwork	286,000.00 CY	11.47 /CY	7.18 /CY	1.00 /CY	/CY	19.66 /CY	5,622,092	30.19 /CY	8,634,266
						31.00.108 Funks Reservoir, Sediment Removal	286,000.00 CY	11.47 /CY	7.18 /CY	1.00 /CY	/CY	19.66 /CY	5,622,092	30.19 /CY	8,634,266
		31.00.110				Funks Reservoir, Reservoir Excavation									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.25.05.00	Earthworks, Structural, Hauling and Disposal									
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	36,000.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	577,274	24.57 /cy	884,433
						Load excavated spoils	36,000.00 cy	1.03 /cy	1.13 /cy		-	2.16 /cy	77,615	3.30 /cy	118,914
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	36,000.00 CY	8.27 /CY	9.92 /CY	/CY	/CY	18.19 /CY	654,889	27.87 /CY	1,003,347
					35.00.20.04	Hydraulic Dredging									
						Hydraulic dredging, pumped to shore dump, hydraulic method	358,000.00 CY	9.20 /CY	5.03 /CY	-	-	14.23 /CY	5,092,844	21.80 /CY	7,802,677
						Moving/Drying Dredging Spoils, Stockpile Area Construction and Maintenance Allowance	1.00 ls	453,420.00 /ls	371,409.50 /ls	358,000.00 /ls	-	1,182,829.50 /ls	1,182,830	1,838,152.18 /ls	1,838,152
						35.00.20.04 Hydraulic Dredging	358,000.00 CY	10.47 /CY	6.07 /CY	1.00 /CY	/CY	17.53 /CY	6,275,673	26.93 /CY	9,640,829
						31.22 Earthworks, Site	358,000.00 CY	11.30 /CY	7.06 /CY	1.00 /CY	/CY	19.36 /CY	6,930,562	29.73 /CY	10,644,176
						31.0 Earthwork	358,000.00 CY	11.30 /CY	7.06 /CY	1.00 /CY	/CY	19.36 /CY	6,930,562	29.73 /CY	10,644,176
						31.00.110 Funks Reservoir, Reservoir Excavation	358,000.00 CY	11.30 /CY	7.06 /CY	1.00 /CY	/CY	19.36 /CY	6,930,562	29.73 /CY	10,644,176
		31.00.112				Funks Reservoir, Construct Pipeline Cofferdam									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.07.15	Earthworks, Sitework, Borrow									
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	77,000.00 CY	0.65 /CY	1.77 /CY	-	-	2.42 /CY	185,978	3.70 /CY	284,934
						Grading deadpool area w/dozer	46,200.00 sy	0.58 /sy	0.82 /sy	-	-	1.40 /sy	64,670	2.14 /sy	99,080
						Load excavated spoils	77,000.00 cy	0.62 /cy	0.68 /cy	0.00 /cy	-	1.29 /cy	99,606	1.98 /cy	152,606
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	77,000.00 cy	0.96 /cy	3.45 /cy	-	-	4.41 /cy	339,553	6.76 /cy	520,225
						31.20.07.15 Earthworks, Sitework, Borrow	77,000.00 CY	2.57 /CY	6.39 /CY	/CY	/CY	8.96 /CY	689,808	13.73 /CY	1,056,845
					31.20.09.40	Earthworks, Sitework, Embankments/Berms									
						Construct cofferdam embankment w/200 HP dozer	68,000.00 CY	1.35 /CY	1.90 /CY	-	-	3.25 /CY	221,048	4.98 /CY	338,665
						Load excavated spoils	68,000.00 cy	0.62 /cy	0.68 /cy	0.00 /cy	-	1.29 /cy	87,964	1.98 /cy	134,769
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	68,000.00 cy	0.96 /cy	3.45 /cy	-	-	4.41 /cy	299,865	6.76 /cy	459,419
						Compaction, water for, 3000 gallon truck, 3 mile haul	68,000.00 cy	0.65 /cy	0.44 /cy	0.00 /cy	-	1.09 /cy	74,306	1.67 /cy	113,842
						Compaction, structural, common fill, 8" lifts, sheepsfoot	68,000.00 cy	0.74 /cy	1.09 /cy	-	-	1.83 /cy	124,281	2.80 /cy	190,409
						Cut & finish cofferdam top/sideslopes w/dozer	57,350.00 sy	0.74 /sy	1.05 /sy	-	-	1.79 /sy	102,784	2.75 /sy	157,474
						Pond and reservoir liners, membrane lining systems HDPE, 100,000 S.F. or more, 60 mil thick, per M.S.F.	158.60 msf	1,050.86 /msf	322.16 /msf	570.00 /msf	-	1,943.02 /msf	308,163	3,018.20 /msf	478,686
						31.20.09.40 Earthworks, Sitework, Embankments/Berms	68,000.00 CY	7.39 /CY	9.19 /CY	1.33 /CY	/CY	17.92 /CY	1,218,410	27.55 /CY	1,873,264
						31.22 Earthworks, Site	145,000.00 CY	4.83 /CY	7.70 /CY	0.62 /CY	/CY	13.16 /CY	1,908,218	20.21 /CY	2,930,109
						31.0 Earthwork	145,000.00 CY	4.83 /CY	7.70 /CY	0.62 /CY	/CY	13.16 /CY	1,908,218	20.21 /CY	2,930,109
						31.00.112 Funks Reservoir, Construct Pipeline Cofferdam	145,000.00 CY	4.83 /CY	7.70 /CY	0.62 /CY	/CY	13.16 /CY	1,908,218	20.21 /CY	2,930,109
		31.00.114				Funks Reservoir, Construct PGP Cofferdam									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.07.15	Earthworks, Sitework, Borrow									
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	19,000.00 CY	0.65 /CY	1.77 /CY	-	-	2.42 /CY	45,891	3.70 /CY	70,309
						Grading deadpool area w/dozer	11,400.00 sy	0.58 /sy	0.82 /sy	-	-	1.40 /sy	15,958	2.14 /sy	24,448
						Load excavated spoils	19,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	24,578	1.98 /cy	37,656
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	19,000.00 cy	0.96 /cy	3.45 /cy	-	-	4.41 /cy	83,786	6.76 /cy	128,367
						31.20.07.15 Earthworks, Sitework, Borrow	19,000.00 CY	2.57 /CY	6.39 /CY	/CY	/CY	8.96 /CY	170,212	13.73 /CY	260,780
					31.20.09.40	Earthworks, Sitework, Embankments/Berms									
						Construct cofferdam embankment w/200 HP dozer	40,000.00 CY	1.35 /CY	1.90 /CY	-	-	3.25 /CY	130,029	4.98 /CY	199,215
						Load excavated spoils	40,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	51,744	1.98 /cy	79,276
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	40,000.00 cy	0.96 /cy	3.45 /cy	-	-	4.41 /cy	176,391	6.76 /cy	270,247
						Compaction, water for, 3000 gallon truck, 3 mile haul	40,000.00 cy	0.65 /cy	0.44 /cy		-	1.09 /cy	43,709	1.67 /cy	66,966
						Compaction, structural, common fill, 8" lifts, sheepsfoot	40,000.00 cy	0.74 /cy	1.09 /cy	-	-	1.83 /cy	73,106	2.80 /cy	112,005
						Cut & finish cofferdam top/sideslopes w/dozer	18,865.00 sy	0.74 /sy	1.05 /sy	-	-	1.79 /sy	33,810	2.75 /sy	51,800
						Pond and reservoir liners, membrane lining systems HDPE, 100,000 S.F. or more, 60 mil thick, per M.S.F.	52.50 msf	1,050.86 /msf	322.16 /msf	570.00 /msf	-	1,943.02 /msf	102,008	3,018.20 /msf	158,455
						31.20.09.40 Earthworks, Sitework, Embankments/Berms	40,000.00 CY	6.05 /CY	8.48 /CY	0.75 /CY	/CY	15.27 /CY	610,798	23.45 /CY	937,964
						31.22 Earthworks, Site	59,000.00 CY	4.93 /CY	7.80 /CY	0.51 /CY	/CY	13.24 /CY	781,010	20.32 /CY	1,198,744
						31.0 Earthwork	59,000.00 CY	4.93 /CY	7.80 /CY	0.51 /CY	/CY	13.24 /CY	781,010	20.32 /CY	1,198,744
						31.00.114 Funks Reservoir, Construct PGP Cofferdam	59,000.00 CY	4.93 /CY	7.80 /CY	0.51 /CY	/CY	13.24 /CY	781,010	20.32 /CY	1,198,744
		31.00.116				Funks Reservoir, Remove Pipeline Cofferdam									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure									
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	68,000.00 CY	0.65 /CY	1.77 /CY	-	-	2.42 /CY	164,240	3.70 /CY	251,630
						Grading area w/dozer	45,880.00 sy	0.58 /sy	0.82 /sy	-	-	1.40 /sy	64,222	2.14 /sy	98,394
						Load excavated spoils	68,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	87,964	1.98 /cy	134,769
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	68,000.00 cy	0.96 /cy	3.45 /cy	-	-	4.41 /cy	299,865	6.76 /cy	459,419
						31.20.07.10 Earthworks, Sitework, Excavating Bulk Measure	68,000.00 CY	2.61 /CY	6.45 /CY	/CY	/CY	9.06 /CY	616,292	13.89 /CY	944,212
						31.22 Earthworks, Site	68,000.00 CY	2.61 /CY	6.45 /CY	/CY	/CY	9.06 /CY	616,292	13.89 /CY	944,212
						31.0 Earthwork	68,000.00 CY	2.61 /CY	6.45 /CY	/CY	/CY	9.06 /CY	616,292	13.89 /CY	944,212
						31.00.116 Funks Reservoir, Remove Pipeline Cofferdam	68,000.00 CY	2.61 /CY	6.45 /CY	/CY	/CY	9.06 /CY	616,292	13.89 /CY	944,212
		31.00.118				Funks Reservoir, Remove PGP Cofferdam									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure									
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	40,000.00 CY	0.65 /CY	1.77 /CY	-	-	2.42 /CY	96,612	3.70 /CY	148,018
						Grading area w/dozer	15,720.00 sy	0.58 /sy	0.82 /sy	-	-	1.40 /sy	22,005	2.14 /sy	33,713
						Load excavated spoils	40,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	51,744	1.98 /cy	79,276

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure									
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	40,000.00 cy	0.96 /cy	3.45 /cy	-	-	4.41 /cy	176,391	6.76 /cy	270,247
						31.20.07.10 Earthworks, Sitework, Excavating Bulk Measure	40,000.00 CY	2.45 /CY	6.22 /CY	/CY	/CY	8.67 /CY	346,751	13.28 /CY	531,253
						31.22 Earthworks, Site	40,000.00 CY	2.45 /CY	6.22 /CY	/CY	/CY	8.67 /CY	346,751	13.28 /CY	531,253
						31.0 Earthwork	40,000.00 CY	2.45 /CY	6.22 /CY	/CY	/CY	8.67 /CY	346,751	13.28 /CY	531,253
						31.00.118 Funks Reservoir, Remove PGP Cofferdam	40,000.00 CY	2.45 /CY	6.22 /CY	/CY	/CY	8.67 /CY	346,751	13.28 /CY	531,253
						06.04 Funks Reservoir	132.73 AC	70,794.43 /AC	63,892.35 /AC	7,792.72 /AC	/AC	142,479.49 /AC	18,911,303	218,855.89 /AC	29,048,742
						06 Funks Reservoir	***1.00 LS***	***10,653,475.12 /LS***	***8,641,641.11 /LS***	***2,263,480.97 /LS***	***407,715.00 /LS***	***21,966,312.20 /LS***	***21,966,312***	***34,151,725.21 /LS***	***34,151,725***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	10,653,475		131,956.228 hrs	
Material	2,263,481			
Allowance	407,715			
Equipment	8,641,641		348,060.160 hrs	
Other				
Subtotal Direct Costs	**21,966,312**	**21,966,312**		
Material Sales Tax, Dunnigan Ca	164,102			7.250 %
Subtotal W/ Sales Tax	**164,102**	**22,130,414**		
Masonry Work I,OH&P	41,167			20.000 %
Metals Work I,OH&P	21,565			20.000 %
Architectural (Div 6-12)I,OH&P	43,179			20.000 %
Mechanical Work I,OH&P	62,795			20.000 %
Electrical Work I,OH&P	129,683			25.000 %
Instruments & Controls I,OH&P	34,942			20.000 %
Subtotal W/ Subcontractor OH&P	**333,331**	**22,463,745**		
General Conditions	1,123,187			5.000 %
Subtotal W/ General Conditions	**1,123,187**	**23,586,932**		
Mobilization/Demobilization	707,608			3.000 %
Prime Contractor Overhead	2,429,454			10.000 %
Prime Contractor Profit	1,603,440			6.000 %
Bonds & Insurance	614,705			2.170 %
Subtotal W/ Prime Markups	**5,355,207**	**28,942,139**		
Contractor Contingency	868,264			3.000 %
Design Contingency	4,341,321			15.000 %
Subtotal W/ Contingency	**5,209,585**	**34,151,724**		
Total Construction Cost		**34,151,724**		
Non-Contract Costs	5,805,793			17.000 %
Total Project Costs	**5,805,793**	**39,957,517**		

Funks PGP

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Funks PGP Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
03			**Funks Pumping Generating Plant (PGP)**										
	03.01		**Funks Reservoir Pumping Generating Plant**										
		03.00.300	Funk PGP Foundation Slab	5,332.00 CY	155.81 /CY	7.33 /CY	232.33 /CY	/CY	/CY	395.47 /CY	2,108,622	643.13 /CY	3,429,153
		03.00.302	Funk PGP Concrete Walls, Perimeter	2,094.00 CY	299.31 /CY	9.70 /CY	309.96 /CY	/CY	/CY	618.96 /CY	1,296,110	1,002.70 /CY	2,099,655
		03.00.304	Funk PGP Concrete Walls, Pier Walls	4,480.00 CY	349.91 /CY	9.74 /CY	338.58 /CY	/CY	/CY	698.22 /CY	3,128,034	1,130.29 /CY	5,063,717
		03.00.306	Funk PGP Elevated Slab	3,400.00 CY	243.35 /CY	7.71 /CY	243.54 /CY	/CY	/CY	494.60 /CY	1,681,625	800.93 /CY	2,723,157
		03.00.308	Funk PGP Slab on Grade @ El 214.00	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.11 /CY	329,751
		05.00.300	Funk PGP, Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,046
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	33,729.80 /LS	2,600.00 /LS	19,500.00 /LS	/LS	/LS	55,829.80 /LS	55,830	103,786.68 /LS	103,787
		40.00.300	Funk PGP, Process Piping	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,274.87 /LF	4,517,906
		44.40.300	Funk PGP, Furnish and Install Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	1,004,309.16 /EA	1,024,996.52 /EA	13,324,955	1,037,242.76 /EA	13,484,156
			03.01 Funks Reservoir Pumping Generating Plant	35,990.00 SF	126.35 /SF	7.30 /SF	183.69 /SF	26.52 /SF	362.77 /SF	706.63 /SF	25,431,523	925.91 /SF	33,323,327
	03.02		**Funks Reservoir Turbine Buildings**										
		03.00.316	Funk PGP Turbine Buildings Foundation Slab	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.49 /CY	1,826,956
		03.00.318	Funk PGP Turbine Buildings Concrete Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.54 /CY	1,433,953
		03.00.320	Funk PGP Turbine Buildings Elevated Slab	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.17 /CY	519,360
		04.00.300	Funk PGP Turbine Buildings Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.04 /SF	144,099
		05.00.302	Funk PGP Turbine Building, Metals	2.00 LS	14,950.80 /LS	4,072.24 /LS	43,590.00 /LS	30,000.00 /LS	/LS	92,613.04 /LS	185,226	168,350.56 /LS	336,701
		08.00.300	Funk PGP Turbine Building, Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.57 /EA	6,837
		23.00.300	Funk PGP Turbine Building, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,847
		26.00.000	Hydopower Generators	2.00 EA	108,531.52 /EA	10,912.00 /EA	150,000.00 /EA	/EA	4,920,000.00 /EA	5,189,443.52 /EA	10,378,887	5,424,943.11 /EA	10,849,886
		26.05.GRDG	Facility Grounding	3,250.00 SF	2.22 /SF	0.10 /SF	1.10 /SF	/SF	/SF	3.41 /SF	11,082	6.33 /SF	20,580
		26.12.SEC	Subfeed from Elec Building	600.00 LF	41.92 /LF	4.18 /LF	24.95 /LF	/LF	/LF	71.05 /LF	42,629	128.84 /LF	77,304
		26.20.DIST	Electrical Distribution Equipment	450.00 AMP	46.44 /AMP	0.79 /AMP	49.26 /AMP	/AMP	/AMP	96.49 /AMP	43,422	180.51 /AMP	81,227
		26.25.LTG	Interior Lighting and Control	1.00 LS	15,144.99 /LS	/LS	6,724.85 /LS	/LS	/LS	21,869.84 /LS	21,870	40,589.43 /LS	40,589
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	1,713.08 /LS	/LS	143.26 /LS	/LS	/LS	1,856.34 /LS	1,856	3,414.29 /LS	3,414
		26.30.DEV	Device Outlets	1.00 LS	10,060.56 /LS	/LS	6,095.20 /LS	/LS	/LS	16,155.76 /LS	16,156	30,066.09 /LS	30,066
		26.40.EQCON	Facility Equipment Connections and Controls	1.00 ALO	25,946.13 /ALO	3,000.00 /ALO	10,000.00 /ALO	/ALO	/ALO	38,946.13 /ALO	38,946	72,139.01 /ALO	72,139
		26.40.HYDTURB	13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A	600.00 LF	380.99 /LF	7.83 /LF	154.39 /LF	2.67 /LF	/LF	545.88 /LF	327,529	1,006.38 /LF	603,827
		26.41.HYDTURB	Hyd Turbine Controls Circuits	600.00 LF	164.55 /LF	7.83 /LF	29.81 /LF	/LF	/LF	202.19 /LF	121,314	367.13 /LF	220,280
		26.90.LPS	Facility Lightning Protection System	3,250.00 SF	1.44 /SF	/SF	0.78 /SF	0.46 /SF	/SF	2.68 /SF	8,702	4.97 /SF	16,141
		27.30.COMCDT	Comm Conduit to Admin	1,200.00 LF	28.15 /LF	8.36 /LF	11.74 /LF	/LF	/LF	48.25 /LF	57,904	84.05 /LF	100,860
		28.20.AC	Access Control System	2.00 DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	/DOOR	2,356.77 /DOOR	4,714	3,790.32 /DOOR	7,581
		28.20.CCTV	Closed Circuit TV and Cameras	2.00 CAM	1,701.66 /CAM	/CAM	1,730.00 /CAM	500.00 /CAM	/CAM	3,931.66 /CAM	7,863	6,731.58 /CAM	13,463
		28.20.ID	Intrusion Detection System	2.00 DOOR	2,918.94 /DOOR	/DOOR	2,000.00 /DOOR	250.00 /DOOR	/DOOR	5,168.94 /DOOR	10,338	8,330.85 /DOOR	16,662
		40.00.304	Funk PGP Turbine Building, Process Piping	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,718.78 /LF	625,319
			03.02 Funks Reservoir Turbine Buildings	2.00 EA	949,646.57 /EA	56,945.15 /EA	1,071,136.83 /EA	64,800.00 /EA	4,920,000.00 /EA	7,062,528.56 /EA	14,125,057	8,569,045.79 /EA	17,138,092
	03.03		**Funks Reservoir Energy Dissipation Valve Structures**										
		03.00.310	Funk PGP Energy Dissipation Structures Foundation Slab	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.50 /CY	477,670
		03.00.312	Funk PGP Energy Dissipation Structures Concrete Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,038.95 /CY	861,289
		03.00.314	Funk PGP Energy Dissipation Structures Elevated Deck	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.35 /CY	221,294
		40.00.302	Funk PGP Energy Dissipation Structures Piping	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,478.91 /LF	297,469
			03.03 Funks Reservoir Energy Dissipation Valve Structures	2.00 EA	246,476.70 /EA	12,866.61 /EA	312,861.40 /EA	/EA	/EA	572,204.70 /EA	1,144,409	928,860.81 /EA	1,857,722
	03.04		**Funks Reservoir Electrical Building**										
		04.00.302	Funk PGP Electrical Building, Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.81 /SF	552,073
		05.00.304	Funk PGP Electrical Building, Metal Roof Framing	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.96 /SF	186,479
		07.00.300	Funk PGP Electrical Building, Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,177
		08.00.302	Funk PGP Electrical Building, Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,850.68 /EA	97,014
		21.00.300	Funk PGP Electrical Building, Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.75 /SF	384,843
		23.00.302	Funk PGP Electrical Building, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	897,966
		26.02.PRI	Primary Feeds fromSubstation	2,180.00 LF	376.38 /LF	26.06 /LF	295.94 /LF	2.20 /LF	/LF	700.58 /LF	1,527,268	1,286.22 /LF	2,803,955
		26.03.MVSWGR	MV SWGR	30,800.00 FA	3.58 /FA	0.69 /FA	50.13 /FA	/FA	/FA	54.40 /FA	1,675,521	103.39 /FA	3,184,278
		26.03.SWGREQ	Station Aux Xfmr, Btty	1.00 LS	54,187.72 /LS	5,931.53 /LS	160,200.00 /LS	/LS	/LS	220,319.25 /LS	220,319	415,605.36 /LS	415,605
		26.04.MVBUS	Medium Voltage Overhead Bus Duct 2000A	540.00 LF	429.87 /LF	1.85 /LF	1,642.50 /LF	4.82 /LF	/LF	2,079.03 /LF	1,122,677	3,931.32 /LF	2,122,914
		26.04.MVVSD	Medium Voltage Variable Speed Drives	13.00 EA	12,973.07 /EA	3,250.00 /EA	420,200.00 /EA	5,000.00 /EA	/EA	441,423.07 /EA	5,738,500	839,884.83 /EA	10,918,503
		26.05.GRDG	Facility Grounding	14,550.00 SF	3.48 /SF	/SF	1.30 /SF	/SF	/SF	4.79 /SF	69,618	8.87 /SF	129,028
		26.20.DIST	Electrical Distribution Equipment	550.00 AMP	36.16 /AMP	0.65 /AMP	38.29 /AMP	/AMP	/AMP	75.10 /AMP	41,306	140.49 /AMP	77,268
		26.25.LTG	Interior Lighting and Control	1.00 LS	86,265.47 /LS	/LS	38,029.50 /LS	/LS	/LS	124,294.97 /LS	124,295	230,672.00 /LS	230,672
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	6,300.47 /LS	/LS	588.58 /LS	/LS	/LS	6,889.05 /LS	6,889	12,674.84 /LS	12,675
		26.30.DEV	Device Outlets	1.00 LS	53,247.76 /LS	/LS	19,053.60 /LS	/LS	/LS	72,301.36 /LS	72,301	133,957.59 /LS	133,958
		26.40.EQCON	Facility Equipment Connections and Controls	1.00 ALO	8,282.95 /ALO	/ALO	4,925.85 /ALO	/ALO	/ALO	13,208.80 /ALO	13,209	24,577.59 /ALO	24,578
		26.40.PMP	13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A	780.00 LF	145.29 /LF	1.28 /LF	115.46 /LF	3.33 /LF	/LF	265.37 /LF	206,985	494.96 /LF	386,069
		26.41.PMP	8000HP Pump Process Control Circuits and Connections	780.00 LF	43.96 /LF	/LF	12.06 /LF	/LF	/LF	56.02 /LF	43,697	103.60 /LF	80,807
		26.90.LPS	Facility Lightning Protection System	14,550.00 SF	1.27 /SF	0.03 /SF	0.85 /SF	0.34 /SF	/SF	2.49 /SF	36,201	4.62 /SF	67,276
		27.10.COMEQ	Communications Room Equipment	1.00 LS	28,011.60 /LS	/LS	21,023.71 /LS	/LS	/LS	49,035.31 /LS	49,035	91,438.37 /LS	91,438
		27.31.COMCDT	Comm Conduit to MH/HH	200.00 LF	224.65 /LF	28.56 /LF	52.68 /LF	/LF	/LF	305.89 /LF	61,178	553.18 /LF	110,636
		28.10.FA	Fire Alarm System	14,550.00 SF	3.58 /SF	/SF	1.41 /SF	0.17 /SF	/SF	5.16 /SF	75,070	9.09 /SF	132,298
		28.20.AC	Access Control System	12.00 DOOR	908.12 /DOOR	/DOOR	466.67 /DOOR	/DOOR	/DOOR	1,374.78 /DOOR	16,497	2,211.02 /DOOR	26,532
		28.20.CCTV	Closed Circuit TV and Cameras	12.00 CAM	3,344.91 /CAM	/CAM	2,063.33 /CAM	833.33 /CAM	/CAM	6,241.57 /CAM	74,899	10,991.34 /CAM	131,896
		28.20.ID	Intrusion Detection System	12.00 DOOR	1,675.69 /DOOR	/DOOR	1,083.33 /DOOR	125.00 /DOOR	/DOOR	2,884.02 /DOOR	34,608	4,645.85 /DOOR	55,750
			03.04 Funks Reservoir Electrical Building	14,550.00 SF	156.21 /SF	10.03 /SF	637.75 /SF	55.89 /SF	/SF	859.88 /SF	12,511,294	1,613.52 /SF	23,476,688
	03.05		**Funks Reservoir Site Electrical**										
		26.20.DB	Site Ductbanks	1.00 LS	/LS	/LS	/LS	50,000.00 /LS	/LS	50,000.00 /LS	50,000	91,683.05 /LS	91,683
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	/LS	/LS	/LS	125,000.00 /LS	/LS	125,000.00 /LS	125,000	229,207.66 /LS	229,208
		28.20.AC	Access Control System	2.00 DOOR	/DOOR	/DOOR	/DOOR	10,000.00 /DOOR	/DOOR	10,000.00 /DOOR	20,000	18,336.60 /DOOR	36,673
		28.20.CCTV	Closed Circuit TV and Cameras	10.00 CAM	/CAM	/CAM	/CAM	7,500.00 /CAM	/CAM	7,500.00 /CAM	75,000	13,752.46 /CAM	137,525
			03.05 Funks Reservoir Site Electrical	1.00 LS	/LS	/LS	/LS	270,000.00 /LS	/LS	270,000.00 /LS	270,000	495,088.49 /LS	495,088
	03.06		**Funks Reservoir PGP Sitework**										
		31.00.300	Funk PGP Earthworks	272,100.00 CY	7.87 /CY	8.96 /CY	2.76 /CY	4.54 /CY	/CY	24.13 /CY	6,565,938	38.41 /CY	10,452,691
		32.00.300	Funk PGP Site Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,572.38 /LS	2,266,572
		33.00.300	Funk PGP Yard Piping	1,850.00 LF	475.48 /LF	373.42 /LF	2,048.09 /LF	/LF	/LF	2,896.99 /LF	5,359,427	4,736.33 /LF	8,762,217
			03.06 Funks Reservoir PGP Sitework	1.00 LS	3,508,869.63 /LS	3,200,258.47 /LS	5,374,040.18 /LS	1,235,250.00 /LS	/LS	13,318,418.28 /LS	13,318,418	21,481,479.45 /LS	21,481,479
			03 Funks Pumping Generating Plant (PGP)	***1.00 LS***	***12,721,270.20 /LS***	***3,748,620.79 /LS***	***24,032,141.19 /LS***	***3,402,650.00 /LS***	***22,896,019.02 /LS***	***66,800,701.20 /LS***	***66,800,701***	***97,772,396.05 /LS***	***97,772,396***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	20,876,113		137,624.944 hrs	
Material	42,265,051			
Allowance	5,765,510			
Equipment	5,969,704		36,598.123 hrs	
Subtotal W/ Contingency	**74,876,378**	**74,876,378**		
Non-Markup Items	22,896,019			
Total Construction Cost	**22,896,019**	**97,772,397**		
Non-Contract Costs	16,621,307			17.000 %
Total Project Costs	**16,621,307**	**114,393,704**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Funks PGP Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
03						**Funks Pumping Generating Plant (PGP)**										
	03.01					Funks Reservoir Pumping Generating Plant										
		03.00.300				Funk PGP Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.48	Cast-In-Place Concrete, Slabs on Grade, 48" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	3,336.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	30,980	14.78 /sfca	49,297
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	432.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	1,110,648	4,158.50 /ton	1,796,474
						Reinforcing in place, unloading & sorting, add to above - slabs	432.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	24,064	88.22 /ton	38,110
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	432.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	26,157	95.89 /ton	41,424
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	5,440.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	712,640	216.96 /cy	1,180,247
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	5,332.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	154,632	45.93 /CY	244,885
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	35,990.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	33,711	1.48 /sf	53,386
						Curing, sprayed membrane curing compound	359.90 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	8,295	37.40 /csf	13,462
						Fine grading, fine grade for slab on grade, machine	3,998.89 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	7,495	2.97 /sy	11,869
						03.10.05.48 Cast-In-Place Concrete, Slabs on Grade, 48" thick	5,332.00 CY	155.81 /CY	7.33 /CY	232.33 /CY	/CY	/CY	395.47 /CY	2,108,622	643.13 /CY	3,429,153
						03.18 Cast-In-Place Concrete, Slabs on Grade	5,332.00 CY	155.81 /CY	7.33 /CY	232.33 /CY	/CY	/CY	395.47 /CY	2,108,622	643.13 /CY	3,429,153
						03.0 Concrete Work	5,332.00 CY	155.81 /CY	7.33 /CY	232.33 /CY	/CY	/CY	395.47 /CY	2,108,622	643.13 /CY	3,429,153
						03.00.300 Funk PGP Foundation Slab	5,332.00 CY	155.81 /CY	7.33 /CY	232.33 /CY	/CY	/CY	395.47 /CY	2,108,622	643.13 /CY	3,429,153
		03.00.302				Funk PGP Concrete Walls, Perimeter										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.48	Cast-In-Place Concrete, Straight Walls, 48" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	28,266.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	416,572	23.73 /sfca	670,877
						Form oil, coverage varies greatly, maximum, includes material only	76.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	1,786	38.92 /gal	2,958
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	177.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	455,057	4,158.50 /ton	736,055
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	177.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	9,860	88.22 /ton	15,615
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	177.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	10,717	95.89 /ton	16,972
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	2,135.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	279,685	216.96 /cy	463,203
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	2,094.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	93,622	70.80 /CY	148,265
						Concrete finishing, walls, includes breaking ties and patching voids	28,266.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	28,811	1.62 /sf	45,709
						03.10.06.48 Cast-In-Place Concrete, Straight Walls, 48" thick	2,094.00 CY	299.31 /CY	9.70 /CY	309.96 /CY	/CY	/CY	618.96 /CY	1,296,110	1,002.70 /CY	2,099,655
						03.20 Cast-In-Place Concrete, Straight Walls	2,094.00 CY	299.31 /CY	9.70 /CY	309.96 /CY	/CY	/CY	618.96 /CY	1,296,110	1,002.70 /CY	2,099,655
						03.0 Concrete Work	2,094.00 CY	299.31 /CY	9.70 /CY	309.96 /CY	/CY	/CY	618.96 /CY	1,296,110	1,002.70 /CY	2,099,655
						03.00.302 Funk PGP Concrete Walls, Perimeter	2,094.00 CY	299.31 /CY	9.70 /CY	309.96 /CY	/CY	/CY	618.96 /CY	1,296,110	1,002.70 /CY	2,099,655
		03.00.304				Funk PGP Concrete Walls, Pier Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	80,640.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	1,188,436	23.73 /sfca	1,913,943
						Form oil, coverage varies greatly, maximum, includes material only	215.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	5,053	38.92 /gal	8,368
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	392.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	1,007,810	4,158.50 /ton	1,630,134
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	392.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	21,836	88.22 /ton	34,581
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	392.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	23,735	95.89 /ton	37,588
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	4,570.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	598,670	216.96 /cy	991,494
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	4,480.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	200,299	70.80 /CY	317,205
						Concrete finishing, walls, includes breaking ties and patching voids	80,640.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	82,195	1.62 /sf	130,404
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	4,480.00 CY	349.91 /CY	9.74 /CY	338.58 /CY	/CY	/CY	698.22 /CY	3,128,034	1,130.29 /CY	5,063,717
						03.20 Cast-In-Place Concrete, Straight Walls	4,480.00 CY	349.91 /CY	9.74 /CY	338.58 /CY	/CY	/CY	698.22 /CY	3,128,034	1,130.29 /CY	5,063,717
						03.0 Concrete Work	4,480.00 CY	349.91 /CY	9.74 /CY	338.58 /CY	/CY	/CY	698.22 /CY	3,128,034	1,130.29 /CY	5,063,717
						03.00.304 Funk PGP Concrete Walls, Pier Walls	4,480.00 CY	349.91 /CY	9.74 /CY	338.58 /CY	/CY	/CY	698.22 /CY	3,128,034	1,130.29 /CY	5,063,717
		03.00.306				Funk PGP Elevated Slab										
			03.0			Concrete Work										
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.36	Cast-In-Place Concrete, Elevated Decks, 36" thick										
						Slab shoring	3,250.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	2,225	1.09 /cf	3,536
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	31,212.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	277,052	14.15 /sf	441,766
						C.I.P. concrete forms, elevated slab, edge forms, 36" high, 3 use, includes shoring, erecting, bracing, stripping and cleaning	3,474.00 sfca	12.19 /sfca	-	0.53 /sfca	-	-	12.72 /sfca	44,182	20.18 /sfca	70,102
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	272.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	699,297	4,158.50 /ton	1,131,113
						Reinforcing in place, unloading & sorting, add to above - decks	272.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	15,152	88.22 /ton	23,995
						Reinforcing steel, crane cost for handling, maximum, add	272.00 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	43,291	252.05 /ton	68,558
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	3,468.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	454,308	216.96 /cy	752,407
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	3,400.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	101,342	47.20 /CY	160,491
						Finishing elev slab, bull float, manual float & manual steel trowel	30,575.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	37,731	1.95 /sf	59,753
						Curing, sprayed membrane curing compound, elevated decks	305.75 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	7,047	37.40 /csf	11,436
						03.10.10.36 Cast-In-Place Concrete, Elevated Decks, 36" thick	3,400.00 CY	243.35 /CY	7.71 /CY	243.54 /CY	/CY	/CY	494.60 /CY	1,681,625	800.93 /CY	2,723,157
						03.24 Cast-In-Place Concrete, Elevated Slabs	3,400.00 CY	243.35 /CY	7.71 /CY	243.54 /CY	/CY	/CY	494.60 /CY	1,681,625	800.93 /CY	2,723,157
						03.0 Concrete Work	3,400.00 CY	243.35 /CY	7.71 /CY	243.54 /CY	/CY	/CY	494.60 /CY	1,681,625	800.93 /CY	2,723,157
						03.00.306 Funk PGP Elevated Slab	3,400.00 CY	243.35 /CY	7.71 /CY	243.54 /CY	/CY	/CY	494.60 /CY	1,681,625	800.93 /CY	2,723,157
		03.00.308				Funk PGP Slab on Grade @ El 214.00										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.24	Cast-In-Place Concrete, Slabs on Grade, 24" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	667.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	6,194	14.78 /sfca	9,856
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	41.25 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	106,051	4,158.50 /ton	171,538
						Reinforcing in place, unloading & sorting, add to above - slabs	41.25 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,298	88.22 /ton	3,639
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	41.25 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	2,498	95.89 /ton	3,955
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	485.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	63,535	216.96 /cy	105,224
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	471.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	13,659	45.93 /CY	21,632
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,358.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	5,955	1.48 /sf	9,431
						Curing, sprayed membrane curing compound	63.58 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,465	37.40 /csf	2,378
						Fine grading, fine grade for slab on grade, machine	706.44 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,324	2.97 /sy	2,097

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						03.10.05.24 Cast-In-Place Concrete, Slabs on Grade, 24" thick	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.11 /CY	329,751
						03.18 Cast-In-Place Concrete, Slabs on Grade	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.11 /CY	329,751
						03.0 Concrete Work	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.11 /CY	329,751
						03.00.308 Funk PGP Slab on Grade @ El 214.00	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.11 /CY	329,751
		05.00.300				Funk PGP, Metals										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Trash Rack Allowance	13.00 ea		-		50,000.00 /ea	-	50,000.00 /ea	650,000	89,183.06 /ea	1,159,380
						Miscellaneous Metals Allowance	1.00 ls	116,094.40 /ls	11,200.00 /ls	100,000.00 /ls	-	-	227,294.40 /ls	227,294	412,666.19 /ls	412,666
						05.00.99.00 Metals, Other	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,046
						05.50 Metal Fabrications	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,046
						05.0 Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,046
						05.00.300 Funk PGP, Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,046
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Allowance for lighting?	260.00 hrs	129.73 /hrs	10.00 /hrs	75.00 /hrs		-	214.73 /hrs	55,830	399.18 /hrs	103,787
						26.00.99.00 Electrical, Other	35,990.00 LS	0.94 /LS	0.07 /LS	0.54 /LS	/LS	/LS	1.55 /LS	55,830	2.88 /LS	103,787
						26.00 Electrical	35,990.00 LS	0.94 /LS	0.07 /LS	0.54 /LS	/LS	/LS	1.55 /LS	55,830	2.88 /LS	103,787
						26.0 Electrical Work	35,990.00 SF	0.94 /SF	0.07 /SF	0.54 /SF	/SF	/SF	1.55 /SF	55,830	2.88 /SF	103,787
						26.26.EXTLTG Exterior Lighting and Control	1.00 LS	33,729.80 /LS	2,600.00 /LS	19,500.00 /LS	/LS	/LS	55,829.80 /LS	55,830	103,786.68 /LS	103,787
		40.00.300				Funk PGP, Process Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Elbow, steel, butt weld, 60" Dia	21.00 ea	3,281.57 /ea	97.68 /ea	9,500.00 /ea	-	-	12,879.25 /ea	270,464	21,085.11 /ea	442,787
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	720.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	434,928	987.09 /LF	710,702
						Butterfly Valves	14.00 ea	2,187.72 /ea	1,560.00 /ea	45,000.00 /ea	-	-	48,747.72 /ea	682,468	80,462.37 /ea	1,126,473
						Check Valves	13.00 ea	2,187.72 /ea	1,560.00 /ea	35,000.00 /ea	-	-	38,747.72 /ea	503,720	63,900.76 /ea	830,710
						Dismantling Joints	13.00 ea	2,187.72 /ea	1,560.00 /ea	37,000.00 /ea	-	-	40,747.72 /ea	529,720	67,213.08 /ea	873,770
						ARV, Complete	13.00 ea	2,500.91 /ea	520.00 /ea	3,500.00 /ea			6,520.91 /ea	84,772	10,580.67 /ea	137,549
						Miscellaneous Items Allowance	1.00 ls				250,000.00 /ls		250,000.00 /ls	250,000	395,915.29 /ls	395,915
						40.10.02.60 Process Pipe, Carbon Steel, 60"	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,274.87 /LF	4,517,906
						40.11 Process Pipe, Carbon Steel	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,274.87 /LF	4,517,906
						40.0 Process Pipe	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,274.87 /LF	4,517,906
						40.00.300 Funk PGP, Process Piping	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,274.87 /LF	4,517,906
		44.40.300				Funk PGP, Furnish and Install Pumps										
			46.0			Water and Wastewater Equipment										
				44.40		Process Equipment - Pumps										
					44.05.42.06	Vertical Turbine Pump: 8000 hp										
						Functional Testing, Pumps, >1000 hp	13.00 ea	3,068.99 /ea	-	100.00 /ea		-	3,168.99 /ea	41,197	5,025.86 /ea	65,336
						Align Pump & Motor, >1000 hp	13.00 ea	3,836.24 /ea	-		2,800.00 /ea	-	6,636.24 /ea	86,271	10,509.55 /ea	136,624
						Vibration Testing, Pumps, >1000 hp	13.00 ea	1,534.50 /ea	-	-	1,400.00 /ea	-	2,934.50 /ea	38,148	4,647.25 /ea	60,414
						Sleeved anchor bolts - Large	156.00 ea	95.91 /ea	-	28.00 /ea	-	-	123.91 /ea	19,329	198.26 /ea	30,928
						Anchor bolts for leveling pump cans	52.00 ea	383.62 /ea	-	150.00 /ea	-	-	533.62 /ea	27,748	855.95 /ea	44,510
						Non-Shrink Machine Grout	208.00 cuft	91.11 /cuft	-	74.00 /cuft	-	-	165.11 /cuft	34,343	266.84 /cuft	55,504
						Grease, Oil, and Lube Pumps, >1000 hp	13.00 ea	1,534.50 /ea	-	150.00 /ea	-	-	1,684.50 /ea	21,898	2,678.55 /ea	34,821
						44.05.42.06 Vertical Turbine Pump: 8000 hp	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,933.60 /EA	428,137
						44.40 Process Equipment - Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,933.60 /EA	428,137
						46.0 Water and Wastewater Equipment	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,933.60 /EA	428,137
			99.1			Nom-Markup Items										
				44.40		Process Equipment - Pumps										
					44.05.42.06	Vertical Turbine Pump: 8000 hp										
						FURNISH Vertical Turbine Pump, SS, 8000 hp	13.00 EA	-	-		-	836,924.54 /EA	836,924.54 /EA	10,880,019	836,924.54 /EA	10,880,019
						Contractor Markups on Pump Purchase 20%, Includes OH&P and Contingencies	1.00 ls		-		-	2,176,000.00 /ls	2,176,000.00 /ls	2,176,000	2,176,000.00 /ls	2,176,000
						44.05.42.06 Vertical Turbine Pump: 8000 hp	13.00 EA	/EA	/EA	/EA	/EA	1,004,309.16 /EA	1,004,309.16 /EA	13,056,019	1,004,309.16 /EA	13,056,019
						44.40 Process Equipment - Pumps	13.00 EA	/EA	/EA	/EA	/EA	1,004,309.16 /EA	1,004,309.16 /EA	13,056,019	1,004,309.16 /EA	13,056,019
						99.1 Nom-Markup Items	13.00 EA	/EA	/EA	/EA	/EA	1,004,309.16 /EA	1,004,309.16 /EA	13,056,019	1,004,309.16 /EA	13,056,019
						44.40.300 Funk PGP, Furnish and Install Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	1,004,309.16 /EA	1,024,996.52 /EA	13,324,955	1,037,242.76 /EA	13,484,156
						03.01 Funks Reservoir Pumping Generating Plant	**35,990.00 SF**	**126.35 /SF**	**7.30 /SF**	**183.69 /SF**	**26.52 /SF**	**362.77 /SF**	**706.63 /SF**	**25,431,523**	**925.91 /SF**	**33,323,327**
	03.02					**Funks Reservoir Turbine Buildings**										
		03.00.316				Funk PGP Turbine Buildings Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.99	Cast-In-Place Concrete, Slabs on Grade, Other										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	4,000.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	37,147	14.78 /sfca	59,109
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	204.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	524,473	4,158.50 /ton	848,335
						Reinforcing in place, unloading & sorting, add to above - slabs	204.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	11,364	88.22 /ton	17,996
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	204.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	12,352	95.89 /ton	19,561
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	3,310.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	433,610	216.96 /cy	718,128
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	3,248.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	94,195	45.93 /CY	149,172
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,700.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	6,276	1.48 /sf	9,938
						Curing, sprayed membrane curing compound	67.00 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,544	37.40 /csf	2,506
						Fine grading, fine grade for slab on grade, machine	744.44 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,395	2.97 /sy	2,210
						03.10.05.99 Cast-In-Place Concrete, Slabs on Grade, Other	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.49 /CY	1,826,956
						03.18 Cast-In-Place Concrete, Slabs on Grade	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.49 /CY	1,826,956
						03.0 Concrete Work	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.49 /CY	1,826,956
						03.00.316 Funk PGP Turbine Buildings Foundation Slab	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.49 /CY	1,826,956
		03.00.318				Funk PGP Turbine Buildings Concrete Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	23,976.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	353,348	23.73 /sfca	569,056
						Form oil, coverage varies greatly, maximum, includes material only	64.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	1,504	38.92 /gal	2,491
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	100.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	257,094	4,158.50 /ton	415,850
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	100.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	5,570	88.22 /ton	8,822
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	100.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	6,055	95.89 /ton	9,589
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	1,360.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	178,160	216.96 /cy	295,062
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	1,332.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	59,553	70.80 /CY	94,312
						Concrete finishing, walls, includes breaking ties and patching voids	23,976.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	24,438	1.62 /sf	38,772
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.54 /CY	1,433,953
						03.20 Cast-In-Place Concrete, Straight Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.54 /CY	1,433,953
						03.0 Concrete Work	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.54 /CY	1,433,953
						03.00.318 Funk PGP Turbine Buildings Concrete Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.54 /CY	1,433,953
		03.00.320				Funk PGP Turbine Buildings Elevated Slab										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
			03.0			Concrete Work										
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.24	Cast-In-Place Concrete, Elevated Decks, 24" thick										
						Slab shoring	143,640.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	98,354	1.09 /cf	156,280
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	5,320.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	47,223	14.15 /sf	75,298
						C.I.P. concrete forms, elevated slab, edge forms, 24" high, 3 use, includes shoring, erecting, bracing, stripping and cleaning	680.00 sfca	12.19 /sfca	-	0.53 /sfca	-	-	12.72 /sfca	8,648	20.18 /sfca	13,722
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	34.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	88,698	4,158.50 /ton	143,468
						Reinforcing in place, unloading & sorting, add to above - decks	34.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	1,922	88.22 /ton	3,044
						Reinforcing steel, crane cost for handling, maximum, add	34.50 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	5,491	252.05 /ton	8,696
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	405.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	53,055	216.96 /cy	87,868
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	394.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	11,744	47.20 /CY	18,598
						Finishing elev slab, bull float, manual float & manual steel trowel	5,320.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	6,565	1.95 /sf	10,397
						Curing, sprayed membrane curing compound, elevated decks	53.20 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,226	37.40 /csf	1,990
						03.10.10.24 Cast-In-Place Concrete, Elevated Decks, 24" thick	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.17 /CY	519,360
						03.24 Cast-In-Place Concrete, Elevated Slabs	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.17 /CY	519,360
						03.0 Concrete Work	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.17 /CY	519,360
						03.00.320 Funk PGP Turbine Buildings Elevated Slab	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.17 /CY	519,360
		04.00.300				Funk PGP Turbine Buildings Masonry										
			04.0			Masonry										
				04.21		Concrete Unit Masonry - Exterior										
					04.00.02.12	Masonry Concrete Masonry Units, 12"										
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	2.00 opng	41.31 /opng	2.13 /opng	13.40 /opng	-	-	56.84 /opng	114	102.35 /opng	205
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	1,008.00 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	-	12.80 /cf	12,898	23.21 /cf	23,397
						Masonry reinforcing bars, #5 and #6 reinforcing steel bars, placed horizontally, ASTM A615	3,600.00 lb	0.79 /lb	-	0.56 /lb	-	-	1.35 /lb	4,845	2.44 /lb	8,788
						Masonry reinforcing bars, #5 and #6 reinforcing steel bars, placed vertically, ASTM A615	1,872.00 lb	0.97 /lb	-	0.56 /lb	-	-	1.53 /lb	2,859	2.76 /lb	5,175
						Masonry reinforcing bars, truss type steel joint reinforcing, mill standard galvanized, 12" wide	19.20 clf	31.43 /clf	-	29.50 /clf	-	-	60.93 /clf	1,170	110.82 /clf	2,128
						Concrt block,high strngt,hollow,3500 psi,12"8"16",inclds mortar and horzntl joint rnfrcng every other course,excluds scffldn,grout and vertcl rnfrcng	2,400.00 SF	14.60 /SF	-	5.20 /SF	-	-	19.80 /SF	47,511	35.69 /SF	85,648
						Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00 lf	62.16 /lf	3.01 /lf	9.90 /lf	-	-	75.07 /lf	1,501	134.62 /lf	2,692
						Silicone water repellants, sprayed on CMU, 2 coat	4,800.00 sf	0.21 /sf	-	0.79 /sf	-	-	1.00 /sf	4,777	1.83 /sf	8,796
						Reglet, zinc and copper alloy, 20 ounce	240.00 lf	3.26 /lf	-	2.87 /lf	-	-	6.13 /lf	1,472	11.15 /lf	2,675
						Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	240.00 lf	5.27 /lf	-	5.25 /lf	-	-	10.52 /lf	2,526	19.15 /lf	4,596
						04.00.02.12 Masonry Concrete Masonry Units, 12"	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.04 /SF	144,099
						04.21 Concrete Unit Masonry - Exterior	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.04 /SF	144,099
						04.0 Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.04 /SF	144,099
						04.00.300 Funk PGP Turbine Buildings Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.04 /SF	144,099
		05.00.302				Funk PGP Turbine Building, Metals										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Removable Roof Allowance	1,380.00 SF	10.99 /SF	4.03 /SF	35.00 /SF	-	-	50.03 /SF	69,037	91.77 /SF	126,641
						Stair Well Roof Allowance	864.00 SF	5.85 /SF	2.15 /SF	25.00 /SF	-	-	33.00 /SF	28,513	60.67 /SF	52,423
						Stair, 4'-0" wide, w/ guardrail both sides	8.00 flt	1,209.32 /flt	90.20 /flt	2,160.00 /flt	-	-	3,459.52 /flt	27,676	6,327.21 /flt	50,618
						Tailbay Gate Allowance	2.00 ea				30,000.00 /ea	-	30,000.00 /ea	60,000	53,509.83 /ea	107,020
						05.00.99.00 Metals, Other	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.05 /SF	336,701
						05.50 Metal Fabrications	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.05 /SF	336,701
						05.0 Metals	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.05 /SF	336,701
						05.00.302 Funk PGP Turbine Building, Metals	2.00 LS	14,950.80 /LS	4,072.24 /LS	43,590.00 /LS	30,000.00 /LS	/LS	92,613.04 /LS	185,226	168,350.56 /LS	336,701
		08.00.300				Funk PGP Turbine Building, Openings										
			08.0			Openings										
				08.10		Doors and Frames										
					08.10.01.00	Openings, Doors, Frames and Hardware										
						Steel frms, knock down, 14 ga., to 8-3/4" throat, to 3'-0" x 7'-0", single	2.00 EA	137.64 /EA	-	430.00 /EA	-	-	567.64 /EA	1,135	1,043.65 /EA	2,087
						Doors, commercial, steel, insulated, full panel, 18 ga., 3'-0" x 7'-0" x 1-3/4" thick	2.00 ea	97.88 /ea	-	520.00 /ea	-	-	617.88 /ea	1,236	1,139.79 /ea	2,280
						Add for baked enamel finish, average cost per leaf	2.00 leaf	12.94 /leaf	-	50.40 /leaf	-	-	63.34 /leaf	127	116.63 /leaf	233
						Average Door Hardware	2.00 ea	91.76 /ea	15.00 /ea	500.00 /ea			606.76 /ea	1,214	1,118.51 /ea	2,237
						08.10.01.00 Openings, Doors, Frames and Hardware	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.57 /EA	6,837
						08.10 Doors and Frames	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.57 /EA	6,837
						08.0 Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.57 /EA	6,837
						08.00.300 Funk PGP Turbine Building, Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.57 /EA	6,837
		23.00.300				Funk PGP Turbine Building, HVAC										
			23.0			HVAC										
				23.00		HVAC										
					23.00.02.00	Mechanical, HVAC										
						HVAC Vent/Fan Allowance	5,320.00 SF	1.75 /SF		7.52 /SF			9.27 /SF	49,307	17.08 /SF	90,847
						23.00.02.00 Mechanical, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,847
						23.00 HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,847
						23.0 HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,847
						23.00.300 Funk PGP Turbine Building, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,847
		26.00.000				Hydopower Generators										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Installation of Francis Turbines	2.00 ea	108,531.52 /ea	10,912.00 /ea	150,000.00 /ea	-	-	269,443.52 /ea	538,887	504,943.11 /ea	1,009,886
						26.00.99.00 Electrical, Other	1.00 LS	217,063.04 /LS	21,824.00 /LS	300,000.00 /LS	/LS	/LS	538,887.04 /LS	538,887	1,009,886.22 /LS	1,009,886
						26.00 Electrical	1.00 LS	217,063.04 /LS	21,824.00 /LS	300,000.00 /LS	/LS	/LS	538,887.04 /LS	538,887	1,009,886.22 /LS	1,009,886
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	538,887	/SF	1,009,886
			99.1			Nom-Markup Items										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Furnish Francis Turbine 16.5 MW	2.00 EA		-		-	4,100,000.00 /EA	4,100,000.00 /EA	8,200,000	4,100,000.00 /EA	8,200,000
						Contractor Markups on Turbines Purchase 20%, Includes OH&P and Contingencies	1.00 ls		-		-	1,640,000.00 /ls	1,640,000.00 /ls	1,640,000	1,640,000.00 /ls	1,640,000
						26.00.99.00 Electrical, Other	1.00 LS	/LS	/LS	/LS	/LS	9,840,000.00 /LS	9,840,000.00 /LS	9,840,000	9,840,000.00 /LS	9,840,000
						26.00 Electrical	1.00 LS	/LS	/LS	/LS	/LS	9,840,000.00 /LS	9,840,000.00 /LS	9,840,000	9,840,000.00 /LS	9,840,000
						99.1 Nom-Markup Items	2.00 EA	/EA	/EA	/EA	/EA	4,920,000.00 /EA	4,920,000.00 /EA	9,840,000	4,920,000.00 /EA	9,840,000
						26.00.000 Hydopower Generators	2.00 EA	108,531.52 /EA	10,912.00 /EA	150,000.00 /EA	/EA	4,920,000.00 /EA	5,189,443.52 /EA	10,378,887	5,424,943.11 /EA	10,849,886
		26.05.GRDG				Facility Grounding										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent trencher chain boom gas oper walking 12 HP	2.00 day	-	156.95 /day	-	-	-	156.95 /day	314	287.81 /day	576
						01.01.06.03 GC Equip, Tools, & Consumables	0.00	/LS	/LS	/LS	/LS	/LS	/LS	314	/LS	576
						26.00 Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	314	/LS	576
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Copper Bus Bar .25"x3.0"	2.00 lf	32.44 /lf	-	52.90 /lf	-	-	85.34 /lf	171	160.30 /lf	321
						Copper Bus Bar Supports	2.00 E	129.73 /E	-	48.30 /E	-	-	178.03 /E	356	329.96 /E	660

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.11.00	Process Electrical, Grounding										
						Grounding rod, copper clad, 15' long, 3/4" diameter	6.00 ea	259.46 /ea	-	55.00 /ea	-	-	314.46 /ea	1,887	580.60 /ea	3,484
						Ground wire, copper wire, bare stranded, 4/0	4.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	3,137	1,468.33 /clf	5,873
						Water pipe ground clamps, heavy duty, bronze, 2-1/2" to 3" diameter	1.00 ea	172.97 /ea	-	60.50 /ea	-	-	233.47 /ea	233	432.48 /ea	432
						Exothermic weld, 4/0 wire to 4/0 wire	24.00 ea	148.26 /ea	-	9.45 /ea	-	-	157.71 /ea	3,785	289.88 /ea	6,957
						Exothermic weld, mold reusable for above	6.00 ea	-	-	141.00 /ea	-	-	141.00 /ea	846	268.77 /ea	1,613
						Protective boxes at grade level, round, concrete, 12" long, incl breather slots	2.00 ea	64.87 /ea	-	112.00 /ea	-	-	176.87 /ea	354	332.44 /ea	665
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	10,768	/LF	20,004
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,768	/SF	20,004
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	11,082	/SF	20,580
						26.05.GRDG Facility Grounding	**3,250.00** SF	2.22 /SF	0.10 /SF	1.10 /SF	/SF	/SF	3.41 /SF	11,082	6.33 /SF	20,580
		26.12.SEC				Subfeed from Elec Building										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	1.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,587	4,824.64 /ton	4,825
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,587	/LF	4,825
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	600.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	10,016	30.88 /lf	18,527
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	10,016	/EA	18,527
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	12,603	/LS	23,352
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	20.00 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	17,135	1,598.90 /clf	31,978
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	17,135	/LF	31,978
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	6.50 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	5,097	1,468.32 /clf	9,544
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	5,097	/LF	9,544
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	22,232	/SF	41,522
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,834	/SF	64,874
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	15.00 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	-	273.89 /CY	4,108	439.36 /CY	6,590
						End bulkheads, plywood, concrete envelope/encasement	24.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	341	22.57 /sf	542
						31.20.07.15 Earthworks, Sitework, Borrow	15.00 CY	216.21 /CY	1.76 /CY	78.67 /CY	/CY	/CY	296.64 /CY	4,450	475.48 /CY	7,132
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	50.00 CY	1.94 /CY	23.32 /CY	-	-	-	25.26 /CY	1,263	40.01 /CY	2,000
						31.20.09.10 Earthworks, Sitework, Backfill	50.00 CY	1.94 /CY	23.32 /CY	/CY	/CY	/CY	25.26 /CY	1,263	40.01 /CY	2,000
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	50.00 CY	10.88 /CY	9.31 /CY	-	-	-	20.19 /CY	1,010	31.98 /CY	1,599
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	50.00 CY	10.88 /CY	9.31 /CY	/CY	/CY	/CY	20.19 /CY	1,010	31.98 /CY	1,599
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	37.04 CY	5.93 /CY	23.02 /CY	-	-	-	28.95 /CY	1,072	45.84 /CY	1,698
						31.25.01.00 Earthworks, Structural, Excavation	37.04 CY	5.93 /CY	23.02 /CY	/CY	/CY	/CY	28.95 /CY	1,072	45.84 /CY	1,698
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,794	/LS	12,429
						31.0 Earthwork	152.04 CY	26.99 /CY	16.51 /CY	7.76 /CY	/CY	/CY	51.27 /CY	7,794	81.75 /CY	12,429
						26.12.SEC Subfeed from Elec Building	**600.00** LF	41.92 /LF	4.18 /LF	24.95 /LF	/LF	/LF	71.05 /LF	42,629	128.84 /LF	77,304
		26.20.DIST				Electrical Distribution Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 1-1/2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	100.00 lf	23.06 /lf	-	19.05 /lf	-	-	42.11 /lf	4,211	78.60 /lf	7,860
						Flexible metallic conduit, steel, 1-1/2" diameter	3.00 lf	20.76 /lf	-	2.55 /lf	-	-	23.31 /lf	70	42.92 /lf	129
						Flexible metallic conduit, steel, 2" diameter	3.00 lf	25.95 /lf	-	3.23 /lf	-	-	29.18 /lf	88	53.73 /lf	161
						Flexible metallic conduit, steel, connectors, insulated, 1-1/2" diameter	1.00 ea	32.43 /ea	-	24.50 /ea	-	-	56.93 /ea	57	106.19 /ea	106
						Flexible metallic conduit, steel, connectors, insulated, 2" diameter	1.00 ea	45.12 /ea	-	26.00 /ea	-	-	71.12 /ea	71	132.28 /ea	132
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 1-1/2" diameter	1.00 ea	45.12 /ea	-	46.00 /ea	-	-	91.12 /ea	91	170.44 /ea	170
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 2" diameter	1.00 ea	57.66 /ea	-	67.00 /ea	-	-	124.66 /ea	125	233.43 /ea	233
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 225 amp, 42 circuits, NQOD, incl 20 A 1 pole in breakers	1.00 ea	3,706.59 /ea	-	4,125.00 /ea	-	-	7,831.59 /ea	7,832	14,659.55 /ea	14,660
						Panelboards, 3 phase 4 wire, main circuit breaker, 277/480 V, 225 amp, 42 circuits, NEHB, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	5,175.00 /ea	-	-	8,881.59 /ea	8,882	16,661.01 /ea	16,661
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	21,426	/LS	40,113
					26.10.03.00	UG Conduit										
						Uninterruptible power supply, charger, inverter, and alarm 1 phase, 120 V, 5 kVA, incl 10 minutes battery	1.00 ea	6,182.64 /ea	356.18 /ea	7,100.00 /ea	-	-	13,638.82 /ea	13,639	25,523.73 /ea	25,524
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	13,639	/LF	25,524
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #6, type XHHW, in raceway	0.70 clf	159.67 /clf	-	54.50 /clf	-	-	214.17 /clf	150	396.66 /clf	278
						Wire, copper, stranded, 600 volt, #4, type XHHW, in raceway	0.70 clf	195.81 /clf	-	77.50 /clf	-	-	273.31 /clf	191	506.79 /clf	355
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	2.00 clf	259.46 /clf	-	159.00 /clf	-	-	418.46 /clf	837	778.84 /clf	1,558
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	2.00 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	1,714	1,598.90 /clf	3,198
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,892	/LF	5,388
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	37,956	/SF	71,025
				26.25		Facility Electrical										
					26.25.06.00	Transformers, Dry Type										
						Transformer, dry-type, ventilated, 3 phase 480 V primary 120/208 V secondary, 75 kVA	1.00 ea	2,965.27 /ea	-	2,500.00 /ea	-	-	5,465.27 /ea	5,465	10,202.70 /ea	10,203
						26.25.06.00 Transformers, Dry Type	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,465	/EA	10,203
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	5,465	/LS	10,203
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,422	/SF	81,227
						26.20.DIST Electrical Distribution Equipment	**450.00** AMP	46.44 /AMP	0.79 /AMP	49.26 /AMP	/AMP	/AMP	96.49 /AMP	43,422	180.51 /AMP	81,227
		26.25.LTG				Interior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	9,062	33.60 /lf	16,802
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	25.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	1,382	101.58 /ea	2,539
						Outlet boxes, pressed steel, covers, blank, 4" square	24.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	408	31.20 /ea	749
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	1.00 ea	16.22 /ea	-	1.66 /ea	-	-	17.88 /ea	18	32.91 /ea	33
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	10,869	/LS	20,124
					26.10.03.00	UG Conduit										
						Toggle switch, quiet type, single pole, 20 amp	1.00 ea	38.44 /ea	-	3.46 /ea	-	-	41.90 /ea	42	77.09 /ea	77
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	42	/LF	77
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	16.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,729	199.12 /clf	3,186
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,729	/LF	3,186
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	12,639	/SF	23,387
				26.20		Facility Electrical										
					26.20.03.00	Facility Electrical, Lighting										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.20.03.00	Facility Electrical, Lighting										
						LED Strip Light, hdwe	24.00 ea	182.08 /ea	-	110.00 /ea	-	-	292.08 /ea	7,010	543.55 /ea	13,045
						Emergency ballast, material only, interior, factory installed in fixture	6.00 ea	-	-	152.00 /ea	-	-	152.00 /ea	912	289.74 /ea	1,738
						Exit lighting, L.E.D. standard, single face, ceiling or wall mount	2.00 ea	129.73 /ea	-	70.00 /ea	-	-	199.73 /ea	399	371.32 /ea	743
						Fixture whips, 3/8" greenfield, 2 connectors, THHN wire, three #14, 6' long	24.00 ea	32.43 /ea	-	5.45 /ea	-	-	37.88 /ea	909	69.86 /ea	1,677
						26.20.03.00 Facility Electrical, Lighting	0.00	/SF	/SF	/SF	/SF	/SF	/SF	9,231	/SF	17,203
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	9,231	/SF	17,203
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	21,870	/SF	40,589
						26.25.LTG Interior Lighting and Control	**1.00** LS	15,144.99 /LS	/LS	6,724.85 /LS	/LS	/LS	21,869.84 /LS	21,870	40,589.43 /LS	40,589
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	80.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	724	16.68 /lf	1,334
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	4.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	221	101.58 /ea	406
						Outlet boxes, pressed steel, covers, blank, 4" square	4.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	68	31.21 /ea	125
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,013	/LS	1,865
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	3.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	324	199.12 /clf	597
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	324	/LF	597
					26.15.07.00	Lighting										
						LED Area Light	4.00 E	97.30 /E	-		-	-	97.30 /E	389	178.41 /E	714
						Wallpack Photocell	4.00 E	32.43 /E	-		-	-	32.43 /E	130	59.47 /E	238
						26.15.07.00 Lighting	0.00	/LS	/LS	/LS	/LS	/LS	/LS	519	/LS	952
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,856	/SF	3,414
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,856	/SF	3,414
						26.26.EXTLTG Exterior Lighting and Control	**1.00** LS	1,713.08 /LS	/LS	143.26 /LS	/LS	/LS	1,856.34 /LS	1,856	3,414.29 /LS	3,414
		26.30.DEV				Device Outlets										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00 lf	14.83 /lf	-	10.00 /lf	-	-	24.83 /lf	12,413	46.25 /lf	23,124
						Outlet boxes, cast, 1 gang, FD, 3/4" hub, 2-11/16" deep	8.00 ea	86.49 /ea	-	22.00 /ea	-	-	108.49 /ea	868	200.52 /ea	1,604
						Duplex receptacle, ground fault interrupting, 20 amp	8.00 ea	38.44 /ea	-	45.00 /ea	-	-	83.44 /ea	668	156.26 /ea	1,250
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	13,949	/LS	25,978
					26.10.03.00	UG Conduit										
						WP cover	8.00 ea	17.30 /ea	-	42.50 /ea	-	-	59.80 /ea	478	112.73 /ea	902
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	478	/LF	902
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	16.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,729	199.12 /clf	3,186
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,729	/LF	3,186
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,156	/SF	30,066
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,156	/SF	30,066
						26.30.DEV Device Outlets	**1.00** LS	10,060.56 /LS	/LS	6,095.20 /LS	/LS	/LS	16,155.76 /LS	16,156	30,066.09 /LS	30,066
		26.40.EQCON				Facility Equipment Connections and Controls										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.20.05.00	Facility Electrical, HVAC										
						Allowance for HVAC circuit, connection, controls	200.00 HR	129.73 /HR	15.00 /HR	50.00 /HR	-	-	194.73 /HR	38,946	360.70 /HR	72,139
						26.20.05.00 Facility Electrical, HVAC	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,139
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,139
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,139
						26.40.EQCON Facility Equipment Connections and Controls	**1.00** ALO	25,946.13 /ALO	3,000.00 /ALO	10,000.00 /ALO	/ALO	/ALO	38,946.13 /ALO	38,946	72,139.01 /ALO	72,139
		26.40.HYDTURB				13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	3.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	7,760	4,824.64 /ton	14,474
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,760	/LF	14,474
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,760	/LS	14,474
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	80.00 lf	64.87 /lf	-	62.50 /lf	-	-	127.37 /lf	10,189	238.08 /lf	19,046
						Rigid galvanized steel plastic coated conduit elbows, 4" diameter, to 15' high	16.00 ea	389.19 /ea	-	196.00 /ea	-	-	585.19 /ea	9,363	1,087.25 /ea	17,396
						Rigid galvanized steel plastic coated conduit couplings, 4" diameter, to 15' high	16.00 ea	28.83 /ea	-	57.50 /ea	-	-	86.33 /ea	1,381	162.47 /ea	2,599
						Flexible metallic conduit, sealtite, 4" diameter	24.00 lf	86.40 /lf	-	20.00 /lf	-	-	106.40 /lf	2,554	196.55 /lf	4,717
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 4" diameter	8.00 ea	129.73 /ea	-	163.00 /ea	-	-	292.73 /ea	2,342	548.59 /ea	4,389
						Flexible metallic conduit, coupling sealtite to rigid, 4" diameter	8.00 ea	129.73 /ea	-	198.00 /ea	-	-	327.73 /ea	2,622	615.30 /ea	4,922
						Electrical Contractor startup assistance per hour	40.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	56,892	2,615.28 /hr	104,611
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	85,343	/LS	157,681
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 4" diameter, to 15' H, incl terminations, fittings, & support	2,320.00 lf	32.43 /lf	-	5.75 /lf	-	-	38.18 /lf	88,584	70.43 /lf	163,400
						PVC conduit elbows, 4" diameter, to 15' H	16.00 ea	116.76 /ea	-	23.00 /ea	-	-	139.76 /ea	2,236	257.94 /ea	4,127
						PVC conduit, field bends, 45 Deg. to 90 Deg., 4" diameter	16.00 ea	129.73 /ea	-	-	-	-	129.73 /ea	2,076	237.88 /ea	3,806
						PVC adapters, 4" diameter, to 15' H	16.00 ea	64.87 /ea	-	4.80 /ea	-	-	69.67 /ea	1,115	128.09 /ea	2,049
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	94,010	/LF	173,382
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .525" to 1.025", pad mount	48.00 ea	324.33 /ea	-	109.00 /ea	-	-	433.33 /ea	20,800	802.48 /ea	38,519
						Medium-cable single cable, copper, XLP shielding, ungrounded neutral, 15 kV, 4/0, in conduit, excl splicing & terminations	78.00 clf	648.65 /clf	-	660.00 /clf	-	-	1,308.65 /clf	102,075	2,447.48 /clf	190,903
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	122,875	/LF	229,422
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	8.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	3,676	842.50 /E	6,740
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	3,676	/EA	6,740
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	305,904	/SF	567,225
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	313,664	/SF	581,699
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	29.63 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	-	273.89 /CY	8,115	439.36 /CY	13,018
						End bulkheads, plywood, concrete envelope/encasement	60.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	853	22.57 /sf	1,354
						31.20.07.15 Earthworks, Sitework, Borrow	29.63 CY	221.94 /CY	1.76 /CY	78.98 /CY	/CY	/CY	302.68 /CY	8,968	485.07 /CY	14,373
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	70.00 CY	1.94 /CY	23.32 /CY	-	-	-	25.26 /CY	1,768	40.01 /CY	2,801
						31.20.09.10 Earthworks, Sitework, Backfill	70.00 CY	1.94 /CY	23.32 /CY	/CY	/CY	/CY	25.26 /CY	1,768	40.01 /CY	2,801
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	70.00 CY	10.88 /CY	9.31 /CY	-	-	-	20.19 /CY	1,414	31.98 /CY	2,239

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	70.00 CY	10.88 /CY	9.31 /CY	/CY	/CY	/CY	20.19 /CY	1,414	31.98 /CY	2,239
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	59.26 CY	5.93 /CY	23.02 /CY	-	-	-	28.95 /CY	1,715	45.84 /CY	2,716
						31.25.01.00 Earthworks, Structural, Excavation	59.26 CY	5.93 /CY	23.02 /CY	/CY	/CY	/CY	28.95 /CY	1,715	45.84 /CY	2,716
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	13,866	/LS	22,128
						31.0 Earthwork	228.89 CY	34.19 /CY	16.17 /CY	10.22 /CY	/CY	/CY	60.58 /CY	13,866	96.68 /CY	22,128
						26.40.HYDTURB 13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A	**600.00** LF	380.99 /LF	7.83 /LF	154.39 /LF	2.67 /LF	/LF	545.88 /LF	327,529	1,006.38 /LF	603,827
		26.41.HYDT URB				Hyd Turbine Controls Circuits										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	3.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	7,760	4,824.64 /ton	14,474
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,760	/LF	14,474
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,760	/LS	14,474
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	40.00 lf	29.65 /lf	-	22.50 /lf	-	-	52.15 /lf	2,086	97.26 /lf	3,890
						Rigid galvanized steel plastic coated conduit elbows, 2" diameter, to 15' high	8.00 ea	129.73 /ea	-	42.00 /ea	-	-	171.73 /ea	1,374	317.94 /ea	2,544
						Rigid galvanized steel plastic coated conduit couplings, 2" diameter, to 15' high	8.00 ea	19.58 /ea	-	14.35 /ea	-	-	33.93 /ea	271	63.26 /ea	506
						Flexible metallic conduit, sealtite, 2" diameter	12.00 lf	34.60 /lf	-	4.30 /lf	-	-	38.90 /lf	467	71.63 /lf	860
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 2" diameter	4.00 ea	51.89 /ea	-	25.50 /ea	-	-	77.39 /ea	310	143.76 /ea	575
						Flexible metallic conduit, coupling sealtite to rigid, 2" diameter	4.00 ea	103.79 /ea	-	31.50 /ea	-	-	135.29 /ea	541	250.35 /ea	1,001
						Electrical Contractor startup assistance per hour	40.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	56,892	2,615.28 /hr	104,611
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	61,941	/LS	113,987
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 2" diameter, to 15' H, incl terminations, fittings, & support	1,160.00 lf	11.53 /lf	-	3.36 /lf	-	-	14.89 /lf	17,274	27.55 /lf	31,958
						PVC conduit elbows, 2" diameter, to 15' H	8.00 ea	51.32 /ea	-	3.54 /ea	-	-	54.86 /ea	439	100.86 /ea	807
						PVC conduit, field bends, 45 Deg. to 90 Deg., 2" diameter	8.00 ea	51.89 /ea	-	-	-	-	51.89 /ea	415	95.15 /ea	761
						PVC adapters, 2" diameter, to 15' H	8.00 ea	38.44 /ea	-	1.39 /ea	-	-	39.83 /ea	319	73.13 /ea	585
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	18,447	/LF	34,111
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	120.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	10,744	164.88 /clf	19,785
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	48.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	8,557	329.05 /clf	15,794
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	19,301	/LF	35,580
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	99,689	/SF	183,678
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	107,449	/SF	198,152
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	29.63 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	-	273.89 /CY	8,115	439.36 /CY	13,018
						End bulkheads, plywood, concrete envelope/encasement	60.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	853	22.57 /sf	1,354
						31.20.07.15 Earthworks, Sitework, Borrow	29.63 CY	221.94 /CY	1.76 /CY	78.98 /CY	/CY	/CY	302.68 /CY	8,968	485.07 /CY	14,373
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	70.00 CY	1.94 /CY	23.32 /CY	-	-	-	25.26 /CY	1,768	40.01 /CY	2,801
						31.20.09.10 Earthworks, Sitework, Backfill	70.00 CY	1.94 /CY	23.32 /CY	/CY	/CY	/CY	25.26 /CY	1,768	40.01 /CY	2,801
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	70.00 CY	10.88 /CY	9.31 /CY	-	-	-	20.19 /CY	1,414	31.98 /CY	2,239
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	70.00 CY	10.88 /CY	9.31 /CY	/CY	/CY	/CY	20.19 /CY	1,414	31.98 /CY	2,239
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	59.26 CY	5.93 /CY	23.02 /CY	-	-	-	28.95 /CY	1,715	45.84 /CY	2,716
						31.25.01.00 Earthworks, Structural, Excavation	59.26 CY	5.93 /CY	23.02 /CY	/CY	/CY	/CY	28.95 /CY	1,715	45.84 /CY	2,716
						26.10 Site Electrical	**1.00** LS	7,824.92 /LS	3,700.53 /LS	2,340.13 /LS	/LS	/LS	13,865.58 /LS	13,866	22,128.05 /LS	22,128
						31.0 Earthwork	228.89 CY	34.19 /CY	16.17 /CY	10.22 /CY	/CY	/CY	60.58 /CY	13,866	96.68 /CY	22,128
						26.41.HYDTURB Hyd Turbine Controls Circuits	**600.00** LF	164.55 /LF	7.83 /LF	29.81 /LF	/LF	/LF	202.19 /LF	121,314	367.13 /LF	220,280
		26.90.LPS				Facility Lightning Protection System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						Air terminal and base, copper, 3/8" dia x 10", to 75' h	10.00 ea	129.73 /ea	-	26.00 /ea	-	-	155.73 /ea	1,557	287.44 /ea	2,874
						Lightning protection cable, copper, 220 lb per thousand feet, to 75' h	400.00 lf	3.24 /lf	-	3.18 /lf	-	-	6.42 /lf	2,569	12.01 /lf	4,803
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,127	/SF	7,678
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,127	/SF	7,678
				26.20		Facility Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						LPS design and certification, misc mat and labor	1.00 LS	2,075.69 /LS	-	1,000.00 /LS	1,500.00 /LS	-	4,575.69 /LS	4,576	8,462.77 /LS	8,463
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,576	/SF	8,463
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,576	/SF	8,463
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,702	/SF	16,141
						26.90.LPS Facility Lightning Protection System	**3,250.00** SF	1.44 /SF	/SF	0.78 /SF	0.46 /SF	/SF	2.68 /SF	8,702	4.97 /SF	16,141
		27.30.COMC DT				Comm Conduit to Admin										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,328	4,824.61 /ton	4,342
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,328	/LF	4,342
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	1,200.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	20,032	30.88 /lf	37,055
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	20,032	/EA	37,055
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	22,360	/LS	41,397
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	13.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	10,194	1,468.33 /clf	19,088
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	10,194	/LF	19,088
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,194	/SF	19,088
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	32,554	/SF	60,485
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	40.00 CY	194.63 /CY	1.76 /CY	77.50 /CY	-	-	273.89 /CY	10,955	439.36 /CY	17,574
						End bulkheads, plywood, concrete envelope/encasement	75.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	1,066	22.57 /sf	1,693
						31.20.07.15 Earthworks, Sitework, Borrow	40.00 CY	219.92 /CY	1.76 /CY	78.87 /CY	/CY	/CY	300.55 /CY	12,022	481.68 /CY	19,267
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	180.00 CY	1.94 /CY	23.32 /CY	-	-	-	25.26 /CY	4,547	40.01 /CY	7,201
						31.20.09.10 Earthworks, Sitework, Backfill	180.00 CY	1.94 /CY	23.32 /CY	/CY	/CY	/CY	25.26 /CY	4,547	40.01 /CY	7,201
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	180.00 CY	10.88 /CY	9.31 /CY	-	-	-	20.19 /CY	3,635	31.98 /CY	5,756
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	180.00 CY	10.88 /CY	9.31 /CY	/CY	/CY	/CY	20.19 /CY	3,635	31.98 /CY	5,756
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	177.78 CY	5.93 /CY	23.02 /CY	-	-	-	28.95 /CY	5,146	45.84 /CY	8,149
						31.25.01.00 Earthworks, Structural, Excavation	177.78 CY	5.93 /CY	23.02 /CY	/CY	/CY	/CY	28.95 /CY	5,146	45.84 /CY	8,149
						26.10 Site Electrical	1.00 LS	12,158.51 /LS	10,036.54 /LS	3,154.75 /LS	/LS	/LS	25,349.80 /LS	25,350	40,374.20 /LS	40,374
						31.0 Earthwork	577.78 CY	21.04 /CY	17.37 /CY	5.46 /CY	/CY	/CY	43.87 /CY	25,350	69.88 /CY	40,374
						27.30.COMCDT Comm Conduit to Admin	1,200.00 LF	28.15 /LF	8.36 /LF	11.74 /LF	/LF	/LF	48.25 /LF	57,904	84.05 /LF	100,860
		28.20.AC				Access Control System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Card reader - all in allowance per each (incl circuit, cards, CX)	2.00 ea	1,556.77 /ea	-	800.00 /ea	-	-	2,356.77 /ea	4,714	3,790.32 /ea	7,581
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,581
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,581
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,581
						28.20.AC Access Control System	2.00 DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	/DOOR	2,356.77 /DOOR	4,714	3,790.32 /DOOR	7,581
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Camera allowance (licenses, circuit, startup, CX)	1.00 LS	1,037.85 /LS	-	1,000.00 /LS	1,000.00 /LS	-	3,037.85 /LS	3,038	5,642.89 /LS	5,643
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Closed circuit television system (CCTV), industrial quality, for additional camera stations, add	2.00 ea	384.39 /ea	-	690.00 /ea	-	-	1,074.39 /ea	2,149	1,751.50 /ea	3,503
						Closed circuit television system (CCTV), industrial quality, for weatherproof camera station, add	2.00 ea	798.35 /ea	-	540.00 /ea	-	-	1,338.35 /ea	2,677	2,158.64 /ea	4,317
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,820
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,820
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,820
						28.20.CCTV Closed Circuit TV and Cameras	2.00 CAM	1,701.66 /CAM	/CAM	1,730.00 /CAM	500.00 /CAM	/CAM	3,931.66 /CAM	7,863	6,731.58 /CAM	13,463
		28.20.ID				Intrusion Detection System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Securitized door, all-in allowance per each (incl circuit, devices, CX)	2.00 ea	2,594.62 /ea	-	1,000.00 /ea	-	-	3,594.62 /ea	7,189	5,765.15 /ea	11,530
						Door controller (all-in cost including vendor program and startup)	1.00 ea	648.65 /ea	-	2,000.00 /ea	500.00 /ea	-	3,148.65 /ea	3,149	5,131.39 /ea	5,131
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,662
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,662
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,662
						28.20.ID Intrusion Detection System	2.00 DOOR	2,918.94 /DOOR	/DOOR	2,000.00 /DOOR	250.00 /DOOR	/DOOR	5,168.94 /DOOR	10,338	8,330.85 /DOOR	16,662
		40.00.304				Funk PGP Turbine Building, Process Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	230.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	138,935	987.09 /LF	227,030
						Dismantling Joints	2.00 ea	2,187.72 /ea	1,560.00 /ea	37,000.00 /ea	-	-	40,747.72 /ea	81,495	67,213.09 /ea	134,426
						Turbine Shutoff Valves	2.00 ea	2,187.72 /ea	1,560.00 /ea	45,000.00 /ea	-	-	48,747.72 /ea	97,495	80,462.37 /ea	160,925
						Miscellaneous Items Allowance	1.00 ls	0.00 /ls	0.00 /ls	0.00 /ls	65,000.00 /ls	0.00 /ls	65,000.00 /ls	65,000	102,937.98 /ls	102,938
						40.10.02.60 Process Pipe, Carbon Steel, 60"	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,718.78 /LF	625,319
						40.11 Process Pipe, Carbon Steel	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,718.78 /LF	625,319
						40.0 Process Pipe	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,718.78 /LF	625,319
						40.00.304 Funk PGP Turbine Building, Process Piping	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,718.78 /LF	625,319
						03.02 Funks Reservoir Turbine Buildings	2.00 EA	949,646.57 /EA	56,945.15 /EA	1,071,136.83 /EA	64,800.00 /EA	4,920,000.00 /EA	7,062,528.56 /EA	14,125,057	8,569,045.79 /EA	17,138,092
	03.03					**Funks Reservoir Energy Dissipation Valve Structures**										
		03.00.310				Funk PGP Energy Dissipation Structures Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.36	Cast-In-Place Concrete, Slabs on Grade, 36" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,848.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	16,328	14.06 /sfca	25,988
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	56.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	143,973	4,158.50 /ton	232,876
						Reinforcing in place, unloading & sorting, add to above - slabs	56.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	3,119	88.22 /ton	4,940
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	762.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	99,822	216.96 /cy	165,321
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	740.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	21,461	45.93 /CY	33,986
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltnt&vlin val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,656.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	6,234	1.48 /sf	9,873
						Curing, sprayed membrane curing compound	66.56 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,534	37.40 /csf	2,490
						Fine grading, fine grade for slab on grade, machine	739.56 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,386	2.97 /sy	2,195
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.50 /CY	477,670
						03.18 Cast-In-Place Concrete, Slabs on Grade	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.50 /CY	477,670
						03.0 Concrete Work	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.50 /CY	477,670
						03.00.310 Funk PGP Energy Dissipation Structures Foundation Slab	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.50 /CY	477,670
		03.00.312				Funk PGP Energy Dissipation Structures Concrete Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	12,800.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	188,641	23.73 /sfca	303,800
						Form oil, coverage varies greatly, maximum, includes material only	34.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	805	38.92 /gal	1,333
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	53.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	137,546	4,158.50 /ton	222,480
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	53.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,980	88.22 /ton	4,720
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	53.50 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	3,239	95.89 /ton	5,130
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	734.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	96,154	216.96 /cy	159,246
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	712.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	31,833	70.80 /CY	50,413
						Finishing; break ties & patch voids (walls, cols or beams)	12,800.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	12,915	1.60 /sf	20,481
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	712.00 CY	331.46 /CY	9.57 /CY	324.86 /CY	/CY	/CY	665.89 /CY	474,113	1,078.09 /CY	767,603
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7' 6" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	840.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	12,380	23.73 /sfca	19,937
						Form oil, coverage varies greatly, maximum, includes material only	2.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	53	38.92 /gal	88
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	22,496	4,158.50 /ton	36,387
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	8.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	487	88.22 /ton	772
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	8.75 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	530	95.89 /ton	839

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7" 6" thick										
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	120.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	15,720	216.96 /cy	26,035
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	117.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	5,231	70.80 /CY	8,284
						Finishing; break ties & patch voids (walls, cols or beams)	840.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	848	1.60 /sf	1,344
						03.10.06.90 Cast-In-Place Concrete, Straight Walls, 7' 6" thick	117.00 CY	220.08 /CY	9.57 /CY	263.90 /CY	/CY	/CY	493.54 /CY	57,744	800.73 /CY	93,685
						03.20 Cast-In-Place Concrete, Straight Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,038.95 /CY	861,289
						03.0 Concrete Work	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,038.95 /CY	861,289
						03.00.312 Funk PGP Energy Dissipation Structures Concrete Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,038.95 /CY	861,289
		03.00.314				Funk PGP Energy Dissipation Structures Elevated Deck										
			03.0			Concrete Work										
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.36	Cast-In-Place Concrete, Elevated Decks, 36" thick										
						Slab shoring	46,000.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	31,497	1.09 /cf	50,048
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	2,000.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	17,753	14.15 /sf	28,307
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	280.00 lf	5.41 /lf	-	0.22 /lf	-	-	5.63 /lf	1,577	8.93 /lf	2,502
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	43,063	4,158.50 /ton	69,655
						Reinforcing in place, unloading & sorting, add to above - decks	16.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	933	88.22 /ton	1,478
						Reinforcing steel, crane cost for handling, maximum, add	16.75 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	2,666	252.05 /ton	4,222
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	230.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	30,130	216.96 /cy	49,900
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	223.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	6,647	47.20 /CY	10,526
						Finishing elev slab, bull float, manual float & manual steel trowel	2,000.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	2,468	1.95 /sf	3,909
						Curing, sprayed membrane curing compound, elevated decks	20.00 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	461	37.40 /csf	748
						03.10.10.36 Cast-In-Place Concrete, Elevated Decks, 36" thick	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.35 /CY	221,294
						03.24 Cast-In-Place Concrete, Elevated Slabs	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.35 /CY	221,294
						03.0 Concrete Work	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.35 /CY	221,294
						03.00.314 Funk PGP Energy Dissipation Structures Elevated Deck	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.35 /CY	221,294
		40.00.302				Funk PGP Energy Dissipation Structures Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Fittings, steel, butt weld, 60" Dia	4.00 ea	3,281.57 /ea	97.68 /ea	9,500.00 /ea	-	-	12,879.25 /ea	51,517	21,085.11 /ea	84,340
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	120.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	72,488	987.09 /LF	118,450
						Energy Dissipating Valves W/ Hood	2.00 ea	2,187.72 /ea	1,560.00 /ea	25,000.00 /ea	-	-	28,747.72 /ea	57,495	47,339.15 /ea	94,678
						40.10.02.60 Process Pipe, Carbon Steel, 60"	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,478.91 /LF	297,469
						40.11 Process Pipe, Carbon Steel	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,478.91 /LF	297,469
						40.0 Process Pipe	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,478.91 /LF	297,469
						40.00.302 Funk PGP Energy Dissipation Structures Piping	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,478.91 /LF	297,469
						03.03 Funks Reservoir Energy Dissipation Valve Structures	**2.00 EA**	**246,476.70 /EA**	**12,866.61 /EA**	**312,861.40 /EA**	**/EA**	**/EA**	**572,204.70 /EA**	**1,144,409**	**928,860.81 /EA**	**1,857,722**
	03.04					**Funks Reservoir Electrical Building**										
		04.00.302				Funk PGP Electrical Building, Masonry										
			04.0			Masonry										
				04.21		Concrete Unit Masonry - Exterior										
					04.00.02.08	Masonry Concrete Masonry Units, 8"										
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	12.00 opng	41.31 /opng	2.12 /opng	13.40 /opng	-	-	56.83 /opng	682	102.34 /opng	1,228
						Grout, door frames, 6' x 7' opening, 3.5 C.F. per opening	4.00 opng	55.08 /opng	2.83 /opng	18.75 /opng	-	-	76.66 /opng	307	138.09 /opng	552
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	3,649.99 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	-	12.80 /cf	46,704	23.21 /cf	84,720
						Reinforcing, steel bars A615, placed horizontal, average #4 bar	4,963.98 lb	1.40 /lb	-	0.40 /lb	-	-	1.80 /lb	8,921	3.23 /lb	16,056
						Masonry reinforcing bars, #3 and #4 reinforcing steel bars, placed vertically, ASTM A615	3,649.99 lb	1.80 /lb	-	0.56 /lb	-	-	2.36 /lb	8,600	4.24 /lb	15,487
						Masonry reinforcing bars, truss type steel joint reinforcing, mill standard galvanized, 12" wide	109.48 clf	31.43 /clf	-	29.50 /clf	-	-	60.93 /clf	6,671	110.82 /clf	12,132
						Concrt block,high strngt,hollow,3500 psi,8"8"16",includs mortar and horzntl joint rnfrcng every other course,excluds scffldn,grout and vertcl rnfrcng	14,600.00 SF	8.50 /SF	-	4.07 /SF	-	-	12.57 /SF	183,576	22.72 /SF	331,745
						Channel framing, structural steel, field fabricated, C6x8.2, incl cutting & welding	180.00 lf	40.69 /lf	1.97 /lf	6.85 /lf	-	-	49.51 /lf	8,911	88.80 /lf	15,984
						Silicone water repellants, sprayed on CMU, 2 coat	29,199.88 sf	0.21 /sf	-	0.79 /sf	-	-	1.00 /sf	29,060	1.83 /sf	53,506
						Reglet, zinc and copper alloy, 20 ounce	682.00 lf	3.26 /lf	-	2.87 /lf	-	-	6.13 /lf	4,183	11.15 /lf	7,602
						Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	682.00 lf	5.27 /lf	-	5.25 /lf	-	-	10.52 /lf	7,177	19.15 /lf	13,061
						04.00.02.08 Masonry Concrete Masonry Units, 8"	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.81 /SF	552,073
						04.21 Concrete Unit Masonry - Exterior	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.81 /SF	552,073
						04.0 Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.81 /SF	552,073
						04.00.302 Funk PGP Electrical Building, Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.81 /SF	552,073
		05.00.304				Funk PGP Electrical Building, Metal Roof Framing										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Open web bar joist, K Series, 40-ton job lots, 28K8, 12.7 plf, 30' to 50' spans, shop fabricated, incl shop primer, horizontal bridging	2,450.00 lf	7.55 /lf	1.41 /lf	12.45 /lf	-	-	21.41 /lf	52,445	39.08 /lf	95,756
						Metal roof decking, steel, open type B wide rib, galvanized, over 500 Sq, 1-1/2" D, 20 gauge	14,384.00 SF	1.26 /SF	0.04 /SF	2.15 /SF	-	-	3.45 /SF	49,607	6.31 /SF	90,723
						05.00.99.00 Metals, Other	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.96 /SF	186,479
						05.50 Metal Fabrications	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.96 /SF	186,479
						05.0 Metals	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.96 /SF	186,479
						05.00.304 Funk PGP Electrical Building, Metal Roof Framing	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.96 /SF	186,479
		07.00.300				Funk PGP Electrical Building, Roofing										
			07.0			Thermal and Moisture Protection										
				07.00		Thermal & Moisture Protection										
					07.50.02.00	Thermal & Moisture Protection, Membrane Roofing										
						Roof Deck Insulation, foamglass, tapered for drainage	14,384.00 sf	1.03 /sf	-	1.16 /sf	-	-	2.19 /sf	31,441	3.98 /sf	57,290
						Elastomeric Roofing, vinyl and neoprene membrane traffic deck	14,384.00 SF	2.74 /SF	0.37 /SF	1.77 /SF	-	-	4.88 /SF	70,161	8.83 /SF	126,990
						Flashing, galvanized steel, .018", 26 ga.	676.00 sf	5.46 /sf	-	0.65 /sf	-	-	6.11 /sf	4,127	10.94 /sf	7,393
						Reglet, stainless steel, .020" thick	676.00 lf	3.26 /lf	-	4.21 /lf	-	-	7.47 /lf	5,051	13.63 /lf	9,216
						Reglet, counter flashing for stainless steel, .020" thick, 12 wide	676.00 lf	5.27 /lf	-	6.80 /lf	-	-	12.07 /lf	8,162	22.03 /lf	14,891
						Roof Hatches, with curb, 1" fiberglass insulation, aluminum curb & cover, 2'-6" x 3'-0"	3.00 ea	258.90 /ea	-	900.00 /ea	-	-	1,158.90 /ea	3,477	2,132.33 /ea	6,397
						07.50.02.00 Thermal & Moisture Protection, Membrane Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,177
						07.00 Thermal & Moisture Protection	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,177
						07.0 Thermal and Moisture Protection	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,177
						07.00.300 Funk PGP Electrical Building, Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,177
		08.00.302				Funk PGP Electrical Building, Openings										
			08.0			Openings										
				08.10		Doors and Frames										
					08.10.01.00	Openings, Doors, Frames and Hardware										
						Steel frms, knock down, 14 ga., to 8-3/4" throat, to 3'-0" x 7'-0", single	12.00 EA	137.64 /EA	-	430.00 /EA	-	-	567.64 /EA	6,812	1,043.66 /EA	12,524
						Steel frames, knock down, 14 ga., to 8-3/4" throat, to 6070, pair	4.00 EA	183.52 /EA	-	455.00 /EA	-	-	638.52 /EA	2,554	1,171.90 /EA	4,688
						Doors, commercial, steel, insulated, full panel, 18 ga., 3'-0" x 7'-0" x 1-3/4" thick	20.00 ea	97.88 /ea	-	520.00 /ea	-	-	617.88 /ea	12,358	1,139.79 /ea	22,796
						Add for baked enamel finish, average cost per leaf	20.00 leaf	12.94 /leaf	-	50.40 /leaf	-	-	63.34 /leaf	1,267	116.63 /leaf	2,333
						Average Door Hardware	20.00 ea	91.76 /ea	15.00 /ea	500.00 /ea			606.76 /ea	12,135	1,118.51 /ea	22,370

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						08.10.01.00 Openings, Doors, Frames and Hardware	16.00 EA	402.33 /EA	18.75 /EA	1,774.25 /EA	/EA	/EA	2,195.33 /EA	35,125	4,044.37 /EA	64,710
						08.10 Doors and Frames	16.00 EA	402.33 /EA	18.75 /EA	1,774.25 /EA	/EA	/EA	2,195.33 /EA	35,125	4,044.37 /EA	64,710
				08.30		Specialty Doors and Frames - Overhead Door										
					08.30.01.20	Specialty Doors and Frames, Coiling Doors										
						Doors, rolling service, steel, manual, 20 gauge, 12' x 10' high, incl. hardware	4.00 EA	1,186.73 /EA	-	1,250.00 /EA	-	-	2,436.73 /EA	9,747	4,436.93 /EA	17,748
						Doors, rolling service, steel, manual, for weatherstripping, extruded rubber, jambs, add	80.00 lf	-	-	19.15 /lf	-	-	19.15 /lf	1,532	35.55 /lf	2,844
						Doors, rolling service, steel, manual, for weatherstripping, hood, extruded rubber, add	48.00 lf	-	-	8.65 /lf	-	-	8.65 /lf	415	16.06 /lf	771
						Doors, rolling service, steel, manual, motor operators for, to 14' x 14' opening	4.00 ea	284.82 /ea	-	1,200.00 /ea	-	-	1,484.82 /ea	5,939	2,735.40 /ea	10,942
						08.30.01.20 Specialty Doors and Frames, Coiling Doors	4.00 EA	1,471.55 /EA	/EA	2,936.80 /EA	/EA	/EA	4,408.35 /EA	17,633	8,075.91 /EA	32,304
						08.30 Specialty Doors and Frames - Overhead Door	4.00 EA	1,471.55 /EA	/EA	2,936.80 /EA	/EA	/EA	4,408.35 /EA	17,633	8,075.91 /EA	32,304
						08.0 Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,850.68 /EA	97,014
						08.00.302 Funk PGP Electrical Building, Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,850.68 /EA	97,014
		21.00.300				Funk PGP Electrical Building, Fire Suppression										
			21.0			Fire Suppression										
				21.00		Fire Suppression										
					21.00.10.10	Fire Suppression Systems										
						Fire Suppression System Allowance	14,384.00 SF				15.00 /SF		15.00 /SF	215,760	26.75 /SF	384,843
						21.00.10.10 Fire-Suppression Systems	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.75 /SF	384,843
						21.00 Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.75 /SF	384,843
						21.0 Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.75 /SF	384,843
						21.00.300 Funk PGP Electrical Building, Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.75 /SF	384,843
		23.00.302				Funk PGP Electrical Building, HVAC										
			23.0			HVAC										
				23.00		HVAC										
					23.00.02.00	Mechanical, HVAC										
						HVAC Allowance	14,384.00 SF				35.00 /SF		35.00 /SF	503,440	62.43 /SF	897,966
						23.00.02.00 Mechanical, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	897,966
						23.00 HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	897,966
						23.0 HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	897,966
						23.00.302 Funk PGP Electrical Building, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	897,966
		26.02.PRI				Primary Feeds fromSubstation										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Roadway steel plates, 8' x 20' x 1"thick, avg cost per sf, monthly	1,600.00 sf	-	1.00 /sf	-	-	-	1.00 /sf	1,600	1.83 /sf	2,934
						01.01.06.03 GC Equip, Tools, & Consumables	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,600	/LS	2,934
						26.00 Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,600	/LS	2,934
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	45.42 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	117,487	4,824.64 /ton	219,135
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	117,487	/LF	219,135
					26.10.03.00	UG Conduit										
						Electrical Underground Ducts and Manholes, PVC, conduit with coupling, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	17,440.00 lf	6.49 /lf	-	3.16 /lf	-	-	9.65 /lf	168,236	17.92 /lf	312,482
						Electrical Underground Ducts and Manholes, PVC, elbows, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	128.00 ea	115.32 /ea	-	23.00 /ea	-	-	138.32 /ea	17,704	255.29 /ea	32,677
						Electrical Underground Ducts and Manholes, PVC, bell end and cap, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	256.00 ea	74.13 /ea	-	9.90 /ea	-	-	84.03 /ea	21,512	154.80 /ea	39,630
						Electrical Underground Ducts and Manholes, PVC, base spacer, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	3,488.00 ea	25.31 /ea	-	1.78 /ea	-	-	27.09 /ea	94,501	49.81 /ea	173,734
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	301,954	/LF	558,523
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrc undrgr ducts and manhls,man holes,precast w/iron racks&pulling irons,cl frame and cover,6'10"7",excluds excavtn,backfll and cast place concrete	12.00 ea	3,167.96 /ea	324.85 /ea	3,775.00 /ea	-	-	7,267.81 /ea	87,214	13,600.38 /ea	163,205
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	87,214	/EA	163,205
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	506,654	/LS	940,863
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .975" to 1.570", pad mount	144.00 ea	172.97 /ea	-	163.00 /ea	-	-	335.97 /ea	48,380	627.88 /ea	90,415
						Medium-cable single cable, copper, XLP shielding, ungrounded neutral, 15 kV, 500 kcmil, in conduit, excl splicing & terminations	400.00 clf	864.87 /clf	-	1,050.00 /clf	-	-	1,914.87 /clf	765,948	3,587.35 /clf	1,434,940
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	814,329	/LF	1,525,355
					26.15.11.00	Process Electrical, Grounding										
						Grounding rod, copper clad, 8' long, 3/4" diameter	12.00 ea	195.82 /ea	-	36.00 /ea	-	-	231.82 /ea	2,782	427.69 /ea	5,132
						Ground wire, copper wire, bare stranded, 4/0	23.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	18,036	1,468.33 /clf	33,772
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	20,817	/LF	38,904
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	24.00 E	242.87 /E	-	-	200.00 /E	-	442.87 /E	10,629	812.07 /E	19,490
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	10,629	/EA	19,490
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	845,775	/SF	1,583,748
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,354,029	/SF	2,527,545
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red), envelope/encasement, poured neat	363.33 cy	194.63 /cy	0.35 /cy	77.50 /cy	-	-	272.48 /cy	98,999	437.13 /cy	158,823
						End bulkheads, plywood, concrete envelope/encasement	320.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	4,550	22.57 /sf	7,223
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	103,550	/CY	166,046
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	1,253.50 ecy	1.94 /ecy	11.66 /ecy	-	-	-	13.60 /ecy	17,051	21.54 /ecy	27,002
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	17,051	/CY	27,002
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 1/4 mile round trip, 5.0 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	1,670.95 lcy	4.46 /lcy	1.86 /lcy	-	-	-	6.33 /lcy	10,572	10.02 /lcy	16,742
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	10,572	/CY	16,742
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	1,453.33 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	42,067	45.84 /bcy	66,620
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	42,067	/CY	66,620
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	173,239	/LS	276,410
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	173,239	/CY	276,410
						26.02.PRI Primary Feeds fromSubstation	**2,180.00** LF	376.38 /LF	26.06 /LF	295.94 /LF	2.20 /LF	/LF	700.58 /LF	1,527,268	1,286.22 /LF	2,803,955
		26.03.MVSWGR				MV SWGR										
			26.0			Electrical Work										
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	80.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	16,378	379.03 /hr	30,323
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	16,378	/LS	30,323
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,378	/SF	30,323
				26.25		Facility Electrical										
					26.25.03.00	Electrical Equipment, Switchgear - General										
						MV SWGR-A	16,000.00 ea	3.24 /ea	0.63 /ea	50.00 /ea	-	-	53.87 /ea	861,892	102.40 /ea	1,638,418
						MV SWGR-B	14,800.00 ea	3.24 /ea	0.63 /ea	50.00 /ea	-	-	53.87 /ea	797,250	102.40 /ea	1,515,537

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	1,659,143	/EA	3,153,955
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,659,143	/LS	3,153,955
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,675,521	/SF	3,184,278
						26.03.MVSWGR MV SWGR	30,800.00 FA	3.58 /FA	0.69 /FA	50.13 /FA	/FA	/FA	54.40 /FA	1,675,521	103.39 /FA	3,184,278
		26.03.SWGREQ				Station Aux Xfmr, Bttry										
			26.0			Electrical Work										
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	24.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	4,914	379.03 /hr	9,097
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	4,914	/LS	9,097
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,914	/SF	9,097
				26.25		Facility Electrical										
					26.25.01.00	Station Equipment										
						Control batteries	100.00 kah	498.29 /kah	52.02 /kah	540.00 /kah	-	-	1,090.30 /kah	109,030	2,038.39 /kah	203,839
						Conversion equipment, station service transformers	1.00 ea	1,245.71 /ea	130.04 /ea	105,000.00 /ea	-	-	106,375.75 /ea	106,376	202,669.59 /ea	202,670
						26.25.01.00 Station Equipment	0.00	/LS	/LS	/LS	/LS	/LS	/LS	215,406	/LS	406,509
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	215,406	/LS	406,509
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	220,319	/SF	415,605
						26.03.SWGREQ Station Aux Xfmr, Bttry	1.00 LS	54,187.72 /LS	5,931.53 /LS	160,200.00 /LS	/LS	/LS	220,319.25 /LS	220,319	415,605.36 /LS	415,605
		26.04.MVBUS				Medium Voltage Overhead Bus Duct 2000A										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Threaded rod, steel, painted, 1/2" diameter	768.00 lf	7.41 /lf	-	6.75 /lf	-	-	14.16 /lf	10,877	26.46 /lf	20,321
						Nuts, galvanized steel, 1/2" diameter	16.00 c	-	-	46.50 /c	-	-	46.50 /c	744	88.64 /c	1,418
						Channels, steel, 1-1/2" x 1-1/2"	896.00 lf	14.83 /lf	-	3.68 /lf	-	-	18.51 /lf	16,582	34.20 /lf	30,644
						Spring nuts, steel channel, long, 1/2"	1,024.00 ea	12.97 /ea	-	0.83 /ea	-	-	13.80 /ea	14,134	25.37 /ea	25,979
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	42,337	/LS	78,363
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 5 kV, .525" to 1.025", pad mount	26.00 ea	129.73 /ea	-	87.50 /ea	-	-	217.23 /ea	5,648	404.67 /ea	10,521
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	5,648	/LF	10,521
					26.15.04.00	Process Electrical, Bus Duct										
						Bus duct, copper, 3 pole 3 wire, 2000 amp	540.00 lf	172.97 /lf	-	1,000.00 /lf	-	-	1,172.97 /lf	633,406	2,223.34 /lf	1,200,602
						Bus duct, copper, 3 pole 3 wire, elbow, 2000 amp V	11.00 ea	1,037.85 /ea	-	5,000.00 /ea	-	-	6,037.85 /ea	66,416	11,433.86 /ea	125,772
						Bus duct, copper, 3 pole 3 wire, elbow, 2000 amp H	4.00 ea	1,037.85 /ea	-	5,000.00 /ea	-	-	6,037.85 /ea	24,151	11,433.87 /ea	45,735
						Bus duct, copper, 3 pole 3 wire, tee fittings, 2000 amp V	5.00 ea	2,075.69 /ea	-	7,500.00 /ea	-	-	9,575.69 /ea	47,878	18,102.32 /ea	90,512
						Bus duct, copper, 3 pole 3 wire, tee fittings, 2000 amp H	4.00 ea	2,075.69 /ea	-	7,500.00 /ea	-	-	9,575.69 /ea	38,303	18,102.32 /ea	72,409
						Bus duct, copper, 3 pole 3 wire, expansion fitting, 2000 amp	4.00 ea	798.34 /ea	-	7,500.00 /ea	-	-	8,298.34 /ea	33,193	15,760.10 /ea	63,040
						Bus duct fittings, flange, wall, with vapor barrier, 2000 amp	4.00 ea	518.92 /ea	-	850.00 /ea	-	-	1,368.92 /ea	5,476	2,571.76 /ea	10,287
						Bus duct fittings, switchboard stub, 3 pole, 3 wire, 2000 amp	17.00 ea	864.87 /ea	-	5,000.00 /ea	-	-	5,864.87 /ea	99,703	11,116.69 /ea	188,984
						Bus duct fittings, bellows, 3 pole, 3 wire, 2000 amp	21.00 ea	864.87 /ea	-	2,500.00 /ea	-	-	3,364.87 /ea	70,662	6,351.28 /ea	133,377
						Bus duct fittings, hanger, spring type, 2000 amp	128.00 ea	172.97 /ea	-	150.00 /ea	-	-	322.97 /ea	41,341	603.10 /ea	77,197
						26.15.04.00 Process Electrical, Bus Duct	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,060,530	/LF	2,007,916
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	13.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	5,973	842.50 /E	10,952
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,973	/EA	10,952
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,114,488	/SF	2,107,753
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	40.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	8,189	379.03 /hr	15,161
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	8,189	/LS	15,161
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,161
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,122,677	/SF	2,122,914
						26.04.MVBUS Medium Voltage Overhead Bus Duct 2000A	540.00 LF	429.87 /LF	1.85 /LF	1,642.50 /LF	4.82 /LF	/LF	2,079.03 /LF	1,122,677	3,931.32 /LF	2,122,914
		26.04.MVVSD				Medium Voltage Variable Speed Drives										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electrical Contractor startup assistance per hour	26.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	36,980	2,615.28 /hr	67,997
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	36,980	/LS	67,997
					26.25.03.00	Electrical Equipment, Switchgear - General										
						MV VSP 8000A 13.8kV, includes allowance for Vendor startup, CX train, doc	13.00 ea	10,378.45 /ea	3,200.00 /ea	420,000.00 /ea	5,000.00 /ea	-	438,578.45 /ea	5,701,520	834,654.27 /ea	10,850,505
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,701,520	/EA	10,850,505
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	5,738,500	/SF	10,918,503
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	5,738,500	/SF	10,918,503
						26.04.MVVSD Medium Voltage Variable Speed Drives	13.00 EA	12,973.07 /EA	3,250.00 /EA	420,200.00 /EA	5,000.00 /EA	/EA	441,423.07 /EA	5,738,500	839,884.83 /EA	10,918,503
		26.05.GRDG				Facility Grounding										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Copper Bus Bar ,25"x 3.0"	20.00 lf	32.43 /lf	-	52.90 /lf	-	-	85.33 /lf	1,707	160.31 /lf	3,206
						Copper Bus Bar Supports	20.00 E	129.73 /E	-	48.30 /E	-	-	178.03 /E	3,561	329.95 /E	6,599
						Ground wire, copper wire, bare stranded, 4/0	35.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	27,445	1,468.33 /clf	51,391
						Exothermic weld, 4/0 wire to 4/0 wire	234.00 ea	148.26 /ea	-	9.45 /ea	-	-	157.71 /ea	36,905	289.88 /ea	67,832
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	69,618	/LF	129,028
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	69,618	/SF	129,028
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	69,618	/SF	129,028
						26.05.GRDG Facility Grounding	14,550.00 SF	3.48 /SF	/SF	1.30 /SF	/SF	/SF	4.79 /SF	69,618	8.87 /SF	129,028
		26.20.DIST				Electrical Distribution Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 1-1/2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	40.00 lf	11.53 /lf	-	3.46 /lf	-	-	14.99 /lf	600	27.74 /lf	1,110
						Flexible metallic conduit, steel, 1-1/2" diameter	3.00 lf	20.76 /lf	-	2.55 /lf	-	-	23.31 /lf	70	42.92 /lf	129
						Flexible metallic conduit, steel, 2" diameter	3.00 lf	25.95 /lf	-	3.23 /lf	-	-	29.18 /lf	88	53.74 /lf	161
						Flexible metallic conduit, steel, connectors, insulated, 1-1/2" diameter	1.00 ea	32.43 /ea	-	24.50 /ea	-	-	56.93 /ea	57	106.14 /ea	106
						Flexible metallic conduit, steel, connectors, insulated, 2" diameter	1.00 ea	45.12 /ea	-	26.00 /ea	-	-	71.12 /ea	71	132.30 /ea	132
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 1-1/2" diameter	1.00 ea	45.12 /ea	-	46.00 /ea	-	-	91.12 /ea	91	170.42 /ea	170
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 2" diameter	1.00 ea	57.66 /ea	-	67.00 /ea	-	-	124.66 /ea	125	233.45 /ea	233
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 100 amp, 30 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	2,594.61 /ea	-	2,125.00 /ea	-	-	4,719.61 /ea	4,720	8,808.23 /ea	8,808
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 225 amp, 42 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	4,125.00 /ea	-	-	7,831.59 /ea	7,832	14,659.55 /ea	14,660
						Panelboards, 3 phase 4 wire, main circuit breaker, 277/480 V, 225 amp, 42 circuits, NEHB, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	5,175.00 /ea	-	-	8,881.59 /ea	8,882	16,661.00 /ea	16,661
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	22,534	/LS	42,171
					26.10.03.00	UG Conduit										
						Uninterruptible power supply, charger, inverter, and alarm 1 phase, 120 V, 5 kVA, incl 10 minutes battery	1.00 ea	6,182.64 /ea	356.18 /ea	7,100.00 /ea	-	-	13,638.82 /ea	13,639	25,523.72 /ea	25,524
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	13,639	/LF	25,524
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #6, type XHHW, in raceway	0.25 clf	159.68 /clf	-	54.50 /clf	-	-	214.20 /clf	54	396.76 /clf	99

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #4, type XHHW, in raceway	0.15 clf	195.80 /clf	-	77.50 /clf	-	-	273.30 /clf	41	506.80 /clf	76
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	1.00 clf	259.46 /clf	-	159.00 /clf	-	-	418.46 /clf	418	778.84 /clf	779
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	0.60 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	514	1,598.92 /clf	959
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,027	/LF	1,913
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	37,200	/SF	69,608
				26.25		Facility Electrical										
					26.25.06.00	Transformers, Dry Type										
						Transformer, dry-type, ventilated, 3 phase 480 V primary 120/208 V secondary, 30 kVA	1.00 ea	2,306.32 /ea	-	1,800.00 /ea	-	-	4,106.32 /ea	4,106	7,660.10 /ea	7,660
						26.25.06.00 Transformers, Dry Type	0.00	/EA	/EA	/EA	/EA	/EA	/EA	4,106	/EA	7,660
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	4,106	/LS	7,660
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	41,306	/SF	77,268
						26.20.DIST Electrical Distribution Equipment	**550.00** AMP	36.16 /AMP	0.65 /AMP	38.29 /AMP	/AMP	/AMP	75.10 /AMP	41,306	140.49 /AMP	77,268
		26.25.LTG				Interior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	2,600.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	47,120	33.60 /lf	87,373
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	150.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	8,289	101.58 /ea	15,236
						Outlet boxes, pressed steel, covers, blank, 4" square	150.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	2,548	31.20 /ea	4,680
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	57,957	/LS	107,290
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	80.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	8,644	199.12 /clf	15,930
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	10.00 clf	103.79 /clf	-	20.50 /clf	-	-	124.29 /clf	1,243	229.38 /clf	2,294
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	9,887	/LF	18,223
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	67,844	/SF	125,513
				26.20		Facility Electrical										
					26.20.03.00	Facility Electrical, Lighting										
						LED Strip Light, hdwe	150.00 ea	182.08 /ea	-	110.00 /ea	-	-	292.08 /ea	43,812	543.55 /ea	81,532
						Emergency ballast, material only, interior, factory installed in fixture	30.00 ea	-	-	152.00 /ea	-	-	152.00 /ea	4,560	289.74 /ea	8,692
						Exit lighting, L.E.D. standard, single face, ceiling or wall mount	12.00 ea	129.73 /ea	-	70.00 /ea	-	-	199.73 /ea	2,397	371.31 /ea	4,456
						Fixture whips, 3/8" greenfield, 2 connectors, THHN wire, three #14, 6' long	150.00 ea	32.43 /ea	-	5.45 /ea	-	-	37.88 /ea	5,682	69.86 /ea	10,479
						26.20.03.00 Facility Electrical, Lighting	0.00	/SF	/SF	/SF	/SF	/SF	/SF	56,451	/SF	105,159
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	56,451	/SF	105,159
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	124,295	/SF	230,672
						26.25.LTG Interior Lighting and Control	**1.00** LS	86,265.47 /LS	/LS	38,029.50 /LS	/LS	/LS	124,294.97 /LS	124,295	230,672.00 /LS	230,672
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	350.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	3,169	16.68 /lf	5,837
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	12.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	663	101.58 /ea	1,219
						Outlet boxes, pressed steel, covers, blank, 4" square	12.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	204	31.20 /ea	374
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	4,036	/LS	7,431
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	12.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,297	199.12 /clf	2,389
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,297	/LF	2,389
					26.15.07.00	Lighting										
						LED Area Light	12.00 E	97.30 /E	-		-	-	97.30 /E	1,168	178.41 /E	2,141
						Wallpack Photocell	12.00 E	32.43 /E	-		-	-	32.43 /E	389	59.47 /E	714
						26.15.07.00 Lighting	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,557	/LS	2,855
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	6,889	/SF	12,675
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	6,889	/SF	12,675
						26.26.EXTLTG Exterior Lighting and Control	**1.00** LS	6,300.47 /LS	/LS	588.58 /LS	/LS	/LS	6,889.05 /LS	6,889	12,674.84 /LS	12,675
		26.30.DEV				Device Outlets										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	3,000.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	54,369	33.60 /lf	100,815
						Outlet boxes, cast, 1 gang, FD, 3/4" hub, 2-11/16" deep	36.00 ea	86.49 /ea	-	22.00 /ea	-	-	108.49 /ea	3,906	200.52 /ea	7,219
						Duplex receptacle, grounded, 120 volt, 20 amp	24.00 ea	38.44 /ea	-	10.65 /ea	-	-	49.09 /ea	1,178	90.78 /ea	2,179
						Duplex receptacle, ground fault interrupting, 20 amp	12.00 ea	38.44 /ea	-	45.00 /ea	-	-	83.44 /ea	1,001	156.26 /ea	1,875
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	60,454	/LS	112,088
					26.10.03.00	UG Conduit										
						WP cover	12.00 ea	17.30 /ea	-	42.50 /ea	-	-	59.80 /ea	718	112.73 /ea	1,353
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	718	/LF	1,353
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	80.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	8,644	199.12 /clf	15,930
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	20.00 clf	103.79 /clf	-	20.50 /clf	-	-	124.29 /clf	2,486	229.38 /clf	4,588
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	11,130	/LF	20,517
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	72,301	/SF	133,958
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	72,301	/SF	133,958
						26.30.DEV Device Outlets	**1.00** LS	53,247.76 /LS	/LS	19,053.60 /LS	/LS	/LS	72,301.36 /LS	72,301	133,957.59 /LS	133,958
		26.40.EQCON				Facility Equipment Connections and Controls										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.00.99.00	Electrical, Other										
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 5 HP motor	4.00 ea	129.73 /ea	-	6.35 /ea	-	-	136.08 /ea	544	249.99 /ea	1,000
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 10 HP motor	2.00 ea	129.73 /ea	-	6.35 /ea	-	-	136.08 /ea	272	249.99 /ea	500
						Motor connections, flexible conduit and fittings, 3 phase, sealtite, 460 volt, 10 HP motor	2.00 ea	129.73 /ea	-	9.30 /ea	-	-	139.03 /ea	278	255.60 /ea	511
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,095	/LS	2,011
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,095	/LS	2,011
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	300.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	2,716	16.68 /lf	5,004
						Electric metallic tubing (EMT), 1" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	9.03 /lf	-	1.80 /lf	-	-	10.83 /lf	2,165	19.98 /lf	3,996
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	4,881	/LS	8,999
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	4.50 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	486	199.12 /clf	896
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	9.00 clf	103.78 /clf	-	20.50 /clf	-	-	124.28 /clf	1,119	229.38 /clf	2,064
						Wire, copper, stranded, 600 volt, #8, type XHHW, in raceway	13.00 clf	129.73 /clf	-	34.00 /clf	-	-	163.73 /clf	2,129	302.69 /clf	3,935
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	3,733	/LF	6,895
					26.20.05.00	Facility Electrical, HVAC										
						HVAC controls - electrical contractor scope	1.00 LS		-	3,500.00 /LS	-	-	3,500.00 /LS	3,500	6,671.57 /LS	6,672
						26.20.05.00 Facility Electrical, HVAC	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,500	/SF	6,672
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	12,114	/SF	22,566
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	13,209	/SF	24,578
						26.40.EQCON Facility Equipment Connections and Controls	**1.00** ALO	8,282.95 /ALO	/ALO	4,925.85 /ALO	/ALO	/ALO	13,208.80 /ALO	13,209	24,577.59 /ALO	24,578
		26.40.PMP				13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A										
			26.0			Electrical Work										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	130.00 lf	64.87 /lf	-	62.50 /lf	-	-	127.37 /lf	16,557	238.08 /lf	30,950
						Rigid galvanized steel plastic coated conduit elbows, 4" diameter, to 15' high	13.00 ea	389.19 /ea	-	196.00 /ea	-	-	585.19 /ea	7,608	1,087.25 /ea	14,134
						Rigid galvanized steel plastic coated conduit couplings, 4" diameter, to 15' high	13.00 ea	28.83 /ea	-	57.50 /ea	-	-	86.33 /ea	1,122	162.47 /ea	2,112
						Flexible metallic conduit, sealtite, 4" diameter	39.00 lf	86.40 /lf	-	20.00 /lf	-	-	106.40 /lf	4,150	196.55 /lf	7,666
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 4" diameter	13.00 ea	129.73 /ea	-	163.00 /ea	-	-	292.73 /ea	3,806	548.59 /ea	7,132
						Flexible metallic conduit, coupling sealtite to rigid, 4" diameter	13.00 ea	129.73 /ea	-	198.00 /ea	-	-	327.73 /ea	4,261	615.30 /ea	7,999
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	37,503	/LS	69,992
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 4" diameter, to 15' H, incl terminations, fittings, & support	650.00 lf	32.43 /lf	-	5.75 /lf	-	-	38.18 /lf	24,819	70.43 /lf	45,780
						PVC conduit elbows, 4" diameter, to 15' H	13.00 ea	116.76 /ea	-	23.00 /ea	-	-	139.76 /ea	1,817	257.94 /ea	3,353
						PVC conduit, field bends, 45 Deg. to 90 Deg., 4" diameter	13.00 ea	129.73 /ea	-	-	-	-	129.73 /ea	1,687	237.88 /ea	3,092
						PVC adapters, 4" diameter, to 15' H	26.00 ea	64.87 /ea	-	4.80 /ea	-	-	69.67 /ea	1,811	128.09 /ea	3,330
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	30,133	/LF	55,556
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .525" to 1.025", pad mount	78.00 ea	324.33 /ea	-	109.00 /ea	-	-	433.33 /ea	33,799	802.48 /ea	62,593
						MV VFD Cable 3/C	9.75 clf	3,373.00 /clf	-	6,000.00 /clf	-	-	9,373.00 /clf	91,387	17,621.90 /clf	171,814
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	125,186	/LF	234,407
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	13.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	5,973	842.50 /E	10,952
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,973	/EA	10,952
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	198,795	/SF	370,908
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	40.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	8,189	379.03 /hr	15,161
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	8,189	/LS	15,161
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,161
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	206,985	/SF	386,069
						26.40.PMP 13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A	**780.00** LF	145.29 /LF	1.28 /LF	115.46 /LF	3.33 /LF	/LF	265.37 /LF	206,985	494.96 /LF	386,069
		26.41.PMP				8000HP Pump Process Control Circuits and Connections										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	130.00 lf	29.65 /lf	-	22.50 /lf	-	-	52.15 /lf	6,780	97.26 /lf	12,644
						Rigid galvanized steel plastic coated conduit elbows, 2" diameter, to 15' high	13.00 ea	129.73 /ea	-	42.00 /ea	-	-	171.73 /ea	2,233	317.94 /ea	4,133
						Rigid galvanized steel plastic coated conduit couplings, 2" diameter, to 15' high	13.00 ea	19.58 /ea	-	14.35 /ea	-	-	33.93 /ea	441	63.26 /ea	822
						Flexible metallic conduit, sealtite, 2" diameter	39.00 lf	34.60 /lf	-	4.30 /lf	-	-	38.90 /lf	1,517	71.63 /lf	2,794
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 2" diameter	13.00 ea	51.89 /ea	-	25.50 /ea	-	-	77.39 /ea	1,006	143.76 /ea	1,869
						Flexible metallic conduit, coupling sealtite to rigid, 2" diameter	13.00 ea	103.79 /ea	-	31.50 /ea	-	-	135.29 /ea	1,759	250.35 /ea	3,255
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	13,735	/LS	25,517
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 2" diameter, to 15' H, incl terminations, fittings, & support	650.00 lf	11.53 /lf	-	3.36 /lf	-	-	14.89 /lf	9,680	27.55 /lf	17,907
						PVC conduit elbows, 2" diameter, to 15' H	13.00 ea	51.32 /ea	-	3.54 /ea	-	-	54.86 /ea	713	100.86 /ea	1,311
						PVC conduit, field bends, 45 Deg. to 90 Deg., 2" diameter	13.00 ea	51.89 /ea	-	-	-	-	51.89 /ea	675	95.15 /ea	1,237
						PVC adapters, 2" diameter, to 15' H	26.00 ea	38.44 /ea	-	1.39 /ea	-	-	39.83 /ea	1,036	73.13 /ea	1,901
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	12,103	/LF	22,357
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	80.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	7,163	164.88 /clf	13,190
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	60.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	10,696	329.05 /clf	19,743
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	17,859	/LF	32,933
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,697	/SF	80,807
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,697	/SF	80,807
						26.41.PMP 8000HP Pump Process Control Circuits and Connections	**780.00** LF	43.96 /LF	/LF	12.06 /LF	/LF	/LF	56.02 /LF	43,697	103.60 /LF	80,807
		26.90.LPS				Facility Lightning Protection System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						Air terminal and base, copper, 3/8" dia x 10", to 75' h	50.00 ea	129.73 /ea	-	26.00 /ea	-	-	155.73 /ea	7,787	287.44 /ea	14,372
						Lightning protection cable, copper, 220 lb per thousand feet, to 75' h	1,650.00 lf	3.24 /lf	-	3.18 /lf	-	-	6.42 /lf	10,598	12.01 /lf	19,814
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	18,385	/SF	34,186
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	18,385	/SF	34,186
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	16.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	3,276	379.03 /hr	6,064
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	3,276	/LS	6,064
					26.15.10.00	Process Electrical, Lightning Protection										
						LPS design and certification, misc mat and labor	1.00 LS	4,540.57 /LS	-	5,000.00 /LS	5,000.00 /LS	-	14,540.57 /LS	14,541	27,024.98 /LS	27,025
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	14,541	/SF	27,025
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	17,816	/SF	33,089
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	36,201	/SF	67,276
						26.90.LPS Facility Lightning Protection System	**14,550.00** SF	1.27 /SF	0.03 /SF	0.85 /SF	0.34 /SF	/SF	2.49 /SF	36,201	4.62 /SF	67,276
		27.10.COMEQ				Communications Room Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	1,811	16.68 /lf	3,336
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	4.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	221	101.58 /ea	406
						Outlet boxes, pressed steel, covers, blank, 4" square	4.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	68	31.21 /ea	125
						Duplex receptacle, grounded, 120 volt, 20 amp	4.00 ea	38.44 /ea	-	10.65 /ea	-	-	49.09 /ea	196	90.78 /ea	363
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	2,296	/LS	4,230
					26.15.01.00	Process Electrical, Wire/Cable										
						Closet Distribution Frame (CDF), 7 feet tall, 19 inches wide	1.00 E	364.31 /E	-	123.00 /E	-	-	487.31 /E	487	902.49 /E	902
						Network Equipment Allowance	1.00 LS	24,287.06 /LS	-	20,000.00 /LS	-	-	44,287.06 /LS	44,287	82,657.47 /LS	82,657
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	6.50 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	702	199.12 /clf	1,294
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	45,477	/LF	84,854
					26.15.03.00	Process Electrical, Cable Tray										
						Cable tray, ladder type, galvanized steel, 4" deep, 4" rung spacing, 12" wide, to 15' elevation, incl fittings & supports	30.00 lf	24.14 /lf	-	17.95 /lf	-	-	42.09 /lf	1,263	78.47 /lf	2,354
						26.15.03.00 Process Electrical, Cable Tray	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,263	/LF	2,354
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	49,035	/SF	91,438
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	49,035	/SF	91,438
						27.10.COMEQ Communications Room Equipment	**1.00** LS	28,011.60 /LS	/LS	21,023.71 /LS	/LS	/LS	49,035.31 /LS	49,035	91,438.37 /LS	91,438
		27.31.COMCDT				Comm Conduit to MH/HH										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,328	4,824.63 /ton	4,342
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,328	/LF	4,342
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	800.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	13,354	30.88 /lf	24,703
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	13,354	/EA	24,703
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	15,682	/LS	29,045
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	130.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	11,639	164.88 /clf	21,434
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	130.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	23,174	329.05 /clf	42,777
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	34,814	/LF	64,211
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	1.55 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	1,212	1,468.33 /clf	2,269
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	1.50 ea	129.73 /ea	-	31.00 /ea	-	-	160.73 /ea	241	296.97 /ea	445
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,453	/LF	2,714
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	36,266	/SF	66,925
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	51,949	/SF	95,970
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	8.90 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	2,438	439.36 /cy	3,912
						End bulkheads, plywood, concrete envelope/encasement	1.07 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	15	22.57 /sf	24
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	2,454	/CY	3,936
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	116.05 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	2,932	40.01 /ecy	4,643
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	2,932	/CY	4,643
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	9.87 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	199	31.98 /lcy	316
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	199	/CY	316
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	125.92 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	3,645	45.84 /bcy	5,772
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	3,645	/CY	5,772
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	9,229	/LS	14,666
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	9,229	/CY	14,666
						27.31.COMCDT Comm Conduit to MH/HH	**200.00** LF	224.65 /LF	28.56 /LF	52.68 /LF	/LF	/LF	305.89 /LF	61,178	553.18 /LF	110,636
		28.10.FA				Fire Alarm System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,820.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	16,477	16.68 /lf	30,355
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	60.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	3,316	101.58 /ea	6,095
						Outlet boxes, pressed steel, covers, blank, 4" square	8.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	136	31.20 /ea	250
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	52.00 ea	16.22 /ea	-	1.66 /ea	-	-	17.88 /ea	930	32.90 /ea	1,711
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	20,858	/LS	38,410
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	300.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	26,860	164.88 /clf	49,464
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,860	/LF	49,464
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	47,719	/SF	87,874
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	47,719	/SF	87,874
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Detection Systems, fire alarm control panel, alarm device, excluding wires & conduits	24.00 ea	129.73 /ea	-	230.00 /ea	-	-	359.73 /ea	8,634	586.37 /ea	14,073
						Detection Systems, fire alarm control panel, actuating device, excluding wires & conduits	4.00 ea	129.73 /ea	-	340.00 /ea	-	-	469.73 /ea	1,879	768.54 /ea	3,074
						Detection Systems, fire alarm control panel, addressable without voice, up to 200 points, excluding wires & conduits, inluding vendor design, startup	1.00 ea	1,816.00 /ea	-	4,575.00 /ea	2,500.00 /ea	-	8,891.00 /ea	8,891	14,412.03 /ea	14,412
						Detection Systems, fire alarm control panel, battery & rack, excluding wires & conduits	1.00 ea	259.46 /ea	-	460.00 /ea	-	-	719.46 /ea	719	1,172.71 /ea	1,173
						Detection Systems, fire alarm control panel, battery & rack, automatic charger, excluding wires & conduits	1.00 ea	129.73 /ea	-	525.00 /ea	-	-	654.73 /ea	655	1,074.95 /ea	1,075
						Detection Systems, visual alarm, ADA type, excluding wires & conduits	24.00 ea	154.90 /ea	-	119.00 /ea	-	-	273.90 /ea	6,574	442.40 /ea	10,618
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,424
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,424
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,424
						28.10.FA Fire Alarm System	**14.550.00** SF	3.58 /SF	/SF	1.41 /SF	0.17 /SF	/SF	5.16 /SF	75,070	9.09 /SF	132,298
		28.20.AC				Access Control System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Card reader - all in allowance per each (incl circuit, cards, CX)	7.00 ea	1,556.77 /ea	-	800.00 /ea	-	-	2,356.77 /ea	16,497	3,790.32 /ea	26,532
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,532
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,532
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,532
						28.20.AC Access Control System	**12.00** DOOR	908.12 /DOOR	/DOOR	466.67 /DOOR	/DOOR	/DOOR	1,374.78 /DOOR	16,497	2,211.02 /DOOR	26,532
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Camera allowance (licenses, circuit, startup, CX)	1.00 LS	25,946.13 /LS	-	10,000.00 /LS	10,000.00 /LS	-	45,946.13 /LS	45,946	84,974.63 /LS	84,975
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,975
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,975
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,975
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Closed circuit television system (CCTV), industrial quality, for additional camera stations, add	12.00 ea	384.39 /ea	-	690.00 /ea	-	-	1,074.39 /ea	12,893	1,751.49 /ea	21,018
						Closed circuit television system (CCTV), industrial quality, for weatherproof camera station, add	12.00 ea	798.34 /ea	-	540.00 /ea	-	-	1,338.34 /ea	16,060	2,158.63 /ea	25,904
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,921
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,921
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,921
						28.20.CCTV Closed Circuit TV and Cameras	**12.00** CAM	3,344.91 /CAM	/CAM	2,063.33 /CAM	833.33 /CAM	/CAM	6,241.57 /CAM	74,899	10,991.34 /CAM	131,896
		28.20.ID				Intrusion Detection System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Securitized door, all-in allowance per each (incl circuit, devices, CX)	7.00 ea	2,594.61 /ea	-	1,000.00 /ea	-	-	3,594.61 /ea	25,162	5,765.15 /ea	40,356
						Door controller (all-in cost including vendor program and startup)	3.00 ea	648.65 /ea	-	2,000.00 /ea	500.00 /ea	-	3,148.65 /ea	9,446	5,131.40 /ea	15,394

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,750
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,750
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,750
						28.20.ID Intrusion Detection System	12.00 DOOR	1,675.69 /DOOR	/DOOR	1,083.33 /DOOR	125.00 /DOOR	/DOOR	2,884.02 /DOOR	34,608	4,645.85 /DOOR	55,750
						03.04 Funks Reservoir Electrical Building	**14,550.00 SF**	**156.21 /SF**	**10.03 /SF**	**637.75 /SF**	**55.89 /SF**	**/SF**	**859.88 /SF**	**12,511,294**	**1,613.52 /SF**	**23,476,688**
	03.05					**Funks Reservoir Site Electrical**										
		26.20.DB				Site Ductbanks										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						In addition to those itemized, lump sum allowance	1.00 ls	-	-	-	50,000.00 /ls	-	50,000.00 /ls	50,000	91,683.05 /ls	91,683
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	50,000	/LS	91,683
						26.00 Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	50,000	/LS	91,683
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	50,000	/SF	91,683
						26.20.DB Site Ductbanks	1.00 LS	/LS	/LS	/LS	50,000.00 /LS	/LS	50,000.00 /LS	50,000	91,683.05 /LS	91,683
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Site lighting, pole, base, circuit, controls, per each (qty assumed)	25.00 ea	-	-	-	5,000.00 /ea	-	5,000.00 /ea	125,000	9,168.31 /ea	229,208
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	125,000	/LS	229,208
						26.00 Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	125,000	/LS	229,208
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	125,000	/SF	229,208
						26.26.EXTLTG Exterior Lighting and Control	1.00 LS	/LS	/LS	/LS	125,000.00 /LS	/LS	125,000.00 /LS	125,000	229,207.66 /LS	229,208
		28.20.AC				Access Control System										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Gate Operator, with card reader, power and control circuit, per each	2.00 ea	-	-	-	10,000.00 /ea	-	10,000.00 /ea	20,000	18,336.60 /ea	36,673
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	20,000	/LS	36,673
						26.00 Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	20,000	/LS	36,673
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,000	/SF	36,673
						28.20.AC Access Control System	2.00 DOOR	/DOOR	/DOOR	/DOOR	10,000.00 /DOOR	/DOOR	10,000.00 /DOOR	20,000	18,336.60 /DOOR	36,673
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Cameras, installed on site ltg poles, assumed qty, per each	10.00 ea	-	-	-	7,500.00 /ea	-	7,500.00 /ea	75,000	13,752.46 /ea	137,525
						26.00.99.00 Electrical, Other	0.00	/LS	/LS	/LS	/LS	/LS	/LS	75,000	/LS	137,525
						26.00 Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	75,000	/LS	137,525
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	75,000	/SF	137,525
						28.20.CCTV Closed Circuit TV and Cameras	10.00 CAM	/CAM	/CAM	/CAM	7,500.00 /CAM	/CAM	7,500.00 /CAM	75,000	13,752.46 /CAM	137,525
						03.05 Funks Reservoir Site Electrical	**1.00 LS**	**/LS**	**/LS**	**/LS**	**270,000.00 /LS**	**/LS**	**270,000.00 /LS**	**270,000**	**495,088.49 /LS**	**495,088**
	03.06					**Funks Reservoir PGP Sitework**										
		31.00.300				Funk PGP Earthworks										
			01.0			General Requirements										
				01.01		Construction Operations										
					01.01.05.00	General Conditions, Other										
						Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement Allowance	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	-	-	60,000.00 /MO	2,160,000	96,107.17 /MO	3,459,858
						01.01.05.00 General Conditions, Other	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,107.17 /MO	3,459,858
						01.01 Construction Operations	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,107.17 /MO	3,459,858
						01.0 General Requirements	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,107.17 /MO	3,459,858
			31.0			Earthwork										
				31.25		Earthworks, Structural										
					31.16.01.00	Earthworks, Sheeting and Shoring										
						Sheet Pile Wall	27,450.00 SF				45.00 /SF		45.00 /SF	1,235,250	71.26 /SF	1,956,217
						31.16.01.00 Earthworks, Sheeting and Shoring	27,450.00 SF	/SF	/SF	/SF	45.00 /SF	/SF	45.00 /SF	1,235,250	71.26 /SF	1,956,217
					31.25.01.00	Earthworks, Structural, Excavation										
						Structural Excavation, excludes sheeting or dewatering	135,000.00 CY	2.65 /CY	3.23 /CY	-	-	-	5.88 /CY	794,111	9.32 /CY	1,257,602
						Stockpile Excavated Spoils	135,000.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	-	2.84 /cy	383,019	4.51 /cy	609,020
						31.25.01.00 Earthworks, Structural, Excavation	135,000.00 CY	3.89 /CY	4.58 /CY	0.25 /CY	/CY	/CY	8.72 /CY	1,177,130	13.83 /CY	1,866,622
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	2,100.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	-	50.50 /CY	106,051	82.51 /CY	173,278
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	2,100.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	/CY	50.50 /CY	106,051	82.51 /CY	173,278
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	86,710.00 CY	6.18 /CY	1.69 /CY	-	-	-	7.87 /CY	682,514	12.47 /CY	1,080,871
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	69,370.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	140,872	3.22 /cy	223,093
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	17,340.00 cy	1.29 /cy	0.15 /cy	-	-	-	1.44 /cy	24,927	2.28 /cy	39,475
						Compaction, water for, 6000 gallon wagon, 6 mile haul	86,710.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	160,734	3.02 /cy	262,092
						31.25.03.00 Earthworks, Structural, Backfill	86,710.00 CY	7.45 /CY	2.98 /CY	1.20 /CY	/CY	/CY	11.64 /CY	1,009,046	18.52 /CY	1,605,531
					31.25.05.00	Earthworks, Structural, Hauling and Disposal										
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	48,290.00 CY	7.24 /CY	8.80 /CY	-	-	-	16.04 /CY	774,348	25.39 /CY	1,226,305
						Load excavated spoils	48,290.00 cy	1.03 /cy	1.13 /cy	-	-	-	2.16 /cy	104,112	3.41 /cy	164,879
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	48,290.00 CY	8.27 /CY	9.92 /CY	/CY	/CY	/CY	18.19 /CY	878,461	28.81 /CY	1,391,184
						31.25 Earthworks, Structural	272,100.00 CY	5.88 /CY	4.99 /CY	0.78 /CY	4.54 /CY	/CY	16.19 /CY	4,405,938	25.70 /CY	6,992,832
						31.0 Earthwork	272,100.00 CY	5.88 /CY	4.99 /CY	0.78 /CY	4.54 /CY	/CY	16.19 /CY	4,405,938	25.70 /CY	6,992,832
						31.00.300 Funk PGP Earthworks	272,100.00 CY	7.87 /CY	8.96 /CY	2.76 /CY	4.54 /CY	/CY	24.13 /CY	6,565,938	38.41 /CY	10,452,691
		32.00.300				Funk PGP Site Improvements										
			32.0			Exterior Improvements										
				32.12		Paving										
					32.40.03.00	Site Improvements, Paving, Concrete										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	2,086.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	19,372	14.78 /sfca	30,825
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	167.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	430,633	4,158.50 /ton	696,549
						Reinforcing in place, unloading & sorting, add to above - slabs	167.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	9,331	88.22 /ton	14,776
						Struct concrete,ready mix,normal wt,4500 osi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	2,284.70 cy	-	-	131.00 /cy	-	-	131.00 /cy	299,296	216.96 /cy	495,682
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	2,240.48 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	64,976	45.93 /CY	102,899
						Cfnsh,firs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&vln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	90,284.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	84,566	1.48 /sf	133,924
						Curing, sprayed membrane curing compound	902.84 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	20,809	37.40 /csf	33,770
						Fine grading, fine grade for slab on grade, machine	10,031.56 SY	1.19 /SY	0.68 /SY	-	-	-	1.87 /SY	18,802	2.97 /SY	29,775
						32.40.03.00 Site Improvements, Paving, Concrete	10,031.56 SY	41.02 /SY	2.27 /SY	51.19 /SY	/SY	/SY	94.48 /SY	947,783	153.34 /SY	1,538,201
					32.40.04.00	Site Improvements, Access Roads, Gravel										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	18,893.00 SY	0.62 /SY	0.35 /SY	-	-	-	0.98 /SY	18,413	1.54 /SY	29,160
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,6"deep	18,893.00 sy	0.94 /sy	0.92 /sy	7.30 /sy	-	-	9.16 /sy	173,037	15.03 /sy	284,030
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	18,893.00 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	18,421	1.54 /sy	29,173
						32.40.04.00 Site Improvements, Access Roads, Gravel	18,893.00 SY	2.13 /SY	1.68 /SY	7.30 /SY	/SY	/SY	11.11 /SY	209,871	18.12 /SY	342,364
					32.40.04.90	Site Improvements, Access Roads, Asphalt										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					32.40.04.90	Site Improvements, Access Roads, Asphalt										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	4,692.00 sy	0.62 /sy	0.35 /sy	-	-	-	0.98 /sy	4,573	1.54 /sy	7,242
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,12"deep	4,692.00 sy	1.34 /sy	1.31 /sy	15.00 /sy	-	-	17.64 /sy	82,773	29.03 /sy	136,188
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	4,692.00 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	4,575	1.54 /sy	7,245
						Plant-mix asphalt paving, for highways and large paved areas, binder course, 2" thick, no hauling included	4,692.00 SY	0.99 /SY	0.39 /SY	7.40 /SY	-	-	8.78 /SY	41,209	14.45 /SY	67,778
						Plant-mix asphalt paving, for highways and large paved areas, wearing course, 2" thick, no hauling included	4,692.00 sy	1.11 /sy	0.43 /sy	8.25 /sy	-	-	9.79 /sy	45,930	16.10 /sy	75,545
						32.40.04.90 Site Improvements, Access Roads, Asphalt	4,692.00 SY	4.62 /SY	2.89 /SY	30.65 /SY	/SY	/SY	38.16 /SY	179,060	62.66 /SY	293,997
						32.12 Paving	33,616.56 SY	14.08 /SY	2.03 /SY	23.66 /SY	/SY	/SY	39.76 /SY	1,336,715	64.69 /SY	2,174,561
				32.31		Fencing										
					32.45.01.00	Fencing, Chain Link										
						Fence,chain link industrial,galvanized steel,3 strands barb wire,2"posts @ 10'oc,9ga wire,6'high,schedule 40,includes excavation,& concrete	1,400.00 LF	6.52 /LF	0.94 /LF	19.95 /LF	-	-	27.41 /LF	38,369	44.85 /LF	62,788
						Fence, chain link industrial, gate, chain link, 8' high, to 18' wide, includes excavation, in concrete	60.00 LF	95.45 /LF	28.04 /LF	176.00 /LF	-	-	299.49 /LF	17,970	487.05 /LF	29,223
						32.45.01.00 Fencing, Chain Link	1,460.00 LF	10.17 /LF	2.05 /LF	26.36 /LF	/LF	/LF	38.59 /LF	56,338	63.02 /LF	92,011
						32.31 Fencing	1,460.00 LF	10.17 /LF	2.05 /LF	26.36 /LF	/LF	/LF	38.59 /LF	56,338	63.02 /LF	92,011
						32.0 Exterior Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,572.38 /LS	2,266,572
						32.00.300 Funk PGP Site Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,572.38 /LS	2,266,572
		33.00.300				Funk PGP Yard Piping										
			33.2			Pipeline Specialties										
				33.01		Pipeline Specialties										
					33.10.99.01	Buried Pipe Specials, Other										
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	36,710.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	161,954	6.99 /cy	256,481
						Pipe bedding and zone, CLSM	20,832.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	1,567,242	124.22 /cy	2,587,702
						Backfill native material	9,350.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	73,596	12.47 /cy	116,551
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	27,360.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	438,728	25.39 /cy	694,796
						Load excavated spoils	27,360.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	44,241	2.56 /cy	70,062
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	9,350.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	18,987	3.22 /cy	30,070
						Compaction, water for, 6000 gallon wagon, 6 mile haul	9,350.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	17,332	3.02 /cy	28,262
						Piping, pipe, WSP, plain end, welded, 144" diameter, excludes excavation or backfill	1,850.00 LF	121.97 /LF	62.10 /LF	970.00 /LF	-	-	1,154.07 /LF	2,135,022	1,897.97 /LF	3,511,253
						Pipe Fittings and Connections Allowance	1.00 ls	162,500.00 /ls	162,500.00 /ls	325,000.00 /ls	-	-	650,000.00 /ls	650,000	1,052,942.25 /ls	1,052,942
						Surge Tanks and Piping Connections	4.00 ea	9,107.20 /ea	3,974.08 /ea	50,000.00 /ea	-	-	63,081.28 /ea	252,325	103,524.37 /ea	414,097
						33.10.99.01 Buried Pipe Specials, Other	1,850.00 LF	475.48 /LF	373.42 /LF	2,048.09 /LF	/LF	/LF	2,896.99 /LF	5,359,427	4,736.33 /LF	8,762,217
						33.01 Pipeline Specialties	1.00 LS	879,641.14 /LS	690,826.28 /LS	3,788,960.00 /LS	/LS	/LS	5,359,427.42 /LS	5,359,427	8,762,216.57 /LS	8,762,217
						33.2 Pipeline Specialties	1.00 LS	879,641.14 /LS	690,826.28 /LS	3,788,960.00 /LS	/LS	/LS	5,359,427.42 /LS	5,359,427	8,762,216.57 /LS	8,762,217
						33.00.300 Funk PGP Yard Piping	1,850.00 LF	475.48 /LF	373.42 /LF	2,048.09 /LF	/LF	/LF	2,896.99 /LF	5,359,427	4,736.33 /LF	8,762,217
						03.06 Funks Reservoir PGP Sitework	1.00 LS	3,508,869.63 /LS	3,200,258.47 /LS	5,374,040.18 /LS	1,235,250.00 /LS	/LS	13,318,418.28 /LS	13,318,418	21,481,479.45 /LS	21,481,479
						03 Funks Pumping Generating Plant (PGP)	**1.00 LS**	**12,721,270.20 /LS**	**3,748,620.79 /LS**	**24,032,141.19 /LS**	**3,402,650.00 /LS**	**22,896,019.02 /LS**	**66,800,701.20 /LS**	**66,800,701**	**97,772,396.05 /LS**	**97,772,396**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	12,721,270		137,624.944 hrs	
Material	24,032,141			
Allowance	3,402,650			
Equipment	3,748,621		36,598.123 hrs	
Subtotal Direct Costs	**43,904,682**	**43,904,682**		
Material Sales Tax, Dunnigan Ca	1,742,330			7.250 %
Subtotal W/ Sales Tax	**1,742,330**	**45,647,012**		
Masonry Work I,OH&P	76,892			20.000 %
Metals Work I,OH&P	232,914			20.000 %
Architectural (Div 6-12)I,OH&P	35,778			20.000 %
Mechanical Work I,OH&P	153,701			20.000 %
Electrical Work I,OH&P	3,104,621			25.000 %
Instruments & Controls I,OH&P				20.000 %
Subtotal W/ Subcontractor OH&P	**3,603,906**	**49,250,918**		
General Conditions	2,462,546			5.000 %
Subtotal W/ General Conditions	**2,462,546**	**51,713,464**		
Mobilization/Demobilization	1,551,404			3.000 %
Prime Contractor Overhead	5,326,487			10.000 %
Prime Contractor Profit	3,515,481			6.000 %
Bonds & Insurance	1,347,718			2.170 %
Subtotal W/ Prime Markups	**11,741,090**	**63,454,554**		
Contractor Contingency	1,903,637			3.000 %
Design Contingency	9,518,184			15.000 %
Subtotal W/ Contingency	**11,421,821**	**74,876,375**		
Non-Markup Items	22,896,019			
Subtotal W/ Non-Markup Items	**22,896,019**	**97,772,394**		
Total Construction Cost		**97,772,394**		
Non-Contract Costs	16,621,307			17.000 %
Total Project Costs	**16,621,307**	**114,393,701**		

TRR East Reservoir

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 TRR East Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / March 1, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
07			TRR East									
	07.01		TRR East Reservoir									
		01.00.700	TRR East Reservoir, Dewatering/Erosion Controls/Dust Abatement	24.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,451.44 /MO	2,218,835
		31.00.700	Construct Haul Roads	3,767.00 SY	3.80 /SY	4.19 /SY	20.00 /SY	/SY	27.98 /SY	105,408	44.06 /SY	165,970
		31.00.702	Construct Bridge	3,600.00 SF	/SF	/SF	/SF	85.00 /SF	85.00 /SF	306,000	129.43 /SF	465,956
		31.00.704	Set up silos, generator, and batch plant within TRR-E footprint	1.00 LS	/LS	/LS	/LS	554,000.00 /LS	554,000.00 /LS	554,000	843,593.72 /LS	843,594
		31.00.706	Install CDSM using auger rigs	900,000.00 CY	/CY	/CY	/CY	85.40 /CY	85.40 /CY	76,860,000	130.04 /CY	117,037,208
		31.00.708	Manage CDSM spoil	100,000.00 CY	2.70 /CY	5.59 /CY	/CY	/CY	8.29 /CY	829,058	12.62 /CY	1,262,434
		31.00.710	Excavate upper 2 ft in reservoir area to remove deleterious materials	450,000.00 CY	3.78 /CY	7.97 /CY	/CY	/CY	11.76 /CY	5,289,557	17.90 /CY	8,054,580
		31.00.712	Base Grades - approach channel (concrete lined)	96,000.00 CY	2.44 /CY	6.67 /CY	/CY	/CY	9.11 /CY	874,644	13.87 /CY	1,331,848
		31.00.714	Base Grades - reservoir bottom grades	210,000.00 CY	6.53 /CY	7.61 /CY	/CY	/CY	14.14 /CY	2,969,164	21.53 /CY	4,521,242
		31.00.716	Construct Embankment	385,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	5,279,351	20.88 /CY	8,039,039
		31.00.718	Construct Check Structures #2	6,433.00 SF	41.36 /SF	3.31 /SF	64.59 /SF	4.70 /SF	113.96 /SF	733,075	182.28 /SF	1,172,633
		31.00.720	Construct Check Structures #3	6,433.00 SF	41.36 /SF	3.31 /SF	64.59 /SF	4.70 /SF	113.96 /SF	733,075	182.28 /SF	1,172,633
		31.00.722	Spillway (concrete lined)	1.00 LS	823,616.16 /LS	36,801.34 /LS	900,593.42 /LS	/LS	1,761,010.92 /LS	1,761,011	2,746,841.31 /LS	2,746,841
		31.00.724	Prepare TRR Subgrade and Install Reservoir Liner	5,000,000.00 SF	0.18 /SF	0.09 /SF	0.60 /SF	/SF	0.87 /SF	4,335,985	1.36 /SF	6,820,045
		31.00.726	Construct GCID Canal Plug	57,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	781,618	20.88 /CY	1,190,195
		31.00.728	Construct Check Structure #1	6,433.00 SF	41.36 /SF	3.31 /SF	64.59 /SF	4.70 /SF	113.96 /SF	733,075	182.28 /SF	1,172,633
			07.01 TRR East Reservoir	140.00 AC	61,587.68 /AC	82,641.07 /AC	39,874.26 /AC	555,790.00 /AC	739,893.01 /AC	103,585,021	1,130,112.04 /AC	158,215,686
			07 TRR East	1.00 LS	8,622,275.20 /LS	11,569,749.07 /LS	5,582,397.00 /LS	77,810,600.00 /LS	103,585,021.27 /LS	103,585,021	158,215,685.98 /LS	158,215,686

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	13,153,157		105,525.200 hrs	
Material	8,957,720			
Allowance	118,484,718			
Equipment	17,620,091		75,746.945 hrs	
Other				
Total Construction Cost	**158,215,686**	**158,215,686**		
Non-Contract Costs	26,896,667			17.000 %
Total Project Costs	**26,896,667**	**185,112,353**		

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
07						TRR East									
	07.01					TRR East Reservoir									
		01.00.700				TRR East Reservoir, Dewatering/Erosion Controls/Dust Abatement									
			01.0			General Requirements									
				01.01		Construction Operations									
					01.01.05.00	General Conditions, Other									
						Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement Allowance	24.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	-	60,000.00 /MO	1,440,000	92,451.44 /MO	2,218,835
						01.01.05.00 General Conditions, Other	24.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,451.44 /MO	2,218,835
						01.01 Construction Operations	24.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,451.44 /MO	2,218,835
						01.0 General Requirements	24.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,451.44 /MO	2,218,835
						01.00.700 TRR East Reservoir, Dewatering/Erosion Controls/Dust Abatement	24.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,451.44 /MO	2,218,835
		31.00.700				Construct Haul Roads									
			32.0			Exterior Improvements									
				32.12		Paving									
					32.40.04.00	Site Improvements, Access Roads, Gravel									
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	3,767.00 SY	0.62 /SY	0.35 /SY	-	-	0.98 /SY	3,671	1.48 /SY	5,590
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	844.00 cy	1.68 /cy	4.63 /cy	-	-	6.31 /cy	5,324	9.61 /cy	8,107
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	422.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	6,767	24.42 /cy	10,304
						Load excavated spoils	422.00 cy	0.77 /cy	0.84 /cy		-	1.62 /cy	682	2.46 /cy	1,039
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,18"deep	3,767.00 sy	1.34 /sy	1.31 /sy	20.00 /sy	-	22.64 /sy	85,290	35.93 /sy	135,336
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	3,767.00 sy	0.57 /sy	0.41 /sy	-	-	0.98 /sy	3,673	1.48 /sy	5,593
						32.40.04.00 Site Improvements, Access Roads, Gravel	3,767.00 SY	3.80 /SY	4.19 /SY	20.00 /SY	/SY	27.98 /SY	105,408	44.06 /SY	165,970
						32.12 Paving	3,767.00 SY	3.80 /SY	4.19 /SY	20.00 /SY	/SY	27.98 /SY	105,408	44.06 /SY	165,970
						32.0 Exterior Improvements	1.00 LS	14,295.48 /LS	15,772.25 /LS	75,340.00 /LS	/LS	105,407.73 /LS	105,408	165,969.92 /LS	165,970
						31.00.700 Construct Haul Roads	3,767.00 SY	3.80 /SY	4.19 /SY	20.00 /SY	/SY	27.98 /SY	105,408	44.06 /SY	165,970
		31.00.702				Construct Bridge									
			34.0			Transportation									
				34.00		Transportation									
					32.50.04.00	Site Improvements, Prefabricated Bridges									
						Construct GCID Canal Bridge, Complete	3,600.00 SF		-		85.00 /SF	85.00 /SF	306,000	129.43 /SF	465,956
						32.50.04.00 Site Improvements, Prefabricated Bridges	3,600.00 SF	/SF	/SF	/SF	85.00 /SF	85.00 /SF	306,000	129.43 /SF	465,956
						34.00 Transportation	3,600.00 SF	/SF	/SF	/SF	85.00 /SF	85.00 /SF	306,000	129.43 /SF	465,956
						34.0 Transportation	3,600.00 SF	/SF	/SF	/SF	85.00 /SF	85.00 /SF	306,000	129.43 /SF	465,956
						31.00.702 Construct Bridge	3,600.00 SF	/SF	/SF	/SF	85.00 /SF	85.00 /SF	306,000	129.43 /SF	465,956
		31.00.704				Set up silos, generator, and batch plant within TRR-E footprint									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.10.00	Earthworks, Sitework, Soil Treatment									
						Set up silos, generator, and batch plant within TRR-E footprint, Assumes multiple soil mixing rigs	1.00 LS		-		554,000.00 /LS	554,000.00 /LS	554,000	843,593.72 /LS	843,594
						31.20.10.00 Earthworks, Sitework, Soil Treatment	0.00	/CY	/CY	/CY	/CY	/CY	554,000	/CY	843,594
						31.22 Earthworks, Site	0.00	/CY	/CY	/CY	/CY	/CY	554,000	/CY	843,594
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	554,000	/CY	843,594
						31.00.704 Set up silos, generator, and batch plant within TRR-E footprint	1.00 LS	/LS	/LS	/LS	554,000.00 /LS	554,000.00 /LS	554,000	843,593.72 /LS	843,594
		31.00.706				Install CDSM using auger rigs									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.10.00	Earthworks, Sitework, Soil Treatment									
						Install CDSM using auger rigs, Complete	900,000.00 CY				85.40 /CY	85.40 /CY	76,860,000	130.04 /CY	117,037,208
						31.20.10.00 Earthworks, Sitework, Soil Treatment	900,000.00 CY	/CY	/CY	/CY	85.40 /CY	85.40 /CY	76,860,000	130.04 /CY	117,037,208
						31.22 Earthworks, Site	900,000.00 CY	/CY	/CY	/CY	85.40 /CY	85.40 /CY	76,860,000	130.04 /CY	117,037,208
						31.0 Earthwork	900,000.00 CY	/CY	/CY	/CY	85.40 /CY	85.40 /CY	76,860,000	130.04 /CY	117,037,208
						31.00.706 Install CDSM using auger rigs	900,000.00 CY	/CY	/CY	/CY	85.40 /CY	85.40 /CY	76,860,000	130.04 /CY	117,037,208
		31.00.708				Manage CDSM spoil									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees									
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	15,000.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	240,531	24.42 /cy	366,264
						Load excavated spoils	100,000.00 CY	0.62 /CY	0.68 /CY		-	1.29 /CY	129,359	1.97 /CY	196,979
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	85,000.00 cy	1.18 /cy	4.23 /cy	-	-	5.40 /cy	459,169	8.23 /cy	699,191
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	100,000.00 CY	2.70 /CY	5.59 /CY	/CY	/CY	8.29 /CY	829,058	12.62 /CY	1,262,434
						31.22 Earthworks, Site	100,000.00 CY	2.70 /CY	5.59 /CY	/CY	/CY	8.29 /CY	829,058	12.62 /CY	1,262,434
						31.0 Earthwork	100,000.00 CY	2.70 /CY	5.59 /CY	/CY	/CY	8.29 /CY	829,058	12.62 /CY	1,262,434
						31.00.708 Manage CDSM spoil	100,000.00 CY	2.70 /CY	5.59 /CY	/CY	/CY	8.29 /CY	829,058	12.62 /CY	1,262,434
		31.00.710				Excavate upper 2 ft in reservoir area to remove deleterious materials									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure									
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	450,000.00 CY	0.65 /CY	1.77 /CY	-	-	2.42 /CY	1,086,884	3.68 /CY	1,655,034
						Grading area w/dozer	333,333.34 sy	0.58 /sy	0.82 /sy	-	-	1.40 /sy	466,594	2.13 /sy	710,498
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	68,000.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	1,090,406	24.42 /cy	1,660,396
						Load excavated spoils	450,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	582,116	1.97 /cy	886,406
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 2 mile,25 mph,exclds loadng eqpmnt	382,000.00 lcy	1.18 /lcy	4.23 /lcy	-	-	5.40 /lcy	2,063,558	8.23 /lcy	3,142,246
						31.20.07.10 Earthworks, Sitework, Excavating Bulk Measure	450,000.00 CY	3.78 /CY	7.97 /CY	/CY	/CY	11.76 /CY	5,289,557	17.90 /CY	8,054,580
						31.22 Earthworks, Site	450,000.00 CY	3.78 /CY	7.97 /CY	/CY	/CY	11.76 /CY	5,289,557	17.90 /CY	8,054,580
						31.0 Earthwork	450,000.00 CY	3.78 /CY	7.97 /CY	/CY	/CY	11.76 /CY	5,289,557	17.90 /CY	8,054,580
						31.00.710 Excavate upper 2 ft in reservoir area to remove deleterious materials	450,000.00 CY	3.78 /CY	7.97 /CY	/CY	/CY	11.76 /CY	5,289,557	17.90 /CY	8,054,580
		31.00.712				Base Grades - approach channel (concrete lined)									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure									
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	96,000.00 CY	0.65 /CY	1.77 /CY	-	-	2.42 /CY	231,869	3.68 /CY	353,074
						Load excavated spoils	96,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	124,185	1.97 /cy	189,100
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 2 mile,25 mph,exclds loadng eqpmnt	96,000.00 lcy	1.18 /lcy	4.23 /lcy	-	-	5.40 /lcy	518,590	8.23 /lcy	789,674
						31.20.07.10 Earthworks, Sitework, Excavating Bulk Measure	96,000.00 CY	2.44 /CY	6.67 /CY	/CY	/CY	9.11 /CY	874,644	13.87 /CY	1,331,848

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						31.22 Earthworks, Site	96,000.00 CY	2.44 /CY	6.67 /CY	/CY	/CY	9.11 /CY	874,644	13.87 /CY	1,331,848
						31.0 Earthwork	96,000.00 CY	2.44 /CY	6.67 /CY	/CY	/CY	9.11 /CY	874,644	13.87 /CY	1,331,848
						31.00.712 Base Grades - approach channel (concrete lined)	96,000.00 CY	2.44 /CY	6.67 /CY	/CY	/CY	9.11 /CY	874,644	13.87 /CY	1,331,848
		31.00.714				Base Grades - reservoir bottom grades									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.09.10	Earthworks, Sitework, Backfill									
						Fill, native fill, compacted, 12" deep	210,000.00 cy	4.08 /cy	2.27 /cy		-	6.35 /cy	1,333,621	9.67 /cy	2,030,747
						Load excavated spoils	210,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	271,654	1.97 /cy	413,656
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 2 mile,25 mph,exclds loadng eqpmnt	210,000.00 CY	1.18 /CY	4.23 /CY	-	-	5.40 /CY	1,134,417	8.23 /CY	1,727,413
						Compaction, water for, 3000 gallon truck, 3 mile haul	210,000.00 cy	0.65 /cy	0.44 /cy	0.00 /cy	-	1.09 /cy	229,473	1.66 /cy	349,426
						31.20.09.10 Earthworks, Sitework, Backfill	210,000.00 CY	6.53 /CY	7.61 /CY	/CY	/CY	14.14 /CY	2,969,164	21.53 /CY	4,521,242
						31.22 Earthworks, Site	210,000.00 CY	6.53 /CY	7.61 /CY	/CY	/CY	14.14 /CY	2,969,164	21.53 /CY	4,521,242
						31.0 Earthwork	210,000.00 CY	6.53 /CY	7.61 /CY	/CY	/CY	14.14 /CY	2,969,164	21.53 /CY	4,521,242
						31.00.714 Base Grades - reservoir bottom grades	210,000.00 CY	6.53 /CY	7.61 /CY	/CY	/CY	14.14 /CY	2,969,164	21.53 /CY	4,521,242
		31.00.716				Construct Embankment									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.09.40	Earthworks, Sitework, Embankments/Berms									
						Construct cofferdam embankment w/200 HP dozer	385,000.00 CY	1.35 /CY	1.90 /CY	-	-	3.25 /CY	1,251,525	4.95 /CY	1,905,737
						Load excavated spoils	385,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	498,032	1.97 /cy	758,370
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	385,000.00 cy	1.18 /cy	4.23 /cy	-	-	5.40 /cy	2,079,764	8.23 /cy	3,166,923
						Compaction, water for, 3000 gallon truck, 3 mile haul	385,000.00 cy	0.65 /cy	0.44 /cy		-	1.09 /cy	420,700	1.66 /cy	640,614
						Compaction, structural, common fill, 8" lifts, sheepsfoot	385,000.00 cy	0.74 /cy	1.09 /cy	-	-	1.83 /cy	703,649	2.78 /cy	1,071,469
						Cut & finish cofferdam top/sideslopes w/dozer	181,720.00 sy	0.74 /sy	1.05 /sy	-	-	1.79 /sy	325,682	2.73 /sy	495,926
						31.20.09.40 Earthworks, Sitework, Embankments/Berms	385,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	5,279,351	20.88 /CY	8,039,039
						31.22 Earthworks, Site	385,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	5,279,351	20.88 /CY	8,039,039
						31.0 Earthwork	385,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	5,279,351	20.88 /CY	8,039,039
						31.00.716 Construct Embankment	385,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	5,279,351	20.88 /CY	8,039,039
		31.00.718				Construct Check Structures #2									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.07	Cast-In-Place Concrete, Slabs on Grade, 7" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	400.00 lf	5.07 /lf	-	0.33 /lf	-	5.40 /lf	2,161	8.25 /lf	3,301
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.00 ton	1,370.95 /ton	-	1,200.00 /ton	-	2,570.95 /ton	10,284	4,001.86 /ton	16,007
						Reinforcing in place, unloading & sorting, add to above - slabs	4.00 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	223	84.83 /ton	339
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	56.00 cy	-	-	131.00 /cy	-	131.00 /cy	7,336	208.98 /cy	11,703
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	54.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	1,566	44.16 /CY	2,385
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,496.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	2,338	1.43 /sf	3,560
						Curing, sprayed membrane curing compound	24.96 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	575	36.00 /csf	899
						Fine grading, fine grade for slab on grade, machine	277.33 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	520	2.85 /sy	792
						03.10.05.07 Cast-In-Place Concrete, Slabs on Grade, 7" thick	54.00 CY	219.33 /CY	10.75 /CY	232.94 /CY	/CY	463.02 /CY	25,003	721.94 /CY	38,985
					03.10.05.16	Cast-In-Place Concrete, Slabs on Grade, 16" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	440.00 sfca	8.32 /sfca	-	0.97 /sfca	-	9.29 /sfca	4,086	14.21 /sfca	6,253
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	27.20 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	69,930	4,001.86 /ton	108,851
						Reinforcing in place, unloading & sorting, add to above - slabs	27.20 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	1,515	84.82 /ton	2,307
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	27.20 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	1,647	92.20 /ton	2,508
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	373.00 cy	-	-	131.00 /cy	-	131.00 /cy	48,863	208.98 /cy	77,948
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	362.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	10,498	44.16 /CY	15,986
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,433.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	6,026	1.43 /sf	9,175
						Curing, sprayed membrane curing compound	64.33 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	1,483	36.00 /csf	2,316
						Fine grading, fine grade for slab on grade, machine	714.78 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	1,340	2.85 /sy	2,040
						03.10.05.16 Cast-In-Place Concrete, Slabs on Grade, 16" thick	362.00 CY	164.71 /CY	8.38 /CY	228.54 /CY	/CY	401.62 /CY	145,387	628.13 /CY	227,384
						03.18 Cast-In-Place Concrete, Slabs on Grade	416.00 CY	171.80 /CY	8.69 /CY	229.11 /CY	/CY	409.59 /CY	170,390	640.31 /CY	266,368
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick									
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	6,760.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	99,626	22.84 /sfca	154,375
						Form oil, coverage varies greatly, maximum, includes material only	18.00 gal		-	23.50 /gal	-	23.50 /gal	423	37.49 /gal	675
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	42,421	4,001.86 /ton	66,031
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	16.50 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	919	84.82 /ton	1,400
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	16.50 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	999	92.20 /ton	1,521
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	194.00 cy	-	-	131.00 /cy	-	131.00 /cy	25,414	208.98 /cy	40,541
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	188.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	8,405	68.08 /CY	12,799
						Concrete finishing, walls, includes breaking ties and patching voids	6,760.00 sf	0.98 /sf	-	0.04 /sf	-	1.02 /sf	6,890	1.56 /sf	10,512
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	188.00 CY	534.66 /CY	9.74 /CY	440.16 /CY	/CY	984.56 /CY	185,097	1,531.13 /CY	287,853
						03.20 Cast-In-Place Concrete, Straight Walls	188.00 CY	534.66 /CY	9.74 /CY	440.16 /CY	/CY	984.56 /CY	185,097	1,531.13 /CY	287,853
						03.0 Concrete Work	604.00 CY	284.74 /CY	9.02 /CY	294.80 /CY	/CY	588.56 /CY	355,487	917.59 /CY	554,221
			05.0			Metals									
				05.50		Metal Fabrications									
					05.50.02.50	Metals, Elevated Platforms, Complete									
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	88.00 lf	21.19 /lf	0.79 /lf	90.50 /lf	-	112.48 /lf	9,898	177.83 /lf	15,649
						Metal Grating Catwalk	315.00 SF				80.00 /SF	80.00 /SF	25,200	121.82 /SF	38,373
						Miscellaneous Consumables Allowance	1.00 ls		-		5,000.00 /ls	5,000.00 /ls	5,000	7,613.67 /ls	7,614
						05.50.02.50 Metals, Elevated Platforms, Complete	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						05.50 Metal Fabrications	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636
						05.0 Metals	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636
			26.0			Electrical Work									
				26.00		Electrical									
					26.00.99.00	Electrical, Other									
						Electrical Allowance	1.00 LS	26,377.28 /LS	2,800.00 /LS	50,000.00 /LS	-	79,177.28 /LS	79,177	143,985.12 /LS	143,985
						26.00.99.00 Electrical, Other	6,433.00 SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
						26.00 Electrical	6,433.00 SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
						26.0 Electrical Work	6,433.00 SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
			31.0			Earthwork									
				31.25		Earthworks, Structural									
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)									
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	275.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	50.50 /CY	13,888	79.44 /CY	21,845
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	275.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	50.50 /CY	13,888	79.44 /CY	21,845
					31.25.03.00	Earthworks, Structural, Backfill									
						Backfill, Native material	700.00 CY	6.18 /CY	1.69 /CY		-	7.87 /CY	5,510	11.99 /CY	8,390
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	700.00 cy	1.29 /cy	0.15 /cy	-	-	1.44 /cy	1,006	2.19 /cy	1,532
						Compaction, water for, 6000 gallon wagon, 6 mile haul	700.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	1.85 /cy	1,298	2.91 /cy	2,037
						31.25.03.00 Earthworks, Structural, Backfill	700.00 CY	7.83 /CY	2.14 /CY	1.20 /CY	/CY	11.16 /CY	7,814	17.08 /CY	11,959
						31.25 Earthworks, Structural	975.00 CY	9.78 /CY	1.75 /CY	10.73 /CY	/CY	22.26 /CY	21,701	34.67 /CY	33,804
						31.0 Earthwork	975.00 CY	9.78 /CY	1.75 /CY	10.73 /CY	/CY	22.26 /CY	21,701	34.67 /CY	33,804
			40.9			Instrumentation & Controls									
				40.90		Instrumentation & Controls									
					40.90.99.01	I&C, Other									
						I&C Allowance	1.00 LS	6,594.32 /LS	600.00 /LS	25,000.00 /LS	-	32,194.32 /LS	32,194	57,274.71 /LS	57,275
						40.90.99.01 I&C, Other	6,433.00 SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
						40.90 Instrumentation & Controls	6,433.00 SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
						40.9 Instrumentation & Controls	6,433.00 SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
			46.0			Water and Wastewater Equipment									
				40.55		Water Control Gates, Other Gates									
					40.30.06.01	Other Gates									
						Slide gates, hydraulic structures, steel, 72" x 72", incl. anchor bolts & grout	2.00 EA	8,217.34 /EA	2,042.34 /EA	15,000.00 /EA	-	25,259.67 /EA	50,519	39,551.21 /EA	79,102
						Langman gates, hydraulic structures, steel, 14'	3.00 EA	11,093.40 /EA	2,205.72 /EA	38,000.00 /EA	-	51,299.12 /EA	153,897	80,869.83 /EA	242,609
						40.30.06.01 Other Gates	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						40.55 Water Control Gates, Other Gates	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						46.0 Water and Wastewater Equipment	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						31.00.718 Construct Check Structures #2	6,433.00 SF	41.36 /SF	3.31 /SF	64.59 /SF	4.70 /SF	113.96 /SF	733,075	182.29 /SF	1,172,633
		31.00.720				Construct Check Structures #3									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.07	Cast-In-Place Concrete, Slabs on Grade, 7" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	400.00 lf	5.07 /lf	-	0.33 /lf	-	5.40 /lf	2,161	8.25 /lf	3,301
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.00 ton	1,370.95 /ton	-	1,200.00 /ton	-	2,570.95 /ton	10,284	4,001.86 /ton	16,007
						Reinforcing in place, unloading & sorting, add to above - slabs	4.00 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	223	84.83 /ton	339
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	56.00 cy	-	-	131.00 /cy	-	131.00 /cy	7,336	208.98 /cy	11,703
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	54.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	1,566	44.16 /CY	2,385
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,496.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	2,338	1.43 /sf	3,560
						Curing, sprayed membrane curing compound	24.96 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	575	36.00 /csf	899
						Fine grading, fine grade for slab on grade, machine	277.33 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	520	2.85 /sy	791
						03.10.05.07 Cast-In-Place Concrete, Slabs on Grade, 7" thick	54.00 CY	219.33 /CY	10.75 /CY	232.94 /CY	/CY	463.02 /CY	25,003	721.94 /CY	38,985
					03.10.05.16	Cast-In-Place Concrete, Slabs on Grade, 16" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	440.00 sfca	8.32 /sfca	-	0.97 /sfca	-	9.29 /sfca	4,086	14.21 /sfca	6,253
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	27.20 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	69,930	4,001.86 /ton	108,851
						Reinforcing in place, unloading & sorting, add to above - slabs	27.20 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	1,515	84.82 /ton	2,307
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	27.20 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	1,647	92.20 /ton	2,508
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	373.00 cy	-	-	131.00 /cy	-	131.00 /cy	48,863	208.98 /cy	77,948
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	362.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	10,498	44.16 /CY	15,986
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,433.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	6,026	1.43 /sf	9,175
						Curing, sprayed membrane curing compound	64.33 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	1,483	36.00 /csf	2,316
						Fine grading, fine grade for slab on grade, machine	714.78 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	1,340	2.85 /sy	2,040
						03.10.05.16 Cast-In-Place Concrete, Slabs on Grade, 16" thick	362.00 CY	164.71 /CY	8.38 /CY	228.54 /CY	/CY	401.62 /CY	145,387	628.13 /CY	227,384
						03.18 Cast-In-Place Concrete, Slabs on Grade	416.00 CY	171.80 /CY	8.69 /CY	229.11 /CY	/CY	409.59 /CY	170,390	640.31 /CY	266,368
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick									
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	6,760.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	99,626	22.84 /sfca	154,375
						Form oil, coverage varies greatly, maximum, includes material only	18.00 gal	-	-	23.50 /gal	-	23.50 /gal	423	37.49 /gal	675
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	42,421	4,001.86 /ton	66,031
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	16.50 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	919	84.82 /ton	1,400
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	16.50 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	999	92.20 /ton	1,521
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	194.00 cy	-	-	131.00 /cy	-	131.00 /cy	25,414	208.98 /cy	40,541
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	188.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	8,405	68.08 /CY	12,799
						Concrete finishing, walls, includes breaking ties and patching voids	6,760.00 sf	0.98 /sf	-	0.04 /sf	-	1.02 /sf	6,890	1.56 /sf	10,512
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	188.00 CY	534.66 /CY	9.74 /CY	440.16 /CY	/CY	984.56 /CY	185,097	1,531.13 /CY	287,853
						03.20 Cast-In-Place Concrete, Straight Walls	188.00 CY	534.66 /CY	9.74 /CY	440.16 /CY	/CY	984.56 /CY	185,097	1,531.13 /CY	287,853
						03.0 Concrete Work	604.00 CY	284.74 /CY	9.02 /CY	294.80 /CY	/CY	588.56 /CY	355,487	917.59 /CY	554,222
			05.0			Metals									
				05.50		Metal Fabrications									
					05.50.02.50	Metals, Elevated Platforms, Complete									

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					05.50.02.50	Metals, Elevated Platforms, Complete									
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	88.00 lf	21.19 /lf	0.79 /lf	90.50 /lf	-	112.48 /lf	9,898	177.83 /lf	15,649
						Metal Grating Catwalk	315.00 SF				80.00 /SF	80.00 /SF	25,200	121.82 /SF	38,373
						Miscellaneous Consumables Allowance	1.00 ls		-		5,000.00 /ls	5,000.00 /ls	5,000	7,613.67 /ls	7,614
						05.50.02.50 Metals, Elevated Platforms, Complete	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636
						05.50 Metal Fabrications	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636
						05.0 Metals	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636
			26.0			Electrical Work									
				26.00		Electrical									
					26.00.99.00	Electrical, Other									
						Electrical Allowance	1.00 LS	26,377.28 /LS	2,800.00 /LS	50,000.00 /LS	-	79,177.28 /LS	79,177	143,985.11 /LS	143,985
						26.00.99.00 Electrical, Other	**6,433.00** SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
						26.00 Electrical	**6,433.00** SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
						26.0 Electrical Work	**6,433.00** SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
			31.0			Earthwork									
				31.25		Earthworks, Structural									
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)									
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	275.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	50.50 /CY	13,888	79.44 /CY	21,845
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	275.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	50.50 /CY	13,888	79.44 /CY	21,845
					31.25.03.00	Earthworks, Structural, Backfill									
						Backfill, Native material	700.00 CY	6.18 /CY	1.69 /CY		-	7.87 /CY	5,510	11.99 /CY	8,390
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	700.00 cy	1.29 /cy	0.15 /cy	-	-	1.44 /cy	1,006	2.19 /cy	1,532
						Compaction, water for, 6000 gallon wagon, 6 mile haul	700.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	1.85 /cy	1,298	2.91 /cy	2,037
						31.25.03.00 Earthworks, Structural, Backfill	700.00 CY	7.83 /CY	2.14 /CY	1.20 /CY	/CY	11.16 /CY	7,814	17.08 /CY	11,959
						31.25 Earthworks, Structural	975.00 CY	9.78 /CY	1.75 /CY	10.73 /CY	/CY	22.26 /CY	21,701	34.67 /CY	33,804
						31.0 Earthwork	975.00 CY	9.78 /CY	1.75 /CY	10.73 /CY	/CY	22.26 /CY	21,701	34.67 /CY	33,804
			40.9			Instrumentation & Controls									
				40.90		Instrumentation & Controls									
					40.90.99.01	I&C, Other									
						I&C Allowance	1.00 LS	6,594.32 /LS	600.00 /LS	25,000.00 /LS	-	32,194.32 /LS	32,194	57,274.70 /LS	57,275
						40.90.99.01 I&C, Other	**6,433.00** SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
						40.90 Instrumentation & Controls	**6,433.00** SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
						40.9 Instrumentation & Controls	**6,433.00** SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
			46.0			Water and Wastewater Equipment									
				40.55		Water Control Gates, Other Gates									
					40.30.06.01	Other Gates									
						Slide gates, hydraulic structures, steel, 72" x 72", incl. anchor bolts & grout	2.00 EA	8,217.34 /EA	2,042.34 /EA	15,000.00 /EA	-	25,259.67 /EA	50,519	39,551.21 /EA	79,102
						Langman gates, hydraulic structures, steel, 14'	3.00 EA	11,093.40 /EA	2,205.72 /EA	38,000.00 /EA	-	51,299.12 /EA	153,897	80,869.83 /EA	242,609
						40.30.06.01 Other Gates	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						40.55 Water Control Gates, Other Gates	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						46.0 Water and Wastewater Equipment	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						31.00.720 Construct Check Structures #3	**6,433.00** SF	41.36 /SF	3.31 /SF	64.59 /SF	4.70 /SF	113.96 /SF	733,075	182.28 /SF	1,172,633
		31.00.722				Spillway (concrete lined)									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.12	Cast-In-Place Concrete, Slabs on Grade, 12" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,430.00 sfca	8.32 /sfca	-	0.97 /sfca	-	9.29 /sfca	13,280	14.21 /sfca	20,322
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	165.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	424,206	4,001.86 /ton	660,307
						Reinforcing in place, unloading & sorting, add to above - slabs	165.00 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	9,191	84.82 /ton	13,996
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	165.00 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	9,991	92.20 /ton	15,213
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	2,270.00 cy	-	-	131.00 /cy	-	131.00 /cy	297,370	208.98 /cy	474,374
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	2,200.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	63,802	44.16 /CY	97,153
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	53,960.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	50,542	1.43 /sf	76,963
						Curing, sprayed membrane curing compound	539.60 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	12,437	36.00 /csf	19,425
						Fine grading, fine grade for slab on grade, machine	5,995.56 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	11,237	2.85 /sy	17,111
						03.10.05.12 Cast-In-Place Concrete, Slabs on Grade, 12" thick	2,200.00 CY	167.56 /CY	9.07 /CY	228.85 /CY	/CY	405.48 /CY	892,056	634.03 /CY	1,394,864
						03.18 Cast-In-Place Concrete, Slabs on Grade	2,200.00 CY	167.56 /CY	9.07 /CY	228.85 /CY	/CY	405.48 /CY	892,056	634.03 /CY	1,394,864
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.99	Cast-In-Place Concrete, Straight Walls, Other									
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	27,120.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	399,682	22.84 /sfca	619,325
						Form oil, coverage varies greatly, maximum, includes material only	73.00 gal	-	-	23.50 /gal	-	23.50 /gal	1,716	37.49 /gal	2,737
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	59.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	151,686	4,001.86 /ton	236,110
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	59.00 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	3,287	84.82 /ton	5,005
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	59.00 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	3,572	92.20 /ton	5,440
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	690.00 cy	-	-	131.00 /cy	-	131.00 /cy	90,390	208.98 /cy	144,193
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	670.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	29,955	68.08 /CY	45,614
						Concrete finishing, walls, includes breaking ties and patching voids	27,120.00 sf	0.98 /sf	-	0.04 /sf	-	1.02 /sf	27,643	1.56 /sf	42,172
						03.10.06.99 Cast-In-Place Concrete, Straight Walls, Other	670.00 CY	581.50 /CY	9.75 /CY	465.37 /CY	/CY	1,056.61 /CY	707,931	1,642.68 /CY	1,100,595
						03.20 Cast-In-Place Concrete, Straight Walls	670.00 CY	581.50 /CY	9.75 /CY	465.37 /CY	/CY	1,056.61 /CY	707,931	1,642.68 /CY	1,100,595
						03.0 Concrete Work	2,870.00 CY	264.20 /CY	9.23 /CY	284.07 /CY	/CY	557.49 /CY	1,599,987	869.50 /CY	2,495,459
			31.0			Earthwork									
				31.25		Earthworks, Structural									
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)									
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	2,300.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	50.50 /CY	116,151	79.44 /CY	182,703
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	2,300.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	50.50 /CY	116,151	79.44 /CY	182,703
					31.25.03.00	Earthworks, Structural, Backfill									
						Backfill, Native material	4,020.00 CY	6.18 /CY	1.69 /CY		-	7.87 /CY	31,642	11.99 /CY	48,183
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	4,020.00 cy	1.29 /cy	0.15 /cy	-	-	1.44 /cy	5,779	2.19 /cy	8,800
						Compaction, water for, 6000 gallon wagon, 6 mile haul	4,020.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	1.85 /cy	7,452	2.91 /cy	11,697
						31.25.03.00 Earthworks, Structural, Backfill	4,020.00 CY	7.83 /CY	2.14 /CY	1.20 /CY	/CY	11.16 /CY	44,873	17.08 /CY	68,679
						31.25 Earthworks, Structural	6,320.00 CY	10.34 /CY	1.63 /CY	13.50 /CY	/CY	25.48 /CY	161,024	39.78 /CY	251,383
						31.0 Earthwork	6,320.00 CY	10.34 /CY	1.63 /CY	13.50 /CY	/CY	25.48 /CY	161,024	39.78 /CY	251,383
						31.00.722 Spillway (concrete lined)	**1.00** LS	823,616.16 /LS	36,801.34 /LS	900,593.42 /LS	/LS	1,761,010.92 /LS	1,761,011	2,746,841.31 /LS	2,746,841
		31.00.724				Prepare TRR Subgrade and Install Reservoir Liner									
			31.0			Earthwork									

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
				31.22		Earthworks, Site									
					31.30.02.00	Site Specialties, Pond and Reservoir Liners									
						Fine grading, lagoon bottoms, with grader	5,000.00 msf	77.56 /msf	44.26 /msf	-	-	121.83 /msf	609,130	185.51 /msf	927,542
						Pond and Reservoir Liners, membrane lining systems HDPE	5,000,000.00 sf	0.10 /sf	0.05 /sf	0.60 /sf	-	0.75 /sf	3,726,855	1.18 /sf	5,892,503
						31.30.02.00 Site Specialties, Pond and Reservoir Liners	555,555.56 SY	1.60 /SY	0.80 /SY	5.40 /SY	/SY	7.81 /SY	4,335,985	12.28 /SY	6,820,045
						31.22 Earthworks, Site	0.00	/CY	/CY	/CY	/CY	/CY	4,335,985	/CY	6,820,045
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	4,335,985	/CY	6,820,045
						31.00.724 Prepare TRR Subgrade and Install Reservoir Liner	5,000,000.00 SF	0.18 /SF	0.09 /SF	0.60 /SF	/SF	0.87 /SF	4,335,985	1.36 /SF	6,820,045
		31.00.726				Construct GCID Canal Plug									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.09.40	Earthworks, Sitework, Embankments/Berms									
						Construct cofferdam embankment w/200 HP dozer	57,000.00 CY	1.35 /CY	1.90 /CY	-	-	3.25 /CY	185,291	4.95 /CY	282,148
						Load excavated spoils	57,000.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	73,735	1.97 /cy	112,278
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	57,000.00 cy	1.18 /cy	4.23 /cy	-	-	5.40 /cy	307,913	8.23 /cy	468,869
						Compaction, water for, 3000 gallon truck, 3 mile haul	57,000.00 cy	0.65 /cy	0.44 /cy		-	1.09 /cy	62,285	1.66 /cy	94,844
						Compaction, structural, common fill, 8" lifts, sheepsfoot	57,000.00 cy	0.74 /cy	1.09 /cy	-	-	1.83 /cy	104,177	2.78 /cy	158,633
						Cut & finish cofferdam top/sideslopes w/dozer	26,904.00 sy	0.74 /sy	1.05 /sy	-	-	1.79 /sy	48,218	2.73 /sy	73,423
						31.20.09.40 Earthworks, Sitework, Embankments/Berms	57,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	781,618	20.88 /CY	1,190,195
						31.22 Earthworks, Site	57,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	781,618	20.88 /CY	1,190,195
						31.0 Earthwork	57,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	781,618	20.88 /CY	1,190,195
						31.00.726 Construct GCID Canal Plug	57,000.00 CY	4.88 /CY	8.83 /CY	/CY	/CY	13.71 /CY	781,618	20.88 /CY	1,190,195
		31.00.728				Construct Check Structure #1									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.07	Cast-In-Place Concrete, Slabs on Grade, 7" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	400.00 lf	5.07 /lf	-	0.33 /lf	-	5.40 /lf	2,161	8.25 /lf	3,301
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.00 ton	1,370.95 /ton	-	1,200.00 /ton	-	2,570.95 /ton	10,284	4,001.86 /ton	16,007
						Reinforcing in place, unloading & sorting, add to above - slabs	4.00 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	223	84.82 /ton	339
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	56.00 cy	-	-	131.00 /cy	-	131.00 /cy	7,336	208.98 /cy	11,703
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	54.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	1,566	44.16 /CY	2,385
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,496.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	2,338	1.43 /sf	3,560
						Curing, sprayed membrane curing compound	24.96 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	575	36.00 /csf	899
						Fine grading, fine grade for slab on grade, machine	277.33 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	520	2.85 /sy	792
						03.10.05.07 Cast-In-Place Concrete, Slabs on Grade, 7" thick	54.00 CY	219.33 /CY	10.75 /CY	232.94 /CY	/CY	463.02 /CY	25,003	721.94 /CY	38,985
					03.10.05.16	Cast-In-Place Concrete, Slabs on Grade, 16" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	440.00 sfca	8.32 /sfca	-	0.97 /sfca	-	9.29 /sfca	4,086	14.21 /sfca	6,253
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	27.20 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	69,930	4,001.86 /ton	108,851
						Reinforcing in place, unloading & sorting, add to above - slabs	27.20 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	1,515	84.82 /ton	2,307
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	27.20 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	1,647	92.20 /ton	2,508
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	373.00 cy	-	-	131.00 /cy	-	131.00 /cy	48,863	208.98 /cy	77,948
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	362.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	10,498	44.16 /CY	15,986
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,433.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	6,026	1.43 /sf	9,175
						Curing, sprayed membrane curing compound	64.33 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	1,483	36.00 /csf	2,316
						Fine grading, fine grade for slab on grade, machine	714.78 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	1,340	2.85 /sy	2,040
						03.10.05.16 Cast-In-Place Concrete, Slabs on Grade, 16" thick	362.00 CY	164.71 /CY	8.38 /CY	228.54 /CY	/CY	401.62 /CY	145,387	628.13 /CY	227,384
						03.18 Cast-In-Place Concrete, Slabs on Grade	416.00 CY	171.80 /CY	8.69 /CY	229.11 /CY	/CY	409.59 /CY	170,390	640.31 /CY	266,368
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick									
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	6,760.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	99,626	22.84 /sfca	154,375
						Form oil, coverage varies greatly, maximum, includes material only	18.00 gal	-	-	23.50 /gal	-	23.50 /gal	423	37.49 /gal	675
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	42,421	4,001.86 /ton	66,031
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	16.50 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	919	84.82 /ton	1,400
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	16.50 ton	53.49 /ton	7.06 /ton	-	-	60.55 /ton	999	92.20 /ton	1,521
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	194.00 cy	-	-	131.00 /cy	-	131.00 /cy	25,414	208.98 /cy	40,541
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	188.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	8,405	68.08 /CY	12,799
						Concrete finishing, walls, includes breaking ties and patching voids	6,760.00 sf	0.98 /sf	-	0.04 /sf	-	1.02 /sf	6,890	1.56 /sf	10,512
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	188.00 CY	534.66 /CY	9.74 /CY	440.16 /CY	/CY	984.56 /CY	185,097	1,531.13 /CY	287,853
						03.20 Cast-In-Place Concrete, Straight Walls	188.00 CY	534.66 /CY	9.74 /CY	440.16 /CY	/CY	984.56 /CY	185,097	1,531.13 /CY	287,853
						03.0 Concrete Work	604.00 CY	284.74 /CY	9.02 /CY	294.80 /CY	/CY	588.56 /CY	355,487	917.59 /CY	554,221
			05.0			Metals									
				05.50		Metal Fabrications									
					05.50.02.50	Metals, Elevated Platforms, Complete									
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	88.00 lf	21.19 /lf	0.79 /lf	90.50 /lf	-	112.48 /lf	9,898	177.83 /lf	15,649
						Metal Grating Catwalk	315.00 SF				80.00 /SF	80.00 /SF	25,200	121.82 /SF	38,373
						Miscellaneous Consumables Allowance	1.00 ls	0.00 /ls	-	0.00 /ls	5,000.00 /ls	5,000.00 /ls	5,000	7,613.66 /ls	7,614
						05.50.02.50 Metals, Elevated Platforms, Complete	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636
						05.50 Metal Fabrications	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636
						05.0 Metals	315.00 SF	5.92 /SF	0.22 /SF	25.28 /SF	95.87 /SF	127.30 /SF	40,098	195.67 /SF	61,636
			26.0			Electrical Work									
				26.00		Electrical									
					26.00.99.00	Electrical, Other									
						Electrical Allowance	1.00 LS	26,377.28 /LS	2,800.00 /LS	50,000.00 /LS	-	79,177.28 /LS	79,177	143,985.14 /LS	143,985
						26.00.99.00 Electrical, Other	6,433.00 SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
						26.00 Electrical	6,433.00 SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
						26.0 Electrical Work	6,433.00 SF	4.10 /SF	0.44 /SF	7.77 /SF	/SF	12.31 /SF	79,177	22.38 /SF	143,985
			31.0			Earthwork									

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
				31.25		Earthworks, Structural									
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)									
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	275.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	50.50 /CY	13,888	79.44 /CY	21,845
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	275.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	50.50 /CY	13,888	79.44 /CY	21,845
					31.25.03.00	Earthworks, Structural, Backfill									
						Backfill, Native material	700.00 CY	6.18 /CY	1.69 /CY		-	7.87 /CY	5,510	11.99 /CY	8,390
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	700.00 cy	1.29 /cy	0.15 /cy	-	-	1.44 /cy	1,006	2.19 /cy	1,532
						Compaction, water for, 6000 gallon wagon, 6 mile haul	700.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	1.85 /cy	1,298	2.91 /cy	2,037
						31.25.03.00 Earthworks, Structural, Backfill	700.00 CY	7.83 /CY	2.14 /CY	1.20 /CY	/CY	11.16 /CY	7,814	17.08 /CY	11,959
						31.25 Earthworks, Structural	975.00 CY	9.78 /CY	1.75 /CY	10.73 /CY	/CY	22.26 /CY	21,701	34.67 /CY	33,804
						31.0 Earthwork	975.00 CY	9.78 /CY	1.75 /CY	10.73 /CY	/CY	22.26 /CY	21,701	34.67 /CY	33,804
			40.9			Instrumentation & Controls									
				40.90		Instrumentation & Controls									
					40.90.99.01	I&C, Other									
						I&C Allowance	1.00 LS	6,594.32 /LS	600.00 /LS	25,000.00 /LS	-	32,194.32 /LS	32,194	57,274.69 /LS	57,275
						40.90.99.01 I&C, Other	6,433.00 SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
						40.90 Instrumentation & Controls	6,433.00 SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
						40.9 Instrumentation & Controls	6,433.00 SF	1.03 /SF	0.09 /SF	3.89 /SF	/SF	5.01 /SF	32,194	8.90 /SF	57,275
			46.0			Water and Wastewater Equipment									
				40.55		Water Control Gates, Other Gates									
					40.30.06.01	Other Gates									
						Slide gates, hydraulic structures, steel, 72" x 72", incl. anchor bolts & grout	2.00 EA	8,217.34 /EA	2,042.34 /EA	15,000.00 /EA	-	25,259.67 /EA	50,519	39,551.21 /EA	79,102
						Langman gates, hydraulic structures, steel, 14'	3.00 EA	11,093.40 /EA	2,205.72 /EA	38,000.00 /EA	-	51,299.12 /EA	153,897	80,869.83 /EA	242,609
						40.30.06.01 Other Gates	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						40.55 Water Control Gates, Other Gates	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						46.0 Water and Wastewater Equipment	5.00 EA	9,942.97 /EA	2,140.37 /EA	28,800.00 /EA	/EA	40,883.34 /EA	204,417	64,342.38 /EA	321,712
						31.00.728 Construct Check Structure #1	6,433.00 SF	41.36 /SF	3.31 /SF	64.59 /SF	4.70 /SF	113.96 /SF	733,075	182.28 /SF	1,172,633
						07.01 TRR East Reservoir	140.00 AC	61,587.68 /AC	82,641.07 /AC	39,874.26 /AC	555,790.00 /AC	739,893.01 /AC	103,585,021	1,130,112.04 /AC	158,215,686
						07 TRR East	**1.00 LS**	**8,622,275.20 /LS**	**11,569,749.07 /LS**	**5,582,397.00 /LS**	**77,810,600.00 /LS**	**103,585,021.27 /LS**	**103,585,021**	**158,215,685.98 /LS**	**158,215,686**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	8,622,275		105,525.200 hrs	
Material	5,582,397			
Allowance	77,810,600			
Equipment	11,569,749		75,746.945 hrs	
Other				
Subtotal Direct Costs	**103,585,021**	**103,585,021**		
Material Sales Tax, Dunnigan Ca	404,724			7.250 %
Subtotal W/ Sales Tax	**404,724**	**103,989,745**		
Electrical Work I,OH&P	59,383			25.000 %
Instruments & Controls I,OH&P	19,317			20.000 %
Subtotal W/ Subcontractor OH&P	**78,700**	**104,068,445**		
General Conditions	5,203,422			5.000 %
Subtotal W/ General Conditions	**5,203,422**	**109,271,867**		
Mobilization/Demobilization	3,278,156			3.000 %
Prime Contractor Overhead	11,255,002			10.000 %
Prime Contractor Profit	7,428,302			6.000 %
Bonds & Insurance	2,847,763			2.170 %
Subtotal W/ Prime Markups	**24,809,223**	**134,081,090**		
Contractor Contingency	4,022,433			3.000 %
Design Contingency	20,112,163			15.000 %
Subtotal W/ Contingency	**24,134,596**	**158,215,686**		
Total Construction Cost		**158,215,686**		
Non-Contract Costs	26,896,667			17.000 %
Total Project Costs	**26,896,667**	**185,112,353**		

TRR East PGP

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 TRR PGP Rev 3
Project Number: D3380602
Design Stage: Feasibilty

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
04			***Terminal Regulating Reservoir (TRR) PGP***										
	04.01		**Terminal Regulating Reservoir (TRR) PGP**										
		03.00.300	Funk PGP Foundation Slab	5,332.00 CY	155.81 /CY	7.33 /CY	232.33 /CY	/CY	/CY	395.47 /CY	2,108,622	643.20 /CY	3,429,561
		03.00.402	TRR PGP Concrete Walls, Perimeter	2,094.00 CY	299.31 /CY	9.70 /CY	309.96 /CY	/CY	/CY	618.96 /CY	1,296,110	1,002.82 /CY	2,099,905
		03.00.404	TRR PGP Concrete Walls, Pier Walls	4,480.00 CY	349.91 /CY	9.74 /CY	338.58 /CY	/CY	/CY	698.22 /CY	3,128,034	1,130.43 /CY	5,064,322
		03.00.406	TRR PGP Elevated Slab	3,400.00 CY	243.35 /CY	7.71 /CY	243.54 /CY	/CY	/CY	494.60 /CY	1,681,625	801.02 /CY	2,723,482
		03.00.408	TRR PGP Slab on Grade @ El 130.00	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
		05.00.400	TRR PGP, Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	33,729.80 /LS	2,600.00 /LS	19,500.00 /LS	/LS	/LS	55,829.80 /LS	55,830	103,797.48 /LS	103,797
		40.00.400	TRR PGP, Process Piping	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
		44.40.400	TRR PGP, Furnish and Install Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	1,128,963.54 /EA	1,149,650.90 /EA	14,945,462	1,161,901.14 /EA	15,104,715
			04.01 Terminal Regulating Reservoir (TRR) PGP	35,990.00 SF	126.35 /SF	7.30 /SF	183.69 /SF	26.52 /SF	407.80 /SF	751.65 /SF	27,052,030	971.00 /SF	34,946,227
	04.02		**Terminal Regulating Reservoir Turbine Buildings**										
		03.00.416	TRR PGP Turbine Buildings Foundation Slab	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
		03.00.418	TRR PGP Turbine Buildings Concrete Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
		03.00.420	TRR PGP Turbine Buildings Elevated Slab	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
		04.00.400	TRR PGP Turbine Buildings Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
		05.00.402	TRR PGP Turbine Building, Metals	2.00 LS	14,950.80 /LS	4,072.24 /LS	43,590.00 /LS	30,000.00 /LS	/LS	92,613.04 /LS	185,226	168,368.48 /LS	336,737
		08.00.400	TRR PGP Turbine Building, Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
		23.00.400	TRR PGP Turbine Building, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
		26.00.000	Hydopower Generators	2.00 EA	108,531.52 /EA	10,912.00 /EA	150,000.00 /EA	/EA	3,600,000.00 /EA	3,869,443.52 /EA	7,738,887	4,104,995.23 /EA	8,209,990
		26.05.GRDG	Facility Grounding	3,250.00 SF	2.22 /SF	0.10 /SF	1.10 /SF	/SF	/SF	3.41 /SF	11,082	6.33 /SF	20,582
		26.12.SEC	Subfeed from Elec Building	600.00 LF	41.92 /LF	4.18 /LF	24.95 /LF	/LF	/LF	71.05 /LF	42,629	128.85 /LF	77,312
		26.20.DIST	Electrical Distribution Equipment	450.00 AMP	46.44 /AMP	0.79 /AMP	49.26 /AMP	/AMP	/AMP	96.49 /AMP	43,422	180.52 /AMP	81,236
		26.25.LTG	Interior Lighting and Control	1.00 LS	15,144.99 /LS	/LS	6,724.85 /LS	/LS	/LS	21,869.84 /LS	21,870	40,593.63 /LS	40,594
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	1,713.08 /LS	/LS	143.26 /LS	/LS	/LS	1,856.34 /LS	1,856	3,414.66 /LS	3,415
		26.30.DEV	Device Outlets	1.00 LS	10,060.56 /LS	/LS	6,095.20 /LS	/LS	/LS	16,155.76 /LS	16,156	30,069.22 /LS	30,069
		26.40.EQCON	Facility Equipment Connections and Controls	1.00 ALO	25,946.13 /ALO	3,000.00 /ALO	10,000.00 /ALO	/ALO	/ALO	38,946.13 /ALO	38,946	72,146.53 /ALO	72,147
		26.40.HYDTURB	13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A	600.00 LF	380.99 /LF	7.83 /LF	154.39 /LF	2.67 /LF	/LF	545.88 /LF	327,529	1,006.48 /LF	603,891
		26.41.HYDTURB	Hyd Turbine Controls Circuits	600.00 LF	164.55 /LF	7.83 /LF	29.81 /LF	/LF	/LF	202.19 /LF	121,314	367.17 /LF	220,303
		26.90.LPS	Facility Lightning Protection System	3,250.00 SF	1.44 /SF	/SF	0.78 /SF	0.46 /SF	/SF	2.68 /SF	8,702	4.97 /SF	16,142
		27.30.COMCDT	Comm Conduit to Admin	1,200.00 LF	28.15 /LF	8.36 /LF	11.74 /LF	/LF	/LF	48.25 /LF	57,904	84.06 /LF	100,871
		28.20.AC	Access Control System	2.00 DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	/DOOR	2,356.77 /DOOR	4,714	3,790.80 /DOOR	7,582
		28.20.CCTV	Closed Circuit TV and Cameras	2.00 CAM	1,701.66 /CAM	/CAM	1,730.00 /CAM	500.00 /CAM	/CAM	3,931.66 /CAM	7,863	6,732.32 /CAM	13,465
		28.20.ID	Intrusion Detection System	2.00 DOOR	2,918.94 /DOOR	/DOOR	2,000.00 /DOOR	250.00 /DOOR	/DOOR	5,168.94 /DOOR	10,338	8,331.85 /DOOR	16,664
		40.00.404	TRR PGP Turbine Building, Process Piping	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
			04.02 Terminal Regulating Reservoir Turbine Buildings	2.00 EA	949,646.57 /EA	56,945.15 /EA	1,071,136.83 /EA	64,800.00 /EA	3,600,000.00 /EA	5,742,528.56 /EA	11,485,057	7,249,460.14 /EA	14,498,920
	04.03		**TRR Reservoir Energy Dissipation Valve Structures**										
		03.00.410	TRR PGP Energy Dissipation Structures Foundation Slab	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
		03.00.412	TRR PGP Energy Dissipation Structures Concrete Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,039.07 /CY	861,391
		03.00.414	TRR PGP Energy Dissipation Structures Elevated Deck	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
		40.00.402	TRR PGP Energy Dissipation Structures Piping	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
			04.03 TRR Reservoir Energy Dissipation Valve Structures	2.00 EA	246,476.70 /EA	12,866.61 /EA	312,861.40 /EA	/EA	/EA	572,204.70 /EA	1,144,409	928,971.47 /EA	1,857,943
	04.04		**TRR Reservoir Electrical Building**										
		04.00.402	TRR PGP Electrical Building, Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
		05.00.404	TRR PGP Electrical Building, Metal Roof Framing	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
		07.00.400	TRR PGP Electrical Building, Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
		08.00.402	TRR PGP Electrical Building, Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,851.19 /EA	97,024
		21.00.400	TRR PGP Electrical Building, Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
		23.00.402	TRR PGP Electrical Building, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
		26.02.PRI	Primary Feeds fromSubstation	2,180.00 LF	376.38 /LF	26.06 /LF	295.94 /LF	2.20 /LF	/LF	700.58 /LF	1,527,268	1,286.35 /LF	2,804,250
		26.03.MVSWGR	MV SWGR	30,800.00 FA	3.58 /FA	0.69 /FA	50.13 /FA	/FA	/FA	54.40 /FA	1,675,521	103.40 /FA	3,184,602
		26.03.SWGREQ	Station Aux Xfmr, Btty	1.00 LS	54,187.72 /LS	5,931.53 /LS	160,200.00 /LS	/LS	/LS	220,319.25 /LS	220,319	415,647.95 /LS	415,648
		26.04.MVBUS	Medium Voltage Overhead Bus Duct 2000A	540.00 LF	429.87 /LF	1.85 /LF	1,642.50 /LF	4.82 /LF	/LF	2,079.03 /LF	1,122,677	3,931.72 /LF	2,123,131
		26.04.MVVSD	Medium Voltage Variable Speed Drives	13.00 EA	12,973.07 /EA	3,250.00 /EA	420,200.00 /EA	5,000.00 /EA	/EA	441,423.07 /EA	5,738,500	839,970.19 /EA	10,919,613
		26.05.GRDG	Facility Grounding	14,550.00 SF	3.48 /SF	/SF	1.30 /SF	/SF	/SF	4.79 /SF	69,618	8.87 /SF	129,042
		26.20.DIST	Electrical Distribution Equipment	550.00 AMP	36.16 /AMP	0.65 /AMP	38.29 /AMP	/AMP	/AMP	75.10 /AMP	41,306	140.50 /AMP	77,278
		26.25.LTG	Interior Lighting and Control	1.00 LS	86,265.47 /LS	/LS	38,029.50 /LS	/LS	/LS	124,294.97 /LS	124,295	230,696.06 /LS	230,696
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	6,300.47 /LS	/LS	588.58 /LS	/LS	/LS	6,889.05 /LS	6,889	12,676.17 /LS	12,676
		26.30.DEV	Device Outlets	1.00 LS	53,247.76 /LS	/LS	19,053.60 /LS	/LS	/LS	72,301.36 /LS	72,301	133,971.57 /LS	133,972
		26.40.EQCON	Facility Equipment Connections and Controls	1.00 ALO	8,282.95 /ALO	/ALO	4,925.85 /ALO	/ALO	/ALO	13,208.80 /ALO	13,209	24,580.13 /ALO	24,580
		26.40.PMP	13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A	780.00 LF	145.29 /LF	1.28 /LF	115.46 /LF	3.33 /LF	/LF	265.37 /LF	206,985	495.01 /LF	386,109
		26.41.PMP	8000HP Pump Process Control Circuits and Connections	780.00 LF	43.96 /LF	/LF	12.06 /LF	/LF	/LF	56.02 /LF	43,697	103.61 /LF	80,815
		26.90.LPS	Facility Lightning Protection System	14,550.00 SF	1.27 /SF	0.03 /SF	0.85 /SF	0.34 /SF	/SF	2.49 /SF	36,201	4.62 /SF	67,283
		27.10.COMEQ	Communications Room Equipment	1.00 LS	28,011.60 /LS	/LS	21,023.71 /LS	/LS	/LS	49,035.31 /LS	49,035	91,447.85 /LS	91,448
		27.31.COMCDT	Comm Conduit to MH/HH	200.00 LF	224.65 /LF	28.56 /LF	52.68 /LF	/LF	/LF	305.89 /LF	61,178	553.24 /LF	110,648
		28.10.FA	Fire Alarm System	14,550.00 SF	3.58 /SF	/SF	1.41 /SF	0.17 /SF	/SF	5.16 /SF	75,070	9.09 /SF	132,312
		28.20.AC	Access Control System	12.00 DOOR	908.12 /DOOR	/DOOR	466.67 /DOOR	/DOOR	/DOOR	1,374.78 /DOOR	16,497	2,211.29 /DOOR	26,535
		28.20.CCTV	Closed Circuit TV and Cameras	12.00 CAM	3,344.91 /CAM	/CAM	2,063.33 /CAM	833.33 /CAM	/CAM	6,241.57 /CAM	74,899	10,992.55 /CAM	131,911
		28.20.ID	Intrusion Detection System	16.00 DOOR	1,256.77 /DOOR	/DOOR	812.50 /DOOR	93.75 /DOOR	/DOOR	2,163.02 /DOOR	34,608	3,484.81 /DOOR	55,757
			04.04 TRR Reservoir Electrical Building	14,384.00 SF	158.01 /SF	10.15 /SF	645.11 /SF	56.54 /SF	/SF	869.81 /SF	12,511,294	1,632.31 /SF	23,479,107
	04.05		**TRR Reservoir Site Electrical**										
		26.20.DB	Site Ductbanks	1.00 LS	/LS	/LS	/LS	50,000.00 /LS	/LS	50,000.00 /LS	50,000	91,692.74 /LS	91,693
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	/LS	/LS	/LS	125,000.00 /LS	/LS	125,000.00 /LS	125,000	229,231.81 /LS	229,232
		28.20.AC	Access Control System	2.00 DOOR	/DOOR	/DOOR	/DOOR	10,000.00 /DOOR	/DOOR	10,000.00 /DOOR	20,000	18,338.55 /DOOR	36,677
		28.20.CCTV	Closed Circuit TV and Cameras	10.00 CAM	/CAM	/CAM	/CAM	7,500.00 /CAM	/CAM	7,500.00 /CAM	75,000	13,753.91 /CAM	137,539
			04.05 TRR Reservoir Site Electrical	1.00 LS	/LS	/LS	/LS	270,000.00 /LS	/LS	270,000.00 /LS	270,000	495,140.74 /LS	495,141
	04.06		**Funks Reservoir PGP Sitework**										
		31.00.400	TRR PGP Earthworks	272,100.00 CY	7.87 /CY	8.96 /CY	2.76 /CY	4.54 /CY	/CY	24.13 /CY	6,565,938	38.42 /CY	10,453,960
		32.00.400	TRR PGP Site Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,841.80 /LS	2,266,842
		33.00.400	TRR PGP Yard Piping	1,850.00 LF	455.79 /LF	364.83 /LF	1,939.98 /LF	/LF	/LF	2,760.60 /LF	5,107,102	4,513.03 /LF	8,349,107
			04.06 Funks Reservoir PGP Sitework	1.00 LS	3,472,440.83 /LS	3,184,362.15 /LS	5,174,040.18 /LS	1,235,250.00 /LS	/LS	13,066,093.16 /LS	13,066,093	21,069,908.87 /LS	21,069,909
			04 Terminal Regulating Reservoir (TRR) PGP	**1.00 LS**	**12,684,841.40 /LS**	**3,732,724.47 /LS**	**23,832,141.19 /LS**	**3,402,650.00 /LS**	**21,876,526.00 /LS**	**65,528,883.06 /LS**	**65,528,883**	**96,347,247.71 /LS**	**96,347,248**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	20,820,875		137,176.944 hrs	
Material	41,938,428			
Allowance	5,766,168			
Equipment	5,945,251		36,470.123 hrs	
Subtotal W/ Contingency	**74,470,722**	**74,470,722**		
Non-Markup Items	21,876,526			
Total Construction Cost	**21,876,526**	**96,347,248**		
Non-Contract Costs	16,379,032			17.000 %
Total Project Costs	**16,379,032**	**112,726,280**		

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
04						***Terminal Regulating Reservoir (TRR) PGP***										
	04.01					Terminal Regulating Reservoir (TRR) PGP										
		03.00.300				*Funk PGP Foundation Slab*										
			03.0			*Concrete Work*										
				03.18		*Cast-In-Place Concrete, Slabs on Grade*										
					03.10.05.48	*Cast-In-Place Concrete, Slabs on Grade, 48" thick*										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	3,336.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	30,980	14.78 /sfca	49,303
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	432.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	1,110,648	4,159.00 /ton	1,796,689
						Reinforcing in place, unloading & sorting, add to above - slabs	432.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	24,064	88.23 /ton	38,115
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	432.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	26,157	95.90 /ton	41,429
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	5,440.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	712,640	216.98 /cy	1,180,385
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	5,332.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	154,632	45.93 /CY	244,915
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	35,990.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	33,711	1.48 /sf	53,393
						Curing, sprayed membrane curing compound	359.90 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	8,295	37.41 /csf	13,463
						Fine grading, fine grade for slab on grade, machine	3,998.89 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	7,495	2.97 /sy	11,871
						03.10.05.48 Cast-In-Place Concrete, Slabs on Grade, 48" thick	*5,332.00 CY*	*155.81 /CY*	*7.33 /CY*	*232.33 /CY*	*/CY*	*/CY*	*395.47 /CY*	*2,108,622*	*643.20 /CY*	*3,429,561*
						03.18 Cast-In-Place Concrete, Slabs on Grade	*5,332.00 CY*	*155.81 /CY*	*7.33 /CY*	*232.33 /CY*	*/CY*	*/CY*	*395.47 /CY*	*2,108,622*	*643.20 /CY*	*3,429,561*
						03.0 Concrete Work	*5,332.00 CY*	*155.81 /CY*	*7.33 /CY*	*232.33 /CY*	*/CY*	*/CY*	*395.47 /CY*	*2,108,622*	*643.20 /CY*	*3,429,561*
						03.00.300 Funk PGP Foundation Slab	*5,332.00 CY*	*155.81 /CY*	*7.33 /CY*	*232.33 /CY*	*/CY*	*/CY*	*395.47 /CY*	*2,108,622*	*643.20 /CY*	*3,429,561*
		03.00.402				*TRR PGP Concrete Walls, Perimeter*										
			03.0			*Concrete Work*										
				03.20		*Cast-In-Place Concrete, Straight Walls*										
					03.10.06.48	*Cast-In-Place Concrete, Straight Walls, 48" thick*										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	28,266.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	416,572	23.74 /sfca	670,957
						Form oil, coverage varies greatly, maximum, includes material only	76.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	1,786	38.92 /gal	2,958
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	177.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	455,057	4,159.00 /ton	736,143
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	177.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	9,860	88.23 /ton	15,616
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	177.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	10,717	95.90 /ton	16,974
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	2,135.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	279,685	216.98 /cy	463,258
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	2,094.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	93,622	70.81 /CY	148,283
						Concrete finishing, walls, includes breaking ties and patching voids	28,266.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	28,811	1.62 /sf	45,715
						03.10.06.48 Cast-In-Place Concrete, Straight Walls, 48" thick	*2,094.00 CY*	*299.31 /CY*	*9.70 /CY*	*309.96 /CY*	*/CY*	*/CY*	*618.96 /CY*	*1,296,110*	*1,002.82 /CY*	*2,099,905*
						03.20 Cast-In-Place Concrete, Straight Walls	*2,094.00 CY*	*299.31 /CY*	*9.70 /CY*	*309.96 /CY*	*/CY*	*/CY*	*618.96 /CY*	*1,296,110*	*1,002.82 /CY*	*2,099,905*
						03.0 Concrete Work	*2,094.00 CY*	*299.31 /CY*	*9.70 /CY*	*309.96 /CY*	*/CY*	*/CY*	*618.96 /CY*	*1,296,110*	*1,002.82 /CY*	*2,099,905*
						03.00.402 TRR PGP Concrete Walls, Perimeter	*2,094.00 CY*	*299.31 /CY*	*9.70 /CY*	*309.96 /CY*	*/CY*	*/CY*	*618.96 /CY*	*1,296,110*	*1,002.82 /CY*	*2,099,905*
		03.00.404				*TRR PGP Concrete Walls, Pier Walls*										
			03.0			*Concrete Work*										
				03.20		*Cast-In-Place Concrete, Straight Walls*										
					03.10.06.36	*Cast-In-Place Concrete, Straight Walls, 36" thick*										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	80,640.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	1,188,436	23.74 /sfca	1,914,173
						Form oil, coverage varies greatly, maximum, includes material only	215.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	5,053	38.92 /gal	8,369
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	392.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	1,007,810	4,159.00 /ton	1,630,329
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	392.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	21,836	88.23 /ton	34,586
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	392.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	23,735	95.90 /ton	37,593
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	4,570.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	598,670	216.98 /cy	991,610
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	4,480.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	200,299	70.81 /CY	317,244
						Concrete finishing, walls, includes breaking ties and patching voids	80,640.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	82,195	1.62 /sf	130,419
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	*4,480.00 CY*	*349.91 /CY*	*9.74 /CY*	*338.58 /CY*	*/CY*	*/CY*	*698.22 /CY*	*3,128,034*	*1,130.43 /CY*	*5,064,322*
						03.20 Cast-In-Place Concrete, Straight Walls	*4,480.00 CY*	*349.91 /CY*	*9.74 /CY*	*338.58 /CY*	*/CY*	*/CY*	*698.22 /CY*	*3,128,034*	*1,130.43 /CY*	*5,064,322*
						03.0 Concrete Work	*4,480.00 CY*	*349.91 /CY*	*9.74 /CY*	*338.58 /CY*	*/CY*	*/CY*	*698.22 /CY*	*3,128,034*	*1,130.43 /CY*	*5,064,322*
						03.00.404 TRR PGP Concrete Walls, Pier Walls	*4,480.00 CY*	*349.91 /CY*	*9.74 /CY*	*338.58 /CY*	*/CY*	*/CY*	*698.22 /CY*	*3,128,034*	*1,130.43 /CY*	*5,064,322*
		03.00.406				*TRR PGP Elevated Slab*										
			03.0			*Concrete Work*										
				03.24		*Cast-In-Place Concrete, Elevated Slabs*										
					03.10.10.36	*Cast-In-Place Concrete, Elevated Decks, 36" thick*										
						Slab shoring	3,250.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	2,225	1.09 /cf	3,536
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	31,212.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	277,052	14.16 /sf	441,820
						C.I.P. concrete forms, elevated slab, edge forms, 36" high, 3 use, includes shoring, erecting, bracing, stripping and cleaning	3,474.00 sfca	12.19 /sfca	-	0.53 /sfca	-	-	12.72 /sfca	44,182	20.18 /sfca	70,111
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	272.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	699,297	4,159.00 /ton	1,131,248
						Reinforcing in place, unloading & sorting, add to above - decks	272.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	15,152	88.23 /ton	23,998
						Reinforcing steel, crane cost for handling, maximum, add	272.00 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	43,291	252.08 /ton	68,566
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	3,468.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	454,308	216.98 /cy	752,495
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	3,400.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	101,342	47.21 /CY	160,510
						Finishing elev slab, bull float, manual float & manual steel trowel	30,575.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	37,731	1.95 /sf	59,760
						Curing, sprayed membrane curing compound, elevated decks	305.75 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	7,047	37.41 /csf	11,438
						03.10.10.36 Cast-In-Place Concrete, Elevated Decks, 36" thick	*3,400.00 CY*	*243.35 /CY*	*7.71 /CY*	*243.54 /CY*	*/CY*	*/CY*	*494.60 /CY*	*1,681,625*	*801.02 /CY*	*2,723,482*
						03.24 Cast-In-Place Concrete, Elevated Slabs	*3,400.00 CY*	*243.35 /CY*	*7.71 /CY*	*243.54 /CY*	*/CY*	*/CY*	*494.60 /CY*	*1,681,625*	*801.02 /CY*	*2,723,482*
						03.0 Concrete Work	*3,400.00 CY*	*243.35 /CY*	*7.71 /CY*	*243.54 /CY*	*/CY*	*/CY*	*494.60 /CY*	*1,681,625*	*801.02 /CY*	*2,723,482*
						03.00.406 TRR PGP Elevated Slab	*3,400.00 CY*	*243.35 /CY*	*7.71 /CY*	*243.54 /CY*	*/CY*	*/CY*	*494.60 /CY*	*1,681,625*	*801.02 /CY*	*2,723,482*
		03.00.408				*TRR PGP Slab on Grade @ El 130.00*										
			03.0			*Concrete Work*										
				03.18		*Cast-In-Place Concrete, Slabs on Grade*										
					03.10.05.24	*Cast-In-Place Concrete, Slabs on Grade, 24" thick*										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	667.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	6,194	14.78 /sfca	9,858
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	41.25 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	106,051	4,159.00 /ton	171,559
						Reinforcing in place, unloading & sorting, add to above - slabs	41.25 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,298	88.23 /ton	3,639
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	41.25 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	2,498	95.90 /ton	3,956
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	485.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	63,535	216.98 /cy	105,236
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	471.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	13,659	45.93 /CY	21,634
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,358.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	5,955	1.48 /sf	9,432
						Curing, sprayed membrane curing compound	63.58 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,465	37.41 /csf	2,378
						Fine grading, fine grade for slab on grade, machine	706.44 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,324	2.97 /sy	2,097

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						03.10.05.24 Cast-In-Place Concrete, Slabs on Grade, 24" thick	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
						03.18 Cast-In-Place Concrete, Slabs on Grade	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
						03.0 Concrete Work	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
						03.00.408 TRR PGP Slab on Grade @ El 130.00	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
		05.00.400				TRR PGP, Metals										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Trash Rack Allowance	13.00 ea		-		50,000.00 /ea	-	50,000.00 /ea	650,000	89,192.73 /ea	1,159,505
						Miscellaneous Metals Allowance	1.00 ls	116,094.40 /ls	11,200.00 /ls	100,000.00 /ls	-	-	227,294.40 /ls	227,294	412,710.16 /ls	412,710
						05.00.99.00 Metals, Other	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
						05.50 Metal Fabrications	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
						05.0 Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
						05.00.400 TRR PGP, Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Allowance for lighting?	260.00 hrs	129.73 /hrs	10.00 /hrs	75.00 /hrs		-	214.73 /hrs	55,830	399.22 /hrs	103,797
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	55,830	/SF	103,797
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	55,830	/SF	103,797
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	55,830	/SF	103,797
						26.26.EXTLTG Exterior Lighting and Control	1.00 LS	33,729.80 /LS	2,600.00 /LS	19,500.00 /LS	/LS	/LS	55,829.80 /LS	55,830	103,797.48 /LS	103,797
		40.00.400				TRR PGP, Process Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Elbow, steel, butt weld, 60" Dia	21.00 ea	3,281.57 /ea	97.68 /ea	9,500.00 /ea	-	-	12,879.25 /ea	270,464	21,087.61 /ea	442,840
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	720.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	434,928	987.20 /LF	710,786
						Butterfly Valves	14.00 ea	2,187.72 /ea	1,560.00 /ea	45,000.00 /ea	-	-	48,747.72 /ea	682,468	80,471.80 /ea	1,126,605
						Check Valves	13.00 ea	2,187.72 /ea	1,560.00 /ea	35,000.00 /ea	-	-	38,747.72 /ea	503,720	63,908.25 /ea	830,807
						Dismantling Joints	13.00 ea	2,187.72 /ea	1,560.00 /ea	37,000.00 /ea	-	-	40,747.72 /ea	529,720	67,220.96 /ea	873,872
						ARV, Complete	13.00 ea	2,500.91 /ea	520.00 /ea	3,500.00 /ea			6,520.91 /ea	84,772	10,581.93 /ea	137,565
						Miscellaneous Items Allowance	1.00 ls				250,000.00 /ls		250,000.00 /ls	250,000	395,963.65 /ls	395,964
						40.10.02.60 Process Pipe, Carbon Steel, 60"	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
						40.11 Process Pipe, Carbon Steel	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
						40.0 Process Pipe	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
						40.00.400 TRR PGP, Process Piping	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
		44.40.400				TRR PGP, Furnish and Install Pumps										
			46.0			Water and Wastewater Equipment										
				44.40		Process Equipment - Pumps										
					44.05.42.06	Vertical Turbine Pump: > 8000 hp										
						Functional Testing, Pumps, >1000 hp	13.00 ea	3,068.99 /ea	-	100.00 /ea		-	3,168.99 /ea	41,197	5,026.47 /ea	65,344
						Align Pump & Motor, >1000 hp	13.00 ea	3,836.24 /ea	-		2,800.00 /ea	-	6,636.24 /ea	86,271	10,510.84 /ea	136,641
						Vibration Testing, Pumps, >1000 hp	13.00 ea	1,534.50 /ea	-	-	1,400.00 /ea	-	2,934.50 /ea	38,148	4,647.81 /ea	60,422
						Sleeved anchor bolts - Large	156.00 ea	95.91 /ea	-	28.00 /ea	-	-	123.91 /ea	19,329	198.28 /ea	30,932
						Anchor bolts for leveling pump cans	52.00 ea	383.62 /ea	-	150.00 /ea	-	-	533.62 /ea	27,748	856.06 /ea	44,515
						Non-Shrink Machine Grout	208.00 cuft	91.11 /cuft	-	74.00 /cuft	-	-	165.11 /cuft	34,343	266.88 /cuft	55,510
						Grease, Oil, and Lube Pumps, >1000 hp	13.00 ea	1,534.50 /ea	-	150.00 /ea	-	-	1,684.50 /ea	21,898	2,678.87 /ea	34,825
						44.05.42.06 Vertical Turbine Pump: > 8000 hp	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,937.60 /EA	428,189
						44.40 Process Equipment - Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,937.60 /EA	428,189
						46.0 Water and Wastewater Equipment	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,937.60 /EA	428,189
			99.1			Nom-Markup Items										
				44.40		Process Equipment - Pumps										
					44.05.42.06	Vertical Turbine Pump: > 8000 hp										
						FURNISH Vertical Turbine Pump, SS, 8850 hp	13.00 EA	-	-		-	940,802.00 /EA	940,802.00 /EA	12,230,426	940,802.00 /EA	12,230,426
						Contractor Markups on Pump Purchase 20%, Includes OH&P and Contingencies	1.00 ls		-		-	2,446,100.00 /ls	2,446,100.00 /ls	2,446,100	2,446,100.00 /ls	2,446,100
						44.05.42.06 Vertical Turbine Pump: > 8000 hp	13.00 EA	/EA	/EA	/EA	/EA	1,128,963.54 /EA	1,128,963.54 /EA	14,676,526	1,128,963.54 /EA	14,676,526
						44.40 Process Equipment - Pumps	13.00 EA	/EA	/EA	/EA	/EA	1,128,963.54 /EA	1,128,963.54 /EA	14,676,526	1,128,963.54 /EA	14,676,526
						99.1 Nom-Markup Items	13.00 EA	/EA	/EA	/EA	/EA	1,128,963.54 /EA	1,128,963.54 /EA	14,676,526	1,128,963.54 /EA	14,676,526
						44.40.400 TRR PGP, Furnish and Install Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	1,128,963.54 /EA	1,149,650.90 /EA	14,945,462	1,161,901.14 /EA	15,104,715
						04.01 Terminal Regulating Reservoir (TRR) PGP	**35,990.00 SF**	**126.35 /SF**	**7.30 /SF**	**183.69 /SF**	**26.52 /SF**	**407.80 /SF**	**751.65 /SF**	**27,052,030**	**971.00 /SF**	**34,946,227**
	04.02					**Terminal Regulating Reservoir Turbine Buildings**										
		03.00.416				TRR PGP Turbine Buildings Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.99	Cast-In-Place Concrete, Slabs on Grade, Other										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	4,000.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	37,147	14.78 /sfca	59,116
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	204.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	524,473	4,159.00 /ton	848,436
						Reinforcing in place, unloading & sorting, add to above - slabs	204.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	11,364	88.23 /ton	17,999
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	204.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	12,352	95.90 /ton	19,564
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	3,310.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	433,610	216.98 /cy	718,212
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	3,248.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	94,195	45.93 /CY	149,190
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,700.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	6,276	1.48 /sf	9,940
						Curing, sprayed membrane curing compound	67.00 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,544	37.41 /csf	2,506
						Fine grading, fine grade for slab on grade, machine	744.44 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,395	2.97 /sy	2,210
						03.10.05.99 Cast-In-Place Concrete, Slabs on Grade, Other	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
						03.18 Cast-In-Place Concrete, Slabs on Grade	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
						03.0 Concrete Work	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
						03.00.416 TRR PGP Turbine Buildings Foundation Slab	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
		03.00.418				TRR PGP Turbine Buildings Concrete Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	23,976.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	353,348	23.74 /sfca	569,125
						Form oil, coverage varies greatly, maximum, includes material only	64.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	1,504	38.92 /gal	2,491
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	100.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	257,094	4,159.00 /ton	415,900
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	100.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	5,570	88.23 /ton	8,823
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	100.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	6,055	95.90 /ton	9,590
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	1,360.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	178,160	216.98 /cy	295,096
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	1,332.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	59,553	70.81 /CY	94,323
						Concrete finishing, walls, includes breaking ties and patching voids	23,976.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	24,438	1.62 /sf	38,777
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
						03.20 Cast-In-Place Concrete, Straight Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
						03.0 Concrete Work	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
						03.00.418 TRR PGP Turbine Buildings Concrete Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
		03.00.420				TRR PGP Turbine Buildings Elevated Slab										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
			03.0			Concrete Work										
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.24	Cast-In-Place Concrete, Elevated Decks, 24" thick										
						Slab shoring	143,640.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	98,354	1.09 /cf	156,299
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	5,320.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	47,223	14.16 /sf	75,307
						C.I.P. concrete forms, elevated slab, edge forms, 24" high, 3 use, includes shoring, erecting, bracing, stripping and cleaning	680.00 sfca	12.19 /sfca	-	0.53 /sfca	-	-	12.72 /sfca	8,648	20.18 /sfca	13,723
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	34.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	88,698	4,159.00 /ton	143,486
						Reinforcing in place, unloading & sorting, add to above - decks	34.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	1,922	88.23 /ton	3,044
						Reinforcing steel, crane cost for handling, maximum, add	34.50 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	5,491	252.08 /ton	8,697
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	405.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	53,055	216.98 /cy	87,878
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	394.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	11,744	47.21 /CY	18,600
						Finishing elev slab, bull float, manual float & manual steel trowel	5,320.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	6,565	1.95 /sf	10,398
						Curing, sprayed membrane curing compound, elevated decks	53.20 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,226	37.41 /csf	1,990
						03.10.10.24 Cast-In-Place Concrete, Elevated Decks, 24" thick	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
						03.24 Cast-In-Place Concrete, Elevated Slabs	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
						03.0 Concrete Work	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
						03.00.400 TRR PGP Turbine Buildings Elevated Slab	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
		04.00.400				TRR PGP Turbine Buildings Masonry										
			04.0			Masonry										
				04.21		Concrete Unit Masonry - Exterior										
					04.00.02.12	Masonry Concrete Masonry Units, 12"										
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	2.00 opng	41.31 /opng	2.13 /opng	13.40 /opng	-	-	56.84 /opng	114	102.36 /opng	205
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	1,008.00 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	-	12.80 /cf	12,898	23.21 /cf	23,399
						Masonry reinforcing bars, #5 and #6 reinforcing steel bars, placed horizontally, ASTM A615	3,600.00 lb	0.79 /lb	-	0.56 /lb	-	-	1.35 /lb	4,845	2.44 /lb	8,789
						Masonry reinforcing bars, #5 and #6 reinforcing steel bars, placed vertically, ASTM A615	1,872.00 lb	0.97 /lb	-	0.56 /lb	-	-	1.53 /lb	2,859	2.76 /lb	5,176
						Masonry reinforcing bars, truss type steel joint reinforcing, mill standard galvanized, 12" wide	19.20 clf	31.43 /clf	-	29.50 /clf	-	-	60.93 /clf	1,170	110.83 /clf	2,128
						Concrt block,high strngt,hollow,3500 psi,12"8"16",inclds mortar and horzntl joint rnfrcng every other course,excluds scffldn,grout and vertcl rnfrcng	2,400.00 SF	14.60 /SF	-	5.20 /SF	-	-	19.80 /SF	47,511	35.69 /SF	85,657
						Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00 lf	62.16 /lf	3.01 /lf	9.90 /lf	-	-	75.07 /lf	1,501	134.63 /lf	2,693
						Silicone water repellants, sprayed on CMU, 2 coat	4,800.00 sf	0.21 /sf	-	0.79 /sf	-	-	1.00 /sf	4,777	1.83 /sf	8,796
						Reglet, zinc and copper alloy, 20 ounce	240.00 lf	3.26 /lf	-	2.87 /lf	-	-	6.13 /lf	1,472	11.15 /lf	2,676
						Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	240.00 lf	5.27 /lf	-	5.25 /lf	-	-	10.52 /lf	2,526	19.15 /lf	4,597
						04.00.02.12 Masonry Concrete Masonry Units, 12"	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
						04.21 Concrete Unit Masonry - Exterior	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
						04.0 Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
						04.00.400 TRR PGP Turbine Buildings Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
		05.00.402				TRR PGP Turbine Building, Metals										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Removable Roof Allowance	1,380.00 SF	10.99 /SF	4.03 /SF	35.00 /SF	-	-	50.03 /SF	69,037	91.78 /SF	126,654
						Stair Well Roof Allowance	864.00 SF	5.85 /SF	2.15 /SF	25.00 /SF	-	-	33.00 /SF	28,513	60.68 /SF	52,428
						Stair, 4'-0" wide, w/ guardrail both sides	8.00 flt	1,209.32 /flt	90.20 /flt	2,160.00 /flt	-	-	3,459.52 /flt	27,676	6,327.88 /flt	50,623
						Tailbay Gate Allowance	2.00 ea				30,000.00 /ea	-	30,000.00 /ea	60,000	53,515.64 /ea	107,031
						05.00.99.00 Metals, Other	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.06 /SF	336,737
						05.50 Metal Fabrications	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.06 /SF	336,737
						05.0 Metals	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.06 /SF	336,737
						05.00.402 TRR PGP Turbine Building, Metals	**2.00** LS	14,950.80 /LS	4,072.24 /LS	43,590.00 /LS	30,000.00 /LS	/LS	92,613.04 /LS	185,226	168,368.48 /LS	336,737
		08.00.400				TRR PGP Turbine Building, Openings										
			08.0			Openings										
				08.10		Doors and Frames										
					08.10.01.00	Openings, Doors, Frames and Hardware										
						Steel frms, knock down, 14 ga., to 8-3/4" throat, to 3'-0" x 7'-0", single	2.00 EA	137.64 /EA	-	430.00 /EA	-	-	567.64 /EA	1,135	1,043.76 /EA	2,088
						Doors, commercial, steel, insulated, full panel, 18 ga., 3'-0" x 7'-0" x 1-3/4" thick	2.00 ea	97.88 /ea	-	520.00 /ea	-	-	617.88 /ea	1,236	1,139.91 /ea	2,280
						Add for baked enamel finish, average cost per leaf	2.00 leaf	12.94 /leaf	-	50.40 /leaf	-	-	63.34 /leaf	127	116.64 /leaf	233
						Average Door Hardware	2.00 ea	91.76 /ea	15.00 /ea	500.00 /ea			606.76 /ea	1,214	1,118.63 /ea	2,237
						08.10.01.00 Openings, Doors, Frames and Hardware	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
						08.10 Doors and Frames	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
						08.0 Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
						08.00.400 TRR PGP Turbine Building, Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
		23.00.400				TRR PGP Turbine Building, HVAC										
			23.0			HVAC										
				23.00		HVAC										
					23.00.02.00	Mechanical, HVAC										
						HVAC Vent/Fan Allowance	5,320.00 SF	1.75 /SF		7.52 /SF			9.27 /SF	49,307	17.08 /SF	90,857
						23.00.02.00 Mechanical, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
						23.00 HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
						23.0 HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
						23.00.400 TRR PGP Turbine Building, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
		26.00.000				Hydopower Generators										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Installation of Francis Turbines	2.00 ea	108,531.52 /ea	10,912.00 /ea	150,000.00 /ea	-	-	269,443.52 /ea	538,887	504,995.23 /ea	1,009,990
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	538,887	/SF	1,009,990
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	538,887	/SF	1,009,990
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	538,887	/SF	1,009,990
			99.1			Non-Markup Items										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Furnish Francis Turbine 11.75 MW	2.00 EA		-		-	3,000,000.00 /EA	3,000,000.00 /EA	6,000,000	3,000,000.00 /EA	6,000,000
						Contractor Markups on Turbines Purchase 20%, Includes OH&P and Contingencies	1.00 ls		-		-	1,200,000.00 /ls	1,200,000.00 /ls	1,200,000	1,200,000.00 /ls	1,200,000
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	7,200,000	/SF	7,200,000
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	7,200,000	/SF	7,200,000
						99.1 Non-Markup Items	2.00 EA	/EA	/EA	/EA	/EA	3,600,000.00 /EA	3,600,000.00 /EA	7,200,000	3,600,000.00 /EA	7,200,000
						26.00.000 Hydopower Generators	2.00 EA	108,531.52 /EA	10,912.00 /EA	150,000.00 /EA	/EA	3,600,000.00 /EA	3,869,443.52 /EA	7,738,887	4,104,995.23 /EA	8,209,990
		26.05.GRDG				Facility Grounding										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	QC Equip, Tools, & Consumables										
						Rent trencher chain boom gas oper walking 12 HP	2.00 day	-	156.95 /day	-	-	-	156.95 /day	314	287.82 /day	576
						01.01.06.03 QC Equip, Tools, & Consumables	0.00	/LS	/LS	/LS	/LS	/LS	/LS	314	/LS	576
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	314	/SF	576
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Copper Bus Bar .25"x3.0"	2.00 lf	32.44 /lf	-	52.90 /lf	-	-	85.34 /lf	171	160.33 /lf	321
						Copper Bus Bar Supports	2.00 E	129.73 /E	-	48.30 /E	-	-	178.03 /E	356	329.99 /E	660

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.11.00	Process Electrical, Grounding										
						Grounding rod, copper clad, 15' long, 3/4" diameter	6.00 ea	259.46 /ea	-	55.00 /ea	-	-	314.46 /ea	1,887	580.66 /ea	3,484
						Ground wire, copper wire, bare stranded, 4/0	4.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	3,137	1,468.48 /clf	5,874
						Water pipe ground clamps, heavy duty, bronze, 2-1/2" to 3" diameter	1.00 ea	172.97 /ea	-	60.50 /ea	-	-	233.47 /ea	233	432.52 /ea	433
						Exothermic weld, 4/0 wire to 4/0 wire	24.00 ea	148.26 /ea	-	9.45 /ea	-	-	157.71 /ea	3,785	289.91 /ea	6,958
						Exothermic weld, mold reusable for above	6.00 ea	-	-	141.00 /ea	-	-	141.00 /ea	846	268.80 /ea	1,613
						Protective boxes at grade level, round, concrete, 12" long, incl breather slots	2.00 ea	64.87 /ea	-	112.00 /ea	-	-	176.87 /ea	354	332.46 /ea	665
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	10,768	/LF	20,007
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,768	/SF	20,007
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	11,082	/SF	20,582
						26.05.GRDG Facility Grounding	**3,250.00** SF	2.22 /SF	0.10 /SF	1.10 /SF	/SF	/SF	3.41 /SF	11,082	6.33 /SF	20,582
		26.12.SEC				Subfeed from Elec Building										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	1.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,587	4,825.13 /ton	4,825
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,587	/LF	4,825
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	600.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	10,016	30.88 /lf	18,529
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	10,016	/EA	18,529
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	12,603	/LS	23,355
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	20.00 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	17,135	1,599.06 /clf	31,981
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	17,135	/LF	31,981
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	6.50 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	5,097	1,468.48 /clf	9,545
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	5,097	/LF	9,545
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	22,232	/SF	41,526
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,834	/SF	64,881
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	15.00 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	4,108	439.42 /cy	6,591
						End bulkheads, plywood, concrete envelope/encasement	24.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	341	22.57 /sf	542
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	4,450	/CY	7,133
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	50.00 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	1,263	40.01 /ecy	2,001
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,263	/CY	2,001
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	50.00 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	1,010	31.98 /lcy	1,599
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,010	/CY	1,599
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	37.04 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	1,072	45.85 /bcy	1,698
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,072	/CY	1,698
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,794	/LS	12,431
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	7,794	/CY	12,431
						26.12.SEC Subfeed from Elec Building	**600.00** LF	41.92 /LF	4.18 /LF	24.95 /LF	/LF	/LF	71.05 /LF	42,629	128.85 /LF	77,312
		26.20.DIST				Electrical Distribution Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 1-1/2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	100.00 lf	23.06 /lf	-	19.05 /lf	-	-	42.11 /lf	4,211	78.61 /lf	7,861
						Flexible metallic conduit, steel, 1-1/2" diameter	3.00 lf	20.76 /lf	-	2.55 /lf	-	-	23.31 /lf	70	42.93 /lf	129
						Flexible metallic conduit, steel, 2" diameter	3.00 lf	25.95 /lf	-	3.23 /lf	-	-	29.18 /lf	88	53.74 /lf	161
						Flexible metallic conduit, steel, connectors, insulated, 1-1/2" diameter	1.00 ea	32.43 /ea	-	24.50 /ea	-	-	56.93 /ea	57	106.17 /ea	106
						Flexible metallic conduit, steel, connectors, insulated, 2" diameter	1.00 ea	45.12 /ea	-	26.00 /ea	-	-	71.12 /ea	71	132.32 /ea	132
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 1-1/2" diameter	1.00 ea	45.12 /ea	-	46.00 /ea	-	-	91.12 /ea	91	170.44 /ea	170
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 2" diameter	1.00 ea	57.66 /ea	-	67.00 /ea	-	-	124.66 /ea	125	233.46 /ea	233
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 225 amp, 42 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	4,125.00 /ea	-	-	7,831.59 /ea	7,832	14,661.07 /ea	14,661
						Panelboards, 3 phase 4 wire, main circuit breaker, 277/480 V, 225 amp, 42 circuits, NEHB, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	5,175.00 /ea	-	-	8,881.59 /ea	8,882	16,662.73 /ea	16,663
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	21,426	/SF	40,117
					26.10.03.00	UG Conduit										
						Uninterruptible power supply, charger, inverter, and alarm 1 phase, 120 V, 5 kVA, incl 10 minutes battery	1.00 ea	6,182.64 /ea	356.18 /ea	7,100.00 /ea	-	-	13,638.82 /ea	13,639	25,526.36 /ea	25,526
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	13,639	/LF	25,526
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #6, type XHHW, in raceway	0.70 clf	159.67 /clf	-	54.50 /clf	-	-	214.17 /clf	150	396.71 /clf	278
						Wire, copper, stranded, 600 volt, #4, type XHHW, in raceway	0.70 clf	195.81 /clf	-	77.50 /clf	-	-	273.31 /clf	191	506.86 /clf	355
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	2.00 clf	259.46 /clf	-	159.00 /clf	-	-	418.46 /clf	837	778.91 /clf	1,558
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	2.00 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	1,714	1,599.07 /clf	3,198
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,892	/LF	5,388
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	37,956	/SF	71,032
				26.25		Facility Electrical										
					26.25.06.00	Transformers, Dry Type										
						Transformer, dry-type, ventilated, 3 phase 480 V primary 120/208 V secondary, 75 kVA	1.00 ea	2,965.27 /ea	-	2,500.00 /ea	-	-	5,465.27 /ea	5,465	10,203.79 /ea	10,204
						26.25.06.00 Transformers, Dry Type	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,465	/EA	10,204
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	5,465	/LS	10,204
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,422	/SF	81,236
						26.20.DIST Electrical Distribution Equipment	**450.00** AMP	46.44 /AMP	0.79 /AMP	49.26 /AMP	/AMP	/AMP	96.49 /AMP	43,422	180.52 /AMP	81,236
		26.25.LTG				Interior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	9,062	33.61 /lf	16,804
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	25.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	1,382	101.59 /ea	2,540
						Outlet boxes, pressed steel, covers, blank, 4" square	24.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	408	31.21 /ea	749
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	1.00 ea	16.22 /ea	-	1.66 /ea	-	-	17.88 /ea	18	32.90 /ea	33
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,869	/SF	20,126
					26.10.03.00	UG Conduit										
						Toggle switch, quiet type, single pole, 20 amp	1.00 ea	38.44 /ea	-	3.46 /ea	-	-	41.90 /ea	42	77.11 /ea	77
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	42	/LF	77
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	16.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,729	199.14 /clf	3,186
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,729	/LF	3,186
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	12,639	/SF	23,389
				26.20		Facility Electrical										
					26.20.03.00	Facility Electrical, Lighting										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.20.03.00	Facility Electrical, Lighting										
						LED Strip Light, hdwe	24.00 ea	182.08 /ea	-	110.00 /ea	-	-	292.08 /ea	7,010	543.60 /ea	13,046
						Emergency ballast, material only, interior, factory installed in fixture	6.00 ea	-	-	152.00 /ea	-	-	152.00 /ea	912	289.77 /ea	1,739
						Exit lighting, L.E.D. standard, single face, ceiling or wall mount	2.00 ea	129.73 /ea	-	70.00 /ea	-	-	199.73 /ea	399	371.36 /ea	743
						Fixture whips, 3/8" greenfield, 2 connectors, THHN wire, three #14, 6' long	24.00 ea	32.43 /ea	-	5.45 /ea	-	-	37.88 /ea	909	69.87 /ea	1,677
						26.20.03.00 Facility Electrical, Lighting	0.00	/SF	/SF	/SF	/SF	/SF	/SF	9,231	/SF	17,205
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	9,231	/SF	17,205
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	21,870	/SF	40,594
						26.25.LTG Interior Lighting and Control	**1.00** LS	15,144.99 /LS	/LS	6,724.85 /LS	/LS	/LS	21,869.84 /LS	21,870	40,593.63 /LS	40,594
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	80.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	724	16.68 /lf	1,334
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	4.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	221	101.59 /ea	406
						Outlet boxes, pressed steel, covers, blank, 4" square	4.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	68	31.21 /ea	125
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,013	/SF	1,866
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	3.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	324	199.14 /clf	597
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	324	/LF	597
					26.15.07.00	Lighting										
						LED Area Light	4.00 E	97.30 /E	-		-	-	97.30 /E	389	178.43 /E	714
						Wallpack Photocell	4.00 E	32.43 /E	-		-	-	32.43 /E	130	59.48 /E	238
						26.15.07.00 Lighting	0.00	/LS	/LS	/LS	/LS	/LS	/LS	519	/LS	952
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,856	/SF	3,415
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,856	/SF	3,415
						26.26.EXTLTG Exterior Lighting and Control	**1.00** LS	1,713.08 /LS	/LS	143.26 /LS	/LS	/LS	1,856.34 /LS	1,856	3,414.66 /LS	3,415
		26.30.DEV				Device Outlets										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00 lf	14.83 /lf	-	10.00 /lf	-	-	24.83 /lf	12,413	46.25 /lf	23,126
						Outlet boxes, cast, 1 gang, FD, 3/4" hub, 2-11/16" deep	8.00 ea	86.49 /ea	-	22.00 /ea	-	-	108.49 /ea	868	200.55 /ea	1,604
						Duplex receptacle, ground fault interrupting, 20 amp	8.00 ea	38.44 /ea	-	45.00 /ea	-	-	83.44 /ea	668	156.28 /ea	1,250
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	13,949	/SF	25,981
					26.10.03.00	UG Conduit										
						WP cover	8.00 ea	17.30 /ea	-	42.50 /ea	-	-	59.80 /ea	478	112.74 /ea	902
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	478	/LF	902
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	16.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,729	199.14 /clf	3,186
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,729	/LF	3,186
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,156	/SF	30,069
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,156	/SF	30,069
						26.30.DEV Device Outlets	**1.00** LS	10,060.56 /LS	/LS	6,095.20 /LS	/LS	/LS	16,155.76 /LS	16,156	30,069.22 /LS	30,069
		26.40.EQCON				Facility Equipment Connections and Controls										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.20.05.00	Facility Electrical, HVAC										
						Allowance for HVAC circuit, connection, controls	200.00 HR	129.73 /HR	15.00 /HR	50.00 /HR	-	-	194.73 /HR	38,946	360.73 /HR	72,147
						26.20.05.00 Facility Electrical, HVAC	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,147
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,147
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,147
						26.40.EQCON Facility Equipment Connections and Controls	**1.00** ALO	25,946.13 /ALO	3,000.00 /ALO	10,000.00 /ALO	/ALO	/ALO	38,946.13 /ALO	38,946	72,146.53 /ALO	72,147
		26.40.HYDTURB				13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	3.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	7,760	4,825.14 /ton	14,475
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,760	/LF	14,475
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,760	/LS	14,475
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	80.00 lf	64.87 /lf	-	62.50 /lf	-	-	127.37 /lf	10,189	238.10 /lf	19,048
						Rigid galvanized steel plastic coated conduit elbows, 4" diameter, to 15' high	16.00 ea	389.19 /ea	-	196.00 /ea	-	-	585.19 /ea	9,363	1,087.37 /ea	17,398
						Rigid galvanized steel plastic coated conduit couplings, 4" diameter, to 15' high	16.00 ea	28.83 /ea	-	57.50 /ea	-	-	86.33 /ea	1,381	162.48 /ea	2,600
						Flexible metallic conduit, sealtite, 4" diameter	24.00 lf	86.40 /lf	-	20.00 /lf	-	-	106.40 /lf	2,554	196.57 /lf	4,718
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 4" diameter	8.00 ea	129.73 /ea	-	163.00 /ea	-	-	292.73 /ea	2,342	548.64 /ea	4,389
						Flexible metallic conduit, coupling sealtite to rigid, 4" diameter	8.00 ea	129.73 /ea	-	198.00 /ea	-	-	327.73 /ea	2,622	615.37 /ea	4,923
						Electrical Contractor startup assistance per hour	40.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	56,892	2,615.55 /hr	104,622
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	85,343	/SF	157,698
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 4" diameter, to 15' H, incl terminations, fittings, & support	2,320.00 lf	32.43 /lf	-	5.75 /lf	-	-	38.18 /lf	88,584	70.44 /lf	163,417
						PVC conduit elbows, 4" diameter, to 15' H	16.00 ea	116.76 /ea	-	23.00 /ea	-	-	139.76 /ea	2,236	257.96 /ea	4,127
						PVC conduit, field bends, 45 Deg. to 90 Deg., 4" diameter	16.00 ea	129.73 /ea	-	-	-	-	129.73 /ea	2,076	237.91 /ea	3,807
						PVC adapters, 4" diameter, to 15' H	16.00 ea	64.87 /ea	-	4.80 /ea	-	-	69.67 /ea	1,115	128.10 /ea	2,050
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	94,010	/LF	173,401
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .525" to 1.025", pad mount	48.00 ea	324.33 /ea	-	109.00 /ea	-	-	433.33 /ea	20,800	802.56 /ea	38,523
						Medium-cable single cable, copper, XLP shielding, ungrounded neutral, 15 kV, 4/0, in conduit, excl splicing & terminations	78.00 clf	648.65 /clf	-	660.00 /clf	-	-	1,308.65 /clf	102,075	2,447.73 /clf	190,923
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	122,875	/LF	229,446
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	8.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	3,676	842.59 /E	6,741
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	3,676	/EA	6,741
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	305,904	/SF	567,285
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	313,664	/SF	581,760
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	29.63 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	8,115	439.41 /cy	13,020
						End bulkheads, plywood, concrete envelope/encasement	60.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	853	22.57 /sf	1,354
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	8,968	/CY	14,374
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	70.00 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	1,768	40.01 /ecy	2,801
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,768	/CY	2,801
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	70.00 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	1,414	31.98 /lcy	2,239

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,414	/CY	2,239
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	59.26 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	1,715	45.84 /bcy	2,717
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,715	/CY	2,717
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	13,866	/LS	22,131
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	13,866	/CY	22,131
						26.40.HYDTURB 13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A	**600.00** LF	380.99 /LF	7.83 /LF	154.39 /LF	2.67 /LF	/LF	545.88 /LF	327,529	1,006.48 /LF	603,891
		26.41.HYDTURB				Hyd Turbine Controls Circuits										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	3.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	7,760	4,825.14 /ton	14,475
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,760	/LF	14,475
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,760	/LS	14,475
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	40.00 lf	29.65 /lf	-	22.50 /lf	-	-	52.15 /lf	2,086	97.27 /lf	3,891
						Rigid galvanized steel plastic coated conduit elbows, 2" diameter, to 15' high	8.00 ea	129.73 /ea	-	42.00 /ea	-	-	171.73 /ea	1,374	317.97 /ea	2,544
						Rigid galvanized steel plastic coated conduit couplings, 2" diameter, to 15' high	8.00 ea	19.58 /ea	-	14.35 /ea	-	-	33.93 /ea	271	63.27 /ea	506
						Flexible metallic conduit, sealtite, 2" diameter	12.00 lf	34.60 /lf	-	4.30 /lf	-	-	38.90 /lf	467	71.64 /lf	860
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 2" diameter	4.00 ea	51.89 /ea	-	25.50 /ea	-	-	77.39 /ea	310	143.78 /ea	575
						Flexible metallic conduit, coupling sealtite to rigid, 2" diameter	4.00 ea	103.79 /ea	-	31.50 /ea	-	-	135.29 /ea	541	250.38 /ea	1,002
						Electrical Contractor startup assistance per hour	40.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	56,892	2,615.55 /hr	104,622
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	61,941	/SF	113,999
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 2" diameter, to 15' H, incl terminations, fittings, & support	1,160.00 lf	11.53 /lf	-	3.36 /lf	-	-	14.89 /lf	17,274	27.55 /lf	31,961
						PVC conduit elbows, 2" diameter, to 15' H	8.00 ea	51.32 /ea	-	3.54 /ea	-	-	54.86 /ea	439	100.87 /ea	807
						PVC conduit, field bends, 45 Deg. to 90 Deg., 2" diameter	8.00 ea	51.89 /ea	-	-	-	-	51.89 /ea	415	95.16 /ea	761
						PVC adapters, 2" diameter, to 15' H	8.00 ea	38.44 /ea	-	1.39 /ea	-	-	39.83 /ea	319	73.14 /ea	585
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	18,447	/LF	34,114
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	120.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	10,744	164.90 /clf	19,788
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	48.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	8,557	329.08 /clf	15,796
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	19,301	/LF	35,584
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	99,689	/SF	183,697
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	107,449	/SF	198,173
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	29.63 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	8,115	439.41 /cy	13,020
						End bulkheads, plywood, concrete envelope/encasement	60.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	853	22.57 /sf	1,354
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	8,968	/CY	14,374
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	70.00 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	1,768	40.01 /ecy	2,801
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,768	/CY	2,801
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	70.00 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	1,414	31.98 /lcy	2,239
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,414	/CY	2,239
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	59.26 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	1,715	45.84 /bcy	2,717
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,715	/CY	2,717
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	13,866	/LS	22,131
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	13,866	/CY	22,131
						26.41.HYDTURB Hyd Turbine Controls Circuits	**600.00** LF	164.55 /LF	7.83 /LF	29.81 /LF	/LF	/LF	202.19 /LF	121,314	367.17 /LF	220,303
		26.90.LPS				Facility Lightning Protection System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						Air terminal and base, copper, 3/8" dia x 10", to 75' h	10.00 ea	129.73 /ea	-	26.00 /ea	-	-	155.73 /ea	1,557	287.47 /ea	2,875
						Lightning protection cable, copper, 220 lb per thousand feet, to 75' h	400.00 lf	3.24 /lf	-	3.18 /lf	-	-	6.42 /lf	2,569	12.01 /lf	4,804
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,127	/SF	7,679
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,127	/SF	7,679
				26.20		Facility Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						LPS design and certification, misc mat and labor	1.00 LS	2,075.69 /LS	-	1,000.00 /LS	1,500.00 /LS	-	4,575.69 /LS	4,576	8,463.66 /LS	8,464
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,576	/SF	8,464
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,576	/SF	8,464
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,702	/SF	16,142
						26.90.LPS Facility Lightning Protection System	**3,250.00** SF	1.44 /SF	/SF	0.78 /SF	0.46 /SF	/SF	2.68 /SF	8,702	4.97 /SF	16,142
		27.30.COMCDT				Comm Conduit to Admin										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,328	4,825.11 /ton	4,343
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,328	/LF	4,343
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	1,200.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	20,032	30.88 /lf	37,059
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	20,032	/EA	37,059
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	22,360	/LS	41,401
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	13.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	10,194	1,468.48 /clf	19,090
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	10,194	/LF	19,090
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,194	/SF	19,090
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	32,554	/SF	60,492
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	40.00 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	10,955	439.41 /cy	17,577
						End bulkheads, plywood, concrete envelope/encasement	75.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	1,066	22.57 /sf	1,693
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	12,022	/CY	19,270
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	180.00 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	4,547	40.01 /ecy	7,202
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	4,547	/CY	7,202
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	180.00 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	3,635	31.98 /lcy	5,757
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	3,635	/CY	5,757
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	177.78 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	5,146	45.84 /bcy	8,150
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	5,146	/CY	8,150
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	25,350	/LS	40,379
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	25,350	/CY	40,379
						27.30.COMCDT Comm Conduit to Admin	**1,200.00** LF	28.15 /LF	8.36 /LF	11.74 /LF	/LF	/LF	48.25 /LF	57,904	84.06 /LF	100,871
		28.20.AC				Access Control System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Card reader - all in allowance per each (incl circuit, cards, CX)	2.00 ea	1,556.77 /ea	-	800.00 /ea	-	-	2,356.77 /ea	4,714	3,790.80 /ea	7,582
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,582
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,582
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,582
						28.20.AC Access Control System	**2.00** DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	/DOOR	2,356.77 /DOOR	4,714	3,790.80 /DOOR	7,582
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Camera allowance (licenses, circuit, startup, CX)	1.00 LS	1,037.85 /LS	-	1,000.00 /LS	1,000.00 /LS	-	3,037.85 /LS	3,038	5,643.46 /LS	5,643
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Closed circuit television system (CCTV), industrial quality, for additional camera stations, add	2.00 ea	384.39 /ea	-	690.00 /ea	-	-	1,074.39 /ea	2,149	1,751.70 /ea	3,503
						Closed circuit television system (CCTV), industrial quality, for weatherproof camera station, add	2.00 ea	798.35 /ea	-	540.00 /ea	-	-	1,338.35 /ea	2,677	2,158.90 /ea	4,318
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,821
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,821
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,821
						28.20.CCTV Closed Circuit TV and Cameras	**2.00** CAM	1,701.66 /CAM	/CAM	1,730.00 /CAM	500.00 /CAM	/CAM	3,931.66 /CAM	7,863	6,732.32 /CAM	13,465
		28.20.ID				Intrusion Detection System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Securitized door, all-in allowance per each (incl circuit, devices, CX)	2.00 ea	2,594.62 /ea	-	1,000.00 /ea	-	-	3,594.62 /ea	7,189	5,765.85 /ea	11,532
						Door controller (all-in cost including vendor program and startup)	1.00 ea	648.65 /ea	-	2,000.00 /ea	500.00 /ea	-	3,148.65 /ea	3,149	5,132.00 /ea	5,132
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,664
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,664
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,664
						28.20.ID Intrusion Detection System	**2.00** DOOR	2,918.94 /DOOR	/DOOR	2,000.00 /DOOR	250.00 /DOOR	/DOOR	5,168.94 /DOOR	10,338	8,331.85 /DOOR	16,664
		40.00.404				TRR PGP Turbine Building, Process Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	230.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	138,935	987.20 /LF	227,057
						Dismantling Joints	2.00 ea	2,187.72 /ea	1,560.00 /ea	37,000.00 /ea	-	-	40,747.72 /ea	81,495	67,220.96 /ea	134,442
						Turbine Shutoff Valves	2.00 ea	2,187.72 /ea	1,560.00 /ea	45,000.00 /ea	-	-	48,747.72 /ea	97,495	80,471.79 /ea	160,944
						Miscellaneous Items Allowance	1.00 ls				65,000.00 /ls		65,000.00 /ls	65,000	102,950.55 /ls	102,951
						40.10.02.60 Process Pipe, Carbon Steel, 60"	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
						40.11 Process Pipe, Carbon Steel	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
						40.0 Process Pipe	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
						40.00.404 TRR PGP Turbine Building, Process Piping	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
						04.02 Terminal Regulating Reservoir Turbine Buildings	**2.00** EA	949,646.57 /EA	56,945.15 /EA	1,071,136.83 /EA	64,800.00 /EA	3,600,000.00 /EA	5,742,528.56 /EA	11,485,057	7,249,460.14 /EA	14,498,920
	04.03					**TRR Reservoir Energy Dissipation Valve Structures**										
		03.00.410				TRR PGP Energy Dissipation Structures Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.36	Cast-In-Place Concrete, Slabs on Grade, 36" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,848.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	16,328	14.06 /sfca	25,991
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	56.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	143,973	4,159.00 /ton	232,904
						Reinforcing in place, unloading & sorting, add to above - slabs	56.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	3,119	88.23 /ton	4,941
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	762.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	99,822	216.98 /cy	165,341
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	740.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	21,461	45.93 /CY	33,990
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltnt&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,656.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	6,234	1.48 /sf	9,874
						Curing, sprayed membrane curing compound	66.56 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,534	37.41 /csf	2,490
						Fine grading, fine grade for slab on grade, machine	739.56 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,386	2.97 /sy	2,195
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
						03.18 Cast-In-Place Concrete, Slabs on Grade	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
						03.0 Concrete Work	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
						03.00.410 TRR PGP Energy Dissipation Structures Foundation Slab	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
		03.00.412				TRR PGP Energy Dissipation Structures Concrete Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	12,800.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	188,641	23.74 /sfca	303,837
						Form oil, coverage varies greatly, maximum, includes material only	34.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	805	38.92 /gal	1,333
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	53.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	137,546	4,159.00 /ton	222,507
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	53.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,980	88.23 /ton	4,720
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	53.50 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	3,239	95.90 /ton	5,131
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	734.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	96,154	216.98 /cy	159,265
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	712.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	31,833	70.81 /CY	50,419
						Finishing: break ties & patch voids (walls, cols or beams)	12,800.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	12,915	1.60 /sf	20,483
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	712.00 CY	331.46 /CY	9.57 /CY	324.86 /CY	/CY	/CY	665.89 /CY	474,113	1,078.22 /CY	767,695
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7' 6" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	840.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	12,380	23.74 /sfca	19,939
						Form oil, coverage varies greatly, maximum, includes material only	2.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	53	38.93 /gal	88
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	22,496	4,159.00 /ton	36,391
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	8.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	487	88.23 /ton	772
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	8.75 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	530	95.90 /ton	839

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7' 6" thick										
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	120.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	15,720	216.98 /cy	26,038
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	117.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	5,231	70.81 /CY	8,285
						Finishing; break ties & patch voids (walls, cols or beams)	840.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	848	1.60 /sf	1,344
						03.10.06.90 Cast-In-Place Concrete, Straight Walls, 7' 6" thick	117.00 CY	220.08 /CY	9.57 /CY	263.90 /CY	/CY	/CY	493.54 /CY	57,744	800.82 /CY	93,697
						03.20 Cast-In-Place Concrete, Straight Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,039.07 /CY	861,391
						03.0 Concrete Work	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,039.07 /CY	861,391
						03.00.412 TRR PGP Energy Dissipation Structures Concrete Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,039.07 /CY	861,391
		03.00.414				TRR PGP Energy Dissipation Structures Elevated Deck										
			03.0			Concrete Work										
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.36	Cast-In-Place Concrete, Elevated Decks, 36" thick										
						Slab shoring	46,000.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	31,497	1.09 /cf	50,054
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	2,000.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	17,753	14.16 /sf	28,311
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	280.00 lf	5.41 /lf	-	0.22 /lf	-	-	5.63 /lf	1,577	8.94 /lf	2,502
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	43,063	4,159.00 /ton	69,663
						Reinforcing in place, unloading & sorting, add to above - decks	16.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	933	88.23 /ton	1,478
						Reinforcing steel, crane cost for handling, maximum, add	16.75 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	2,666	252.08 /ton	4,222
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	230.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	30,130	216.98 /cy	49,906
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	223.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	6,647	47.21 /CY	10,528
						Finishing elev slab, bull float, manual float & manual steel trowel	2,000.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	2,468	1.95 /sf	3,909
						Curing, sprayed membrane curing compound, elevated decks	20.00 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	461	37.41 /csf	748
						03.10.10.36 Cast-In-Place Concrete, Elevated Decks, 36" thick	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
						03.24 Cast-In-Place Concrete, Elevated Slabs	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
						03.0 Concrete Work	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
						03.00.414 TRR PGP Energy Dissipation Structures Elevated Deck	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
		40.00.402				TRR PGP Energy Dissipation Structures Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Fittings, steel, butt weld, 60" Dia	4.00 ea	3,281.57 /ea	97.68 /ea	9,500.00 /ea	-	-	12,879.25 /ea	51,517	21,087.61 /ea	84,350
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	120.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	72,488	987.20 /LF	118,464
						Energy Dissipating Valves W/ Hood	2.00 ea	2,187.72 /ea	1,560.00 /ea	25,000.00 /ea	-	-	28,747.72 /ea	57,495	47,344.71 /ea	94,689
						40.10.02.60 Process Pipe, Carbon Steel, 60"	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
						40.11 Process Pipe, Carbon Steel	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
						40.0 Process Pipe	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
						40.00.402 TRR PGP Energy Dissipation Structures Piping	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
						04.03 TRR Reservoir Energy Dissipation Valve Structures	**2.00 EA**	**246,476.70 /EA**	**12,866.61 /EA**	**312,861.40 /EA**	**/EA**	**/EA**	**572,204.70 /EA**	**1,144,409**	**928,971.47 /EA**	**1,857,943**
	04.04					**TRR Reservoir Electrical Building**										
		04.00.402				TRR PGP Electrical Building, Masonry										
			04.0			Masonry										
				04.21		Concrete Unit Masonry - Exterior										
					04.00.02.08	Masonry Concrete Masonry Units, 8"										
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	12.00 opng	41.31 /opng	2.12 /opng	13.40 /opng	-	-	56.83 /opng	682	102.35 /opng	1,228
						Grout, door frames, 6' x 7' opening, 3.5 C.F. per opening	4.00 opng	55.08 /opng	2.83 /opng	18.75 /opng	-	-	76.66 /opng	307	138.11 /opng	552
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	3,649.99 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	-	12.80 /cf	46,704	23.21 /cf	84,729
						Reinforcing, steel bars A615, placed horizontal, average #4 bar	4,963.98 lb	1.40 /lb	-	0.40 /lb	-	-	1.80 /lb	8,921	3.23 /lb	16,057
						Masonry reinforcing bars, #3 and #4 reinforcing steel bars, placed vertically, ASTM A615	3,649.99 lb	1.80 /lb	-	0.56 /lb	-	-	2.36 /lb	8,600	4.24 /lb	15,488
						Masonry reinforcing bars, truss type steel joint reinforcing, mill standard galvanized, 12" wide	109.48 clf	31.43 /clf	-	29.50 /clf	-	-	60.93 /clf	6,671	110.83 /clf	12,134
						Concrt block,high strngt,hollow,3500 psi,8"8"16",includs mortar and horzntl joint rnfrcng every other course,excluds scffldn,grout and vertcl rnfrcng	14,600.00 SF	8.50 /SF	-	4.07 /SF	-	-	12.57 /SF	183,576	22.72 /SF	331,780
						Channel framing, structural steel, field fabricated, C6x8.2, incl cutting & welding	180.00 lf	40.69 /lf	1.97 /lf	6.85 /lf	-	-	49.51 /lf	8,911	88.81 /lf	15,986
						Silicone water repellants, sprayed on CMU, 2 coat	29,199.88 sf	0.21 /sf	-	0.79 /sf	-	-	1.00 /sf	29,060	1.83 /sf	53,512
						Reglet, zinc and copper alloy, 20 ounce	682.00 lf	3.26 /lf	-	2.87 /lf	-	-	6.13 /lf	4,183	11.15 /lf	7,603
						Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	682.00 lf	5.27 /lf	-	5.25 /lf	-	-	10.52 /lf	7,177	19.15 /lf	13,062
						04.00.02.08 Masonry Concrete Masonry Units, 8"	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
						04.21 Concrete Unit Masonry - Exterior	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
						04.0 Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
						04.00.402 TRR PGP Electrical Building, Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
		05.00.404				TRR PGP Electrical Building, Metal Roof Framing										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Open web bar joist, K Series, 40-ton job lots, 28K8, 12.7 plf, 30' to 50' spans, shop fabricated, incl shop primer, horizontal bridging	2,450.00 lf	7.55 /lf	1.41 /lf	12.45 /lf	-	-	21.41 /lf	52,445	39.09 /lf	95,766
						Metal roof decking, steel, open type B wide rib, galvanized, over 500 Sq, 1-1/2" D, 20 gauge	14,384.00 SF	1.26 /SF	0.04 /SF	2.15 /SF	-	-	3.45 /SF	49,607	6.31 /SF	90,733
						05.00.99.00 Metals, Other	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
						05.50 Metal Fabrications	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
						05.0 Metals	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
						05.00.404 TRR PGP Electrical Building, Metal Roof Framing	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
		07.00.400				TRR PGP Electrical Building, Roofing										
			07.0			Thermal and Moisture Protection										
				07.00		Thermal & Moisture Protection										
					07.50.02.00	Thermal & Moisture Protection, Membrane Roofing										
						Roof Deck Insulation, foamglass, tapered for drainage	14,384.00 sf	1.03 /sf	-	1.16 /sf	-	-	2.19 /sf	31,441	3.98 /sf	57,296
						Elastomeric Roofing, vinyl and neoprene membrane traffic deck	14,384.00 SF	2.74 /SF	0.37 /SF	1.77 /SF	-	-	4.88 /SF	70,161	8.83 /SF	127,003
						Flashing, galvanized steel, .018", 26 ga.	676.00 sf	5.46 /sf	-	0.65 /sf	-	-	6.11 /sf	4,127	10.94 /sf	7,394
						Reglet, stainless steel, .020" thick	676.00 lf	3.26 /lf	-	4.21 /lf	-	-	7.47 /lf	5,051	13.64 /lf	9,217
						Reglet, counter flashing for stainless steel, .020" thick, 12 wide	676.00 lf	5.27 /lf	-	6.80 /lf	-	-	12.07 /lf	8,162	22.03 /lf	14,893
						Roof Hatches, with curb, 1" fiberglass insulation, aluminum curb & cover, 2'-6" x 3'-0"	3.00 ea	258.90 /ea	-	900.00 /ea	-	-	1,158.90 /ea	3,477	2,132.55 /ea	6,398
						07.50.02.00 Thermal & Moisture Protection, Membrane Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
						07.00 Thermal & Moisture Protection	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
						07.0 Thermal and Moisture Protection	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
						07.00.400 TRR PGP Electrical Building, Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
		08.00.402				TRR PGP Electrical Building, Openings										
			08.0			Openings										
				08.10		Doors and Frames										
					08.10.01.00	Openings, Doors, Frames and Hardware										
						Steel frms, knock down, 14 ga., to 8-3/4" throat, to 3'-0" x 7'-0", single	12.00 EA	137.64 /EA	-	430.00 /EA	-	-	567.64 /EA	6,812	1,043.76 /EA	12,525
						Steel frames, knock down, 14 ga., to 8-3/4" throat, to 6070, pair	4.00 EA	183.52 /EA	-	455.00 /EA	-	-	638.52 /EA	2,554	1,172.02 /EA	4,688
						Doors, commercial, steel, insulated, full panel, 18 ga., 3'-0" x 7'-0" x 1-3/4" thick	20.00 ea	97.88 /ea	-	520.00 /ea	-	-	617.88 /ea	12,358	1,139.91 /ea	22,798
						Add for baked enamel finish, average cost per leaf	20.00 leaf	12.94 /leaf	-	50.40 /leaf	-	-	63.34 /leaf	1,267	116.64 /leaf	2,333
						Average Door Hardware	20.00 ea	91.76 /ea	15.00 /ea	500.00 /ea			606.76 /ea	12,135	1,118.62 /ea	22,372

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						08.10.01.00 Openings, Doors, Frames and Hardware	16.00 EA	402.33 /EA	18.75 /EA	1,774.25 /EA	/EA	/EA	2,195.33 /EA	35,125	4,044.79 /EA	64,717
						08.10 Doors and Frames	16.00 EA	402.33 /EA	18.75 /EA	1,774.25 /EA	/EA	/EA	2,195.33 /EA	35,125	4,044.79 /EA	64,717
				08.30		Specialty Doors and Frames - Overhead Door										
					08.30.01.20	Specialty Doors and Frames, Coiling Doors										
						Doors, rolling service, steel, manual, 20 gauge, 12' x 10' high, incl. hardware	4.00 EA	1,186.73 /EA	-	1,250.00 /EA	-	-	2,436.73 /EA	9,747	4,437.40 /EA	17,750
						Doors, rolling service, steel, manual, for weatherstripping, extruded rubber, jambs, add	80.00 lf	-	-	19.15 /lf	-	-	19.15 /lf	1,532	35.55 /lf	2,844
						Doors, rolling service, steel, manual, for weatherstripping, hood, extruded rubber, add	48.00 lf	-	-	8.65 /lf	-	-	8.65 /lf	415	16.06 /lf	771
						Doors, rolling service, steel, manual, motor operators for, to 14' x 14' opening	4.00 ea	284.82 /ea	-	1,200.00 /ea	-	-	1,484.82 /ea	5,939	2,735.69 /ea	10,943
						08.30.01.20 Specialty Doors and Frames, Coiling Doors	4.00 EA	1,471.55 /EA	/EA	2,936.80 /EA	/EA	/EA	4,408.35 /EA	17,633	8,076.77 /EA	32,307
						08.30 Specialty Doors and Frames - Overhead Door	4.00 EA	1,471.55 /EA	/EA	2,936.80 /EA	/EA	/EA	4,408.35 /EA	17,633	8,076.77 /EA	32,307
						08.0 Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,851.19 /EA	97,024
						08.00.402 TRR PGP Electrical Building, Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,851.19 /EA	97,024
		21.00.400				TRR PGP Electrical Building, Fire Suppression										
			21.0			Fire Suppression										
				21.00		Fire Suppression										
					21.00.10.10	Fire Suppression Systems										
						Fire Suppression System Allowance	14,384.00 SF				15.00 /SF		15.00 /SF	215,760	26.76 /SF	384,884
						21.00.10.10 Fire-Suppression Systems	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
						21.00 Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
						21.0 Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
						21.00.400 TRR PGP Electrical Building, Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
		23.00.402				TRR PGP Electrical Building, HVAC										
			23.0			HVAC										
				23.00		HVAC										
					23.00.02.00	Mechanical, HVAC										
						HVAC Allowance	14,384.00 SF				35.00 /SF		35.00 /SF	503,440	62.43 /SF	898,064
						23.00.02.00 Mechanical, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
						23.00 HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
						23.0 HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
						23.00.402 TRR PGP Electrical Building, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
		26.02.PRI				Primary Feeds fromSubstation										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Roadway steel plates, 8' x 20' x 1"thick, avg cost per sf, monthly	1,600.00 sf	-	1.00 /sf	-	-	-	1.00 /sf	1,600	1.83 /sf	2,934
						01.01.06.03 GC Equip, Tools, & Consumables	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,600	/LS	2,934
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,600	/SF	2,934
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	45.42 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	117,487	4,825.14 /ton	219,158
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	117,487	/LF	219,158
					26.10.03.00	UG Conduit										
						Electrical Underground Ducts and Manholes, PVC, conduit with coupling, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	17,440.00 lf	6.49 /lf	-	3.16 /lf	-	-	9.65 /lf	168,236	17.92 /lf	312,515
						Electrical Underground Ducts and Manholes, PVC, elbows, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	128.00 ea	115.32 /ea	-	23.00 /ea	-	-	138.32 /ea	17,704	255.32 /ea	32,681
						Electrical Underground Ducts and Manholes, PVC, bell end and cap, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	256.00 ea	74.13 /ea	-	9.90 /ea	-	-	84.03 /ea	21,512	154.82 /ea	39,634
						Electrical Underground Ducts and Manholes, PVC, base spacer, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	3,488.00 ea	25.31 /ea	-	1.78 /ea	-	-	27.09 /ea	94,501	49.81 /ea	173,752
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	301,954	/LF	558,582
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrc undrgr ducts and manhls,man holes,precast w/iron racks&pulling irons,cl frame and cover,6'10"7",excluds excavtn,backfll and cast place concrete	12.00 ea	3,167.96 /ea	324.85 /ea	3,775.00 /ea	-	-	7,267.81 /ea	87,214	13,601.79 /ea	163,221
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	87,214	/EA	163,221
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	506,654	/LS	940,961
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .975" to 1.570", pad mount	144.00 ea	172.97 /ea	-	163.00 /ea	-	-	335.97 /ea	48,380	627.95 /ea	90,424
						Medium-cable single cable, copper, XLP shielding, ungrounded neutral, 15 kV, 500 kcmil, in conduit, excl splicing & terminations	400.00 clf	864.87 /clf	-	1,050.00 /clf	-	-	1,914.87 /clf	765,948	3,587.72 /clf	1,435,088
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	814,329	/LF	1,525,512
					26.15.11.00	Process Electrical, Grounding										
						Grounding rod, copper clad, 8' long, 3/4" diameter	12.00 ea	195.82 /ea	-	36.00 /ea	-	-	231.82 /ea	2,782	427.73 /ea	5,133
						Ground wire, copper wire, bare stranded, 4/0	23.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	18,036	1,468.48 /clf	33,775
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	20,817	/LF	38,908
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	24.00 E	242.87 /E	-	-	200.00 /E	-	442.87 /E	10,629	812.16 /E	19,492
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	10,629	/EA	19,492
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	845,775	/SF	1,583,912
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,354,029	/SF	2,527,807
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red), envelope/encasement, poured neat	363.33 cy	194.63 /cy	0.35 /cy	77.50 /cy	-	-	272.48 /cy	98,999	437.18 /cy	158,842
						End bulkheads, plywood, concrete envelope/encasement	320.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	4,550	22.57 /sf	7,224
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	103,550	/CY	166,066
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	1,253.50 ecy	1.94 /ecy	11.66 /ecy	-	-	-	13.60 /ecy	17,051	21.54 /ecy	27,006
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	17,051	/CY	27,006
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 1/4 mile round trip, 5.0 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	1,670.95 lcy	4.46 /lcy	1.86 /lcy	-	-	-	6.33 /lcy	10,572	10.02 /lcy	16,744
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	10,572	/CY	16,744
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	1,453.33 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	42,067	45.84 /bcy	66,628
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	42,067	/CY	66,628
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	173,239	/LS	276,443
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	173,239	/CY	276,443
						26.02.PRI Primary Feeds fromSubstation	2,180.00 LF	376.38 /LF	26.06 /LF	295.94 /LF	2.20 /LF	/LF	700.58 /LF	1,527,268	1,286.35 /LF	2,804,290
		26.03.MVSWGR				MV SWGR										
			26.0			Electrical Work										
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	80.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	16,378	379.07 /hr	30,326
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,378	/SF	30,326
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,378	/SF	30,326
				26.25		Facility Electrical										
					26.25.03.00	Electrical Equipment, Switchgear - General										
						MV SWGR-A	16,000.00 ea	3.24 /ea	0.63 /ea	50.00 /ea	-	-	53.87 /ea	861,892	102.41 /ea	1,638,585
						MV SWGR-B	14,800.00 ea	3.24 /ea	0.63 /ea	50.00 /ea	-	-	53.87 /ea	797,250	102.41 /ea	1,515,691

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	1,659,143	/EA	3,154,276
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,659,143	/LS	3,154,276
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,675,521	/SF	3,184,602
						26.03.MVSWGR MV SWGR	30,800.00 FA	3.58 /FA	0.69 /FA	50.13 /FA	/FA	/FA	54.40 /FA	1,675,521	103.40 /FA	3,184,602
		26.03.SWGREQ				Station Aux Xfmr, Bttry										
			26.0			Electrical Work										
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	24.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	4,914	379.07 /hr	9,098
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,914	/SF	9,098
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,914	/SF	9,098
				26.25		Facility Electrical										
					26.25.01.00	Station Equipment										
						Control batteries	100.00 kah	498.29 /kah	52.02 /kah	540.00 /kah	-	-	1,090.30 /kah	109,030	2,038.60 /kah	203,860
						Conversion equipment, station service transformers	1.00 ea	1,245.71 /ea	130.04 /ea	105,000.00 /ea	-	-	106,375.75 /ea	106,376	202,690.14 /ea	202,690
						26.25.01.00 Station Equipment	0.00	/LS	/LS	/LS	/LS	/LS	/LS	215,406	/LS	406,550
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	215,406	/LS	406,550
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	220,319	/SF	415,648
						26.03.SWGREQ Station Aux Xfmr, Bttry	1.00 LS	54,187.72 /LS	5,931.53 /LS	160,200.00 /LS	/LS	/LS	220,319.25 /LS	220,319	415,647.95 /LS	415,648
		26.04.MVBUS				Medium Voltage Overhead Bus Duct 2000A										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Threaded rod, steel, painted, 1/2" diameter	768.00 lf	7.41 /lf	-	6.75 /lf	-	-	14.16 /lf	10,877	26.46 /lf	20,323
						Nuts, galvanized steel, 1/2" diameter	16.00 c	-	-	46.50 /c	-	-	46.50 /c	744	88.65 /c	1,418
						Channels, steel, 1-1/2" x 1-1/2"	896.00 lf	14.83 /lf	-	3.68 /lf	-	-	18.51 /lf	16,582	34.20 /lf	30,647
						Spring nuts, steel channel, long, 1/2"	1,024.00 ea	12.97 /ea	-	0.83 /ea	-	-	13.80 /ea	14,134	25.37 /ea	25,982
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	42,337	/SF	78,371
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 5 kV, .525" to 1.025", pad mount	26.00 ea	129.73 /ea	-	87.50 /ea	-	-	217.23 /ea	5,648	404.71 /ea	10,523
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	5,648	/LF	10,523
					26.15.04.00	Process Electrical, Bus Duct										
						Bus duct, copper, 3 pole 3 wire, 2000 amp	540.00 lf	172.97 /lf	-	1,000.00 /lf	-	-	1,172.97 /lf	633,406	2,223.56 /lf	1,200,725
						Bus duct, copper, 3 pole 3 wire, elbow, 2000 amp V	11.00 ea	1,037.85 /ea	-	5,000.00 /ea	-	-	6,037.85 /ea	66,416	11,435.03 /ea	125,785
						Bus duct, copper, 3 pole 3 wire, elbow, 2000 amp H	4.00 ea	1,037.85 /ea	-	5,000.00 /ea	-	-	6,037.85 /ea	24,151	11,435.03 /ea	45,740
						Bus duct, copper, 3 pole 3 wire, tee fittings, 2000 amp V	5.00 ea	2,075.69 /ea	-	7,500.00 /ea	-	-	9,575.69 /ea	47,878	18,104.17 /ea	90,521
						Bus duct, copper, 3 pole 3 wire, tee fittings, 2000 amp H	4.00 ea	2,075.69 /ea	-	7,500.00 /ea	-	-	9,575.69 /ea	38,303	18,104.17 /ea	72,417
						Bus duct, copper, 3 pole 3 wire, expansion fitting, 2000 amp	4.00 ea	798.34 /ea	-	7,500.00 /ea	-	-	8,298.34 /ea	33,193	15,761.70 /ea	63,047
						Bus duct fittings, flange, wall, with vapor barrier, 2000 amp	4.00 ea	518.92 /ea	-	850.00 /ea	-	-	1,368.92 /ea	5,476	2,572.03 /ea	10,288
						Bus duct fittings, switchboard stub, 3 pole, 3 wire, 2000 amp	17.00 ea	864.87 /ea	-	5,000.00 /ea	-	-	5,864.87 /ea	99,703	11,117.82 /ea	189,003
						Bus duct fittings, bellows, 3 pole, 3 wire, 2000 amp	21.00 ea	864.87 /ea	-	2,500.00 /ea	-	-	3,364.87 /ea	70,662	6,351.93 /ea	133,391
						Bus duct fittings, hanger, spring type, 2000 amp	128.00 ea	172.97 /ea	-	150.00 /ea	-	-	322.97 /ea	41,341	633.16 /ea	77,205
						26.15.04.00 Process Electrical, Bus Duct	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,060,530	/LF	2,008,121
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	13.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	5,973	842.59 /E	10,954
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,973	/EA	10,954
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,114,488	/SF	2,107,968
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	40.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	8,189	379.07 /hr	15,163
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,163
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,163
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,122,677	/SF	2,123,131
						26.04.MVBUS Medium Voltage Overhead Bus Duct 2000A	540.00 LF	429.87 /LF	1.85 /LF	1,642.50 /LF	4.82 /LF	/LF	2,079.03 /LF	1,122,677	3,931.72 /LF	2,123,131
		26.04.MVVSD				Medium Voltage Variable Speed Drives										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electrical Contractor startup assistance per hour	26.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	36,980	2,615.55 /hr	68,004
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	36,980	/SF	68,004
					26.25.03.00	Electrical Equipment, Switchgear - General										
						MV VSP 8000A 13.8kV, includes allowance for Vendor startup, CX train, doc	13.00 ea	10,378.45 /ea	3,200.00 /ea	420,000.00 /ea	5,000.00 /ea	-	438,578.45 /ea	5,701,520	834,739.09 /ea	10,851,608
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,701,520	/EA	10,851,608
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	5,738,500	/SF	10,919,613
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	5,738,500	/SF	10,919,613
						26.04.MVVSD Medium Voltage Variable Speed Drives	13.00 EA	12,973.07 /EA	3,250.00 /EA	420,200.00 /EA	5,000.00 /EA	/EA	441,423.07 /EA	5,738,500	839,970.19 /EA	10,919,613
		26.05.GRDG				Facility Grounding										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Copper Bus Bar ,25"x 3.0"	20.00 lf	32.43 /lf	-	52.90 /lf	-	-	85.33 /lf	1,707	160.32 /lf	3,206
						Copper Bus Bar Supports	20.00 E	129.73 /E	-	48.30 /E	-	-	178.03 /E	3,561	329.98 /E	6,600
						Ground wire, copper wire, bare stranded, 4/0	35.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	27,445	1,468.48 /clf	51,397
						Exothermic weld, 4/0 wire to 4/0 wire	234.00 ea	148.26 /ea	-	9.45 /ea	-	-	157.71 /ea	36,905	289.91 /ea	67,839
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	69,618	/LF	129,042
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	69,618	/SF	129,042
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	69,618	/SF	129,042
						26.05.GRDG Facility Grounding	14,550.00 SF	3.48 /SF	/SF	1.30 /SF	/SF	/SF	4.79 /SF	69,618	8.87 /SF	129,042
		26.20.DIST				Electrical Distribution Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 1-1/2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	40.00 lf	11.53 /lf	-	3.46 /lf	-	-	14.99 /lf	600	27.74 /lf	1,110
						Flexible metallic conduit, steel, 1-1/2" diameter	3.00 lf	20.76 /lf	-	2.55 /lf	-	-	23.31 /lf	70	42.93 /lf	129
						Flexible metallic conduit, steel, 2" diameter	3.00 lf	25.95 /lf	-	3.23 /lf	-	-	29.18 /lf	88	53.74 /lf	161
						Flexible metallic conduit, steel, connectors, insulated, 1-1/2" diameter	1.00 ea	32.43 /ea	-	24.50 /ea	-	-	56.93 /ea	57	106.17 /ea	106
						Flexible metallic conduit, steel, connectors, insulated, 2" diameter	1.00 ea	45.12 /ea	-	26.00 /ea	-	-	71.12 /ea	71	132.30 /ea	132
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 1-1/2" diameter	1.00 ea	45.12 /ea	-	46.00 /ea	-	-	91.12 /ea	91	170.44 /ea	170
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 2" diameter	1.00 ea	57.66 /ea	-	67.00 /ea	-	-	124.66 /ea	125	233.48 /ea	233
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 100 amp, 30 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	2,594.61 /ea	-	2,125.00 /ea	-	-	4,719.61 /ea	4,720	8,809.13 /ea	8,809
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 225 amp, 42 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	4,125.00 /ea	-	-	7,831.59 /ea	7,832	14,661.06 /ea	14,661
						Panelboards, 3 phase 4 wire, main circuit breaker, 277/480 V, 225 amp, 42 circuits, NEHB, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	5,175.00 /ea	-	-	8,881.59 /ea	8,882	16,662.73 /ea	16,663
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	22,534	/SF	42,175
					26.10.03.00	UG Conduit										
						Uninterruptible power supply, charger, inverter, and alarm 1 phase, 120 V, 5 kVA, incl 10 minutes battery	1.00 ea	6,182.64 /ea	356.18 /ea	7,100.00 /ea	-	-	13,638.82 /ea	13,639	25,526.37 /ea	25,526
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	13,639	/LF	25,526
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #6, type XHHW, in raceway	0.25 clf	159.68 /clf	-	54.50 /clf	-	-	214.20 /clf	54	396.76 /clf	99

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #4, type XHHW, in raceway	0.15 clf	195.80 /clf	-	77.50 /clf	-	-	273.30 /clf	41	506.87 /clf	76
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	1.00 clf	259.46 /clf	-	159.00 /clf	-	-	418.46 /clf	418	778.92 /clf	779
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	0.60 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	514	1,599.05 /clf	959
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,027	/LF	1,914
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	37,200	/SF	69,615
				26.25		Facility Electrical										
					26.25.06.00	Transformers, Dry Type										
						Transformer, dry-type, ventilated, 3 phase 480 V primary 120/208 V secondary, 30 kVA	1.00 ea	2,306.32 /ea	-	1,800.00 /ea	-	-	4,106.32 /ea	4,106	7,660.90 /ea	7,661
						26.25.06.00 Transformers, Dry Type	0.00	/EA	/EA	/EA	/EA	/EA	/EA	4,106	/EA	7,661
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	4,106	/LS	7,661
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	41,306	/SF	77,276
						26.20.DIST Electrical Distribution Equipment	**550.00** AMP	36.16 /AMP	0.65 /AMP	38.29 /AMP	/AMP	/AMP	75.10 /AMP	41,306	140.50 /AMP	77,276
		26.25.LTG				Interior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	2,600.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	47,120	33.61 /lf	87,382
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	150.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	8,289	101.59 /ea	15,238
						Outlet boxes, pressed steel, covers, blank, 4" square	150.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	2,548	31.21 /ea	4,681
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	57,957	/SF	107,301
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	80.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	8,644	199.14 /clf	15,931
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	10.00 clf	103.79 /clf	-	20.50 /clf	-	-	124.29 /clf	1,243	229.41 /clf	2,294
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	9,887	/LF	18,225
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	67,844	/SF	125,526
				26.20		Facility Electrical										
					26.20.03.00	Facility Electrical, Lighting										
						LED Strip Light, hdwe	150.00 ea	182.08 /ea	-	110.00 /ea	-	-	292.08 /ea	43,812	543.60 /ea	81,541
						Emergency ballast, material only, interior, factory installed in fixture	30.00 ea	-	-	152.00 /ea	-	-	152.00 /ea	4,560	289.77 /ea	8,693
						Exit lighting, L.E.D. standard, single face, ceiling or wall mount	12.00 ea	129.73 /ea	-	70.00 /ea	-	-	199.73 /ea	2,397	371.35 /ea	4,456
						Fixture whips, 3/8" greenfield, 2 connectors, THHN wire, three #14, 6' long	150.00 ea	32.43 /ea	-	5.45 /ea	-	-	37.88 /ea	5,682	69.87 /ea	10,480
						26.20.03.00 Facility Electrical, Lighting	0.00	/SF	/SF	/SF	/SF	/SF	/SF	56,451	/SF	105,170
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	56,451	/SF	105,170
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	124,295	/SF	230,696
						26.25.LTG Interior Lighting and Control	**1.00** LS	86,265.47 /LS	/LS	38,029.50 /LS	/LS	/LS	124,294.97 /LS	124,295	230,696.06 /LS	230,696
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	350.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	3,169	16.68 /lf	5,838
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	12.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	663	101.59 /ea	1,219
						Outlet boxes, pressed steel, covers, blank, 4" square	12.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	204	31.21 /ea	374
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,036	/SF	7,432
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	12.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,297	199.14 /clf	2,390
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,297	/LF	2,390
					26.15.07.00	Lighting										
						LED Area Light	12.00 E	97.30 /E	-		-	-	97.30 /E	1,168	178.43 /E	2,141
						Wallpack Photocell	12.00 E	32.43 /E	-		-	-	32.43 /E	389	59.48 /E	714
						26.15.07.00 Lighting	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,557	/LS	2,855
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	6,889	/SF	12,676
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	6,889	/SF	12,676
						26.26.EXTLTG Exterior Lighting and Control	**1.00** LS	6,300.47 /LS	/LS	588.58 /LS	/LS	/LS	6,889.05 /LS	6,889	12,676.17 /LS	12,676
		26.30.DEV				Device Outlets										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	3,000.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	54,369	33.61 /lf	100,825
						Outlet boxes, cast, 1 gang, FD, 3/4" hub, 2-11/16" deep	36.00 ea	86.49 /ea	-	22.00 /ea	-	-	108.49 /ea	3,906	200.54 /ea	7,220
						Duplex receptacle, grounded, 120 volt, 20 amp	24.00 ea	38.44 /ea	-	10.65 /ea	-	-	49.09 /ea	1,178	90.79 /ea	2,179
						Duplex receptacle, ground fault interrupting, 20 amp	12.00 ea	38.44 /ea	-	45.00 /ea	-	-	83.44 /ea	1,001	156.28 /ea	1,875
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	60,454	/SF	112,099
					26.10.03.00	UG Conduit										
						WP cover	12.00 ea	17.30 /ea	-	42.50 /ea	-	-	59.80 /ea	718	112.74 /ea	1,353
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	718	/LF	1,353
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	80.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	8,644	199.14 /clf	15,931
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	20.00 clf	103.79 /clf	-	20.50 /clf	-	-	124.29 /clf	2,486	229.41 /clf	4,588
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	11,130	/LF	20,519
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	72,301	/SF	133,972
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	72,301	/SF	133,972
						26.30.DEV Device Outlets	**1.00** LS	53,247.76 /LS	/LS	19,053.60 /LS	/LS	/LS	72,301.36 /LS	72,301	133,971.57 /LS	133,972
		26.40.EQCON				Facility Equipment Connections and Controls										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.00.99.00	Electrical, Other										
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 5 HP motor	4.00 ea	129.73 /ea	-	6.35 /ea	-	-	136.08 /ea	544	250.01 /ea	1,000
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 10 HP motor	2.00 ea	129.73 /ea	-	6.35 /ea	-	-	136.08 /ea	272	250.01 /ea	500
						Motor connections, flexible conduit and fittings, 3 phase, sealtite, 460 volt, 10 HP motor	2.00 ea	129.73 /ea	-	9.30 /ea	-	-	139.03 /ea	278	255.64 /ea	511
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,095	/SF	2,011
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,095	/LS	2,011
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	300.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	2,716	16.68 /lf	5,004
						Electric metallic tubing (EMT), 1" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	9.03 /lf	-	1.80 /lf	-	-	10.83 /lf	2,165	19.98 /lf	3,996
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,881	/SF	9,000
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	4.50 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	486	199.14 /clf	896
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	9.00 clf	103.78 /clf	-	20.50 /clf	-	-	124.28 /clf	1,119	229.41 /clf	2,065
						Wire, copper, stranded, 600 volt, #8, type XHHW, in raceway	13.00 clf	129.73 /clf	-	34.00 /clf	-	-	163.73 /clf	2,129	302.72 /clf	3,935
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	3,733	/LF	6,896
					26.20.05.00	Facility Electrical, HVAC										
						HVAC controls - electrical contractor scope	1.00 LS		-	3,500.00 /LS	-	-	3,500.00 /LS	3,500	6,672.24 /LS	6,672
						26.20.05.00 Facility Electrical, HVAC	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,500	/SF	6,672
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	12,114	/SF	22,589
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	13,209	/SF	24,580
						26.40.EQCON Facility Equipment Connections and Controls	**1.00** ALO	8,282.95 /ALO	/ALO	4,925.85 /ALO	/ALO	/ALO	13,208.80 /ALO	13,209	24,580.13 /ALO	24,580
		26.40.PMP				13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A										
			26.0			Electrical Work										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	130.00 lf	64.87 /lf	-	62.50 /lf	-	-	127.37 /lf	16,557	238.10 /lf	30,953
						Rigid galvanized steel plastic coated conduit elbows, 4" diameter, to 15' high	13.00 ea	389.19 /ea	-	196.00 /ea	-	-	585.19 /ea	7,608	1,087.37 /ea	14,136
						Rigid galvanized steel plastic coated conduit couplings, 4" diameter, to 15' high	13.00 ea	28.83 /ea	-	57.50 /ea	-	-	86.33 /ea	1,122	162.49 /ea	2,112
						Flexible metallic conduit, sealtite, 4" diameter	39.00 lf	86.40 /lf	-	20.00 /lf	-	-	106.40 /lf	4,150	196.57 /lf	7,666
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 4" diameter	13.00 ea	129.73 /ea	-	163.00 /ea	-	-	292.73 /ea	3,806	548.64 /ea	7,132
						Flexible metallic conduit, coupling sealtite to rigid, 4" diameter	13.00 ea	129.73 /ea	-	198.00 /ea	-	-	327.73 /ea	4,261	615.37 /ea	8,000
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	37,503	/SF	70,000
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 4" diameter, to 15' H, incl terminations, fittings, & support	650.00 lf	32.43 /lf	-	5.75 /lf	-	-	38.18 /lf	24,819	70.44 /lf	45,785
						PVC conduit elbows, 4" diameter, to 15' H	13.00 ea	116.76 /ea	-	23.00 /ea	-	-	139.76 /ea	1,817	257.96 /ea	3,354
						PVC conduit, field bends, 45 Deg. to 90 Deg., 4" diameter	13.00 ea	129.73 /ea	-	-	-	-	129.73 /ea	1,687	237.91 /ea	3,093
						PVC adapters, 4" diameter, to 15' H	26.00 ea	64.87 /ea	-	4.80 /ea	-	-	69.67 /ea	1,811	128.10 /ea	3,331
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	30,133	/LF	55,562
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .525" to 1.025", pad mount	78.00 ea	324.33 /ea	-	109.00 /ea	-	-	433.33 /ea	33,799	802.56 /ea	62,600
						MV VFD Cable 3/C	9.75 clf	3,373.00 /clf	-	6,000.00 /clf	-	-	9,373.00 /clf	91,387	17,623.71 /clf	171,831
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	125,186	/LF	234,431
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	13.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	5,973	842.59 /E	10,954
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,973	/EA	10,954
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	198,795	/SF	370,946
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	40.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	8,189	379.07 /hr	15,163
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,163
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,163
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	206,985	/SF	386,109
						26.40.PMP 13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A	**780.00** LF	145.29 /LF	1.28 /LF	115.46 /LF	3.33 /LF	/LF	265.37 /LF	206,985	495.01 /LF	386,109
		26.41.PMP				8000HP Pump Process Control Circuits and Connections										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	130.00 lf	29.65 /lf	-	22.50 /lf	-	-	52.15 /lf	6,780	97.27 /lf	12,645
						Rigid galvanized steel plastic coated conduit elbows, 2" diameter, to 15' high	13.00 ea	129.73 /ea	-	42.00 /ea	-	-	171.73 /ea	2,233	317.97 /ea	4,134
						Rigid galvanized steel plastic coated conduit couplings, 2" diameter, to 15' high	13.00 ea	19.58 /ea	-	14.35 /ea	-	-	33.93 /ea	441	63.27 /ea	822
						Flexible metallic conduit, sealtite, 2" diameter	39.00 lf	34.60 /lf	-	4.30 /lf	-	-	38.90 /lf	1,517	71.64 /lf	2,794
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 2" diameter	13.00 ea	51.89 /ea	-	25.50 /ea	-	-	77.39 /ea	1,006	143.77 /ea	1,869
						Flexible metallic conduit, coupling sealtite to rigid, 2" diameter	13.00 ea	103.79 /ea	-	31.50 /ea	-	-	135.29 /ea	1,759	250.38 /ea	3,255
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	13,735	/SF	25,519
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 2" diameter, to 15' H, incl terminations, fittings, & support	650.00 lf	11.53 /lf	-	3.36 /lf	-	-	14.89 /lf	9,680	27.55 /lf	17,909
						PVC conduit elbows, 2" diameter, to 15' H	13.00 ea	51.32 /ea	-	3.54 /ea	-	-	54.86 /ea	713	100.87 /ea	1,311
						PVC conduit, field bends, 45 Deg. to 90 Deg., 2" diameter	13.00 ea	51.89 /ea	-	-	-	-	51.89 /ea	675	95.16 /ea	1,237
						PVC adapters, 2" diameter, to 15' H	26.00 ea	38.44 /ea	-	1.39 /ea	-	-	39.83 /ea	1,036	73.14 /ea	1,902
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	12,103	/LF	22,359
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	80.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	7,163	164.90 /clf	13,192
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	60.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	10,696	329.08 /clf	19,745
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	17,859	/LF	32,937
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,697	/SF	80,815
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,697	/SF	80,815
						26.41.PMP 8000HP Pump Process Control Circuits and Connections	**780.00** LF	43.96 /LF	/LF	12.06 /LF	/LF	/LF	56.02 /LF	43,697	103.61 /LF	80,815
		26.90.LPS				Facility Lightning Protection System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						Air terminal and base, copper, 3/8" dia x 10", to 75' h	50.00 ea	129.73 /ea	-	26.00 /ea	-	-	155.73 /ea	7,787	287.47 /ea	14,374
						Lightning protection cable, copper, 220 lb per thousand feet, to 75' h	1,650.00 lf	3.24 /lf	-	3.18 /lf	-	-	6.42 /lf	10,598	12.01 /lf	19,816
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	18,385	/SF	34,190
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	18,385	/SF	34,190
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	16.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	3,276	379.07 /hr	6,065
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,276	/SF	6,065
					26.15.10.00	Process Electrical, Lightning Protection										
						LPS design and certification, misc mat and labor	1.00 LS	4,540.57 /LS	-	5,000.00 /LS	5,000.00 /LS	-	14,540.57 /LS	14,541	27,027.79 /LS	27,028
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	14,541	/SF	27,028
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	17,816	/SF	33,093
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	36,201	/SF	67,283
						26.90.LPS Facility Lightning Protection System	**14,550.00** SF	1.27 /SF	0.03 /SF	0.85 /SF	0.34 /SF	/SF	2.49 /SF	36,201	4.62 /SF	67,283
		27.10.COMEQ				Communications Room Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	1,811	16.68 /lf	3,336
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	4.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	221	101.59 /ea	406
						Outlet boxes, pressed steel, covers, blank, 4" square	4.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	68	31.21 /ea	125
						Duplex receptacle, grounded, 120 volt, 20 amp	4.00 ea	38.44 /ea	-	10.65 /ea	-	-	49.09 /ea	196	90.79 /ea	363
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	2,296	/SF	4,230
					26.15.01.00	Process Electrical, Wire/Cable										
						Closet Distribution Frame (CDF), 7 feet tall, 19 inches wide	1.00 E	364.31 /E	-	123.00 /E	-	-	487.31 /E	487	902.58 /E	903
						Network Equipment Allowance	1.00 LS	24,287.06 /LS	-	20,000.00 /LS	-	-	44,287.06 /LS	44,287	82,666.03 /LS	82,666
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	6.50 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	702	199.14 /clf	1,294
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	45,477	/LF	84,863
					26.15.03.00	Process Electrical, Cable Tray										
						Cable tray, ladder type, galvanized steel, 4" deep, 4" rung spacing, 12" wide, to 15' elevation, incl fittings & supports	30.00 lf	24.14 /lf	-	17.95 /lf	-	-	42.09 /lf	1,263	78.48 /lf	2,354
						26.15.03.00 Process Electrical, Cable Tray	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,263	/LF	2,354
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	49,035	/SF	91,448
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	49,035	/SF	91,448
						27.10.COMEQ Communications Room Equipment	**1.00** LS	28,011.60 /LS	/LS	21,023.71 /LS	/LS	/LS	49,035.31 /LS	49,035	91,447.85 /LS	91,448
		27.31.COMCDT				Comm Conduit to MH/HH										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,328	4,825.14 /ton	4,343
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,328	/LF	4,343
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Electrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	800.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	13,354	30.88 /lf	24,706
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	13,354	/EA	24,706
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	15,682	/LS	29,049
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	130.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	11,639	164.90 /clf	21,436
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	130.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	23,174	329.08 /clf	42,781
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	34,814	/LF	64,217
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	1.55 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	1,212	1,468.48 /clf	2,269
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	1.50 ea	129.73 /ea	-	31.00 /ea	-	-	160.73 /ea	241	297.01 /ea	446
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,453	/LF	2,714
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	36,266	/SF	66,932
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	51,949	/SF	95,980
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	8.90 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	2,438	439.41 /cy	3,912
						End bulkheads, plywood, concrete envelope/encasement	1.07 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	15	22.59 /sf	24
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	2,454	/CY	3,936
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	116.05 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	2,932	40.01 /ecy	4,643
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	2,932	/CY	4,643
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	9.87 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	199	31.98 /lcy	316
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	199	/CY	316
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	125.92 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	3,645	45.84 /bcy	5,773
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	3,645	/CY	5,773
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	9,229	/LS	14,668
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	9,229	/CY	14,668
						27.31.COMCDT Comm Conduit to MH/HH	**200.00** LF	224.65 /LF	28.56 /LF	52.68 /LF	/LF	/LF	305.89 /LF	61,178	553.24 /LF	110,648
		28.10.FA				Fire Alarm System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,820.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	16,477	16.68 /lf	30,358
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	60.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	3,316	101.59 /ea	6,095
						Outlet boxes, pressed steel, covers, blank, 4" square	8.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	136	31.21 /ea	250
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	52.00 ea	16.22 /ea	-	1.66 /ea	-	-	17.88 /ea	930	32.90 /ea	1,711
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,858	/SF	38,414
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	300.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	26,860	164.90 /clf	49,469
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,860	/LF	49,469
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	47,719	/SF	87,883
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	47,719	/SF	87,883
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Detection Systems, fire alarm control panel, alarm device, excluding wires & conduits	24.00 ea	129.73 /ea	-	230.00 /ea	-	-	359.73 /ea	8,634	586.44 /ea	14,074
						Detection Systems, fire alarm control panel, actuating device, excluding wires & conduits	4.00 ea	129.73 /ea	-	340.00 /ea	-	-	469.73 /ea	1,879	768.64 /ea	3,075
						Detection Systems, fire alarm control panel, addressable without voice, up to 200 points, excluding wires & conduits, inluding vendor design, startup	1.00 ea	1,816.00 /ea	-	4,575.00 /ea	2,500.00 /ea	-	8,891.00 /ea	8,891	14,413.72 /ea	14,414
						Detection Systems, fire alarm control panel, battery & rack, excluding wires & conduits	1.00 ea	259.46 /ea	-	460.00 /ea	-	-	719.46 /ea	719	1,172.87 /ea	1,173
						Detection Systems, fire alarm control panel, battery & rack, automatic charger, excluding wires & conduits	1.00 ea	129.73 /ea	-	525.00 /ea	-	-	654.73 /ea	655	1,075.06 /ea	1,075
						Detection Systems, visual alarm, ADA type, excluding wires & conduits	24.00 ea	154.90 /ea	-	119.00 /ea	-	-	273.90 /ea	6,574	442.45 /ea	10,619
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,429
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,429
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,429
						28.10.FA Fire Alarm System	**14.550.00** SF	3.58 /SF	/SF	1.41 /SF	0.17 /SF	/SF	5.16 /SF	75,070	9.09 /SF	132,312
		28.20.AC				Access Control System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Card reader - all in allowance per each (incl circuit, cards, CX)	7.00 ea	1,556.77 /ea	-	800.00 /ea	-	-	2,356.77 /ea	16,497	3,790.78 /ea	26,535
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,535
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,535
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,535
						28.20.AC Access Control System	**12.00** DOOR	908.12 /DOOR	/DOOR	466.67 /DOOR	/DOOR	/DOOR	1,374.78 /DOOR	16,497	2,211.29 /DOOR	26,535
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Camera allowance (licenses, circuit, startup, CX)	1.00 LS	25,946.13 /LS	-	10,000.00 /LS	10,000.00 /LS	-	45,946.13 /LS	45,946	84,983.51 /LS	84,984
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,984
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,984
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,984
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Closed circuit television system (CCTV), industrial quality, for additional camera stations, add	12.00 ea	384.39 /ea	-	690.00 /ea	-	-	1,074.39 /ea	12,893	1,751.70 /ea	21,020
						Closed circuit television system (CCTV), industrial quality, for weatherproof camera station, add	12.00 ea	798.34 /ea	-	540.00 /ea	-	-	1,338.34 /ea	16,060	2,158.89 /ea	25,907
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,927
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,927
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,927
						28.20.CCTV Closed Circuit TV and Cameras	**12.00** CAM	3,344.91 /CAM	/CAM	2,063.33 /CAM	833.33 /CAM	/CAM	6,241.57 /CAM	74,899	10,992.55 /CAM	131,911
		28.20.ID				Intrusion Detection System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Securitized door, all-in allowance per each (incl circuit, devices, CX)	7.00 ea	2,594.61 /ea	-	1,000.00 /ea	-	-	3,594.61 /ea	25,162	5,765.85 /ea	40,361
						Door controller (all-in cost including vendor program and startup)	3.00 ea	648.65 /ea	-	2,000.00 /ea	500.00 /ea	-	3,148.65 /ea	9,446	5,132.00 /ea	15,396

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,757
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,757
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,757
						28.20.ID Intrusion Detection System	16.00 DOOR	1,256.77 /DOOR	/DOOR	812.50 /DOOR	93.75 /DOOR	/DOOR	2,163.02 /DOOR	34,608	3,484.81 /DOOR	55,757
						04.04 TRR Reservoir Electrical Building	**14,384.00 SF**	**158.01 /SF**	**10.15 /SF**	**645.11 /SF**	**56.54 /SF**	**/SF**	**869.81 /SF**	**12,511,294**	**1,632.31 /SF**	**23,479,107**
	04.05					**TRR Reservoir Site Electrical**										
		26.20.DB				Site Ductbanks										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						In addition to those itemized, lump sum allowance	1.00 ls	-	-	-	50,000.00 /ls	-	50,000.00 /ls	50,000	91,692.74 /ls	91,693
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	50,000	/SF	91,693
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	50,000	/SF	91,693
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	50,000	/SF	91,693
						26.20.DB Site Ductbanks	1.00 LS	/LS	/LS	/LS	50,000.00 /LS	/LS	50,000.00 /LS	50,000	91,692.74 /LS	91,693
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Site lighting, pole, base, circuit, controls, per each (qty assumed)	25.00 ea	-	-	-	5,000.00 /ea	-	5,000.00 /ea	125,000	9,169.27 /ea	229,232
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	125,000	/SF	229,232
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	125,000	/SF	229,232
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	125,000	/SF	229,232
						26.26.EXTLTG Exterior Lighting and Control	1.00 LS	/LS	/LS	/LS	125,000.00 /LS	/LS	125,000.00 /LS	125,000	229,231.81 /LS	229,232
		28.20.AC				Access Control System										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Gate Operator, with card reader, power and control circuit, per each	2.00 ea	-	-	-	10,000.00 /ea	-	10,000.00 /ea	20,000	18,338.55 /ea	36,677
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,000	/SF	36,677
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,000	/SF	36,677
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,000	/SF	36,677
						28.20.AC Access Control System	2.00 DOOR	/DOOR	/DOOR	/DOOR	10,000.00 /DOOR	/DOOR	10,000.00 /DOOR	20,000	18,338.55 /DOOR	36,677
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Cameras, installed on site ltg poles, assumed qty, per each	10.00 ea	-	-	-	7,500.00 /ea	-	7,500.00 /ea	75,000	13,753.91 /ea	137,539
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	75,000	/SF	137,539
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	75,000	/SF	137,539
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	75,000	/SF	137,539
						28.20.CCTV Closed Circuit TV and Cameras	10.00 CAM	/CAM	/CAM	/CAM	7,500.00 /CAM	/CAM	7,500.00 /CAM	75,000	13,753.91 /CAM	137,539
						04.05 TRR Reservoir Site Electrical	**1.00 LS**	**/LS**	**/LS**	**/LS**	**270,000.00 /LS**	**/LS**	**270,000.00 /LS**	**270,000**	**495,140.74 /LS**	**495,141**
	04.06					**Funks Reservoir PGP Sitework**										
		31.00.400				TRR PGP Earthworks										
			01.0			General Requirements										
				01.01		Construction Operations										
					01.01.05.00	General Conditions, Other										
						Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement Allowance	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	-	-	60,000.00 /MO	2,160,000	96,118.77 /MO	3,460,276
						01.01.05.00 General Conditions, Other	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,118.77 /MO	3,460,276
						01.01 Construction Operations	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,118.77 /MO	3,460,276
						01.0 General Requirements	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,118.77 /MO	3,460,276
			31.0			Earthwork										
				31.25		Earthworks, Structural										
					31.16.01.00	Earthworks, Sheeting and Shoring										
						Sheet Pile Wall	27,450.00 SF				45.00 /SF		45.00 /SF	1,235,250	71.27 /SF	1,956,456
						31.16.01.00 Earthworks, Sheeting and Shoring	27,450.00 SF	/SF	/SF	/SF	45.00 /SF	/SF	45.00 /SF	1,235,250	71.27 /SF	1,956,456
					31.25.01.00	Earthworks, Structural, Excavation										
						Structural Excavation, excludes sheeting or dewatering	135,000.00 CY	2.65 /CY	3.23 /CY	-	-	-	5.88 /CY	794,111	9.32 /CY	1,257,756
						Stockpile Excavated Spoils	135,000.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	-	2.84 /cy	383,019	4.51 /cy	609,094
						31.25.01.00 Earthworks, Structural, Excavation	135,000.00 CY	3.89 /CY	4.58 /CY	0.25 /CY	/CY	/CY	8.72 /CY	1,177,130	13.83 /CY	1,866,849
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	2,100.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	-	50.50 /CY	106,051	82.52 /CY	173,298
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	2,100.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	/CY	50.50 /CY	106,051	82.52 /CY	173,298
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	86,710.00 CY	6.18 /CY	1.69 /CY	-	-	-	7.87 /CY	682,514	12.47 /CY	1,081,003
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	69,370.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	140,872	3.22 /cy	223,121
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	17,340.00 cy	1.29 /cy	0.15 /cy	-	-	-	1.44 /cy	24,927	2.28 /cy	39,480
						Compaction, water for, 6000 gallon wagon, 6 mile haul	86,710.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	160,734	3.02 /cy	262,123
						31.25.03.00 Earthworks, Structural, Backfill	86,710.00 CY	7.45 /CY	2.98 /CY	1.20 /CY	/CY	/CY	11.64 /CY	1,009,046	18.52 /CY	1,605,727
					31.25.05.00	Earthworks, Structural, Hauling and Disposal										
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	48,290.00 CY	7.24 /CY	8.80 /CY	-	-	-	16.04 /CY	774,348	25.40 /CY	1,226,455
						Load excavated spoils	48,290.00 cy	1.03 /cy	1.13 /cy	-	-	-	2.16 /cy	104,112	3.41 /cy	164,899
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	48,290.00 CY	8.27 /CY	9.92 /CY	/CY	/CY	/CY	18.19 /CY	878,461	28.81 /CY	1,391,354
						31.25 Earthworks, Structural	272,100.00 CY	5.88 /CY	4.99 /CY	0.78 /CY	4.54 /CY	/CY	16.19 /CY	4,405,938	25.70 /CY	6,993,685
						31.0 Earthwork	272,100.00 CY	5.88 /CY	4.99 /CY	0.78 /CY	4.54 /CY	/CY	16.19 /CY	4,405,938	25.70 /CY	6,993,685
						31.00.400 TRR PGP Earthworks	272,100.00 CY	7.87 /CY	8.96 /CY	2.76 /CY	4.54 /CY	/CY	24.13 /CY	6,565,938	36.42 /CY	10,453,960
		32.00.400				TRR PGP Site Improvements										
			32.0			Exterior Improvements										
				32.12		Paving										
					32.40.03.00	Site Improvements, Paving, Concrete										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	2,086.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	19,372	14.78 /sfca	30,829
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	167.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	430,633	4,159.00 /ton	696,633
						Reinforcing in place, unloading & sorting, add to above - slabs	167.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	9,331	88.23 /ton	14,778
						Struct concrete,ready mix,normal wt,4500 osi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	2,284.70 cy	-	-	131.00 /cy	-	-	131.00 /cy	299,296	216.98 /cy	495,740
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	2,240.48 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	64,976	45.93 /CY	102,912
						Cfnsh,firs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&vln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	90,284.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	84,566	1.48 /sf	133,940
						Curing, sprayed membrane curing compound	902.84 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	20,809	37.41 /csf	33,774
						Fine grading, fine grade for slab on grade, machine	10,031.56 SY	1.19 /SY	0.68 /SY	-	-	-	1.87 /SY	18,802	2.97 /SY	29,779
						32.40.03.00 Site Improvements, Paving, Concrete	10,031.56 SY	41.02 /SY	2.27 /SY	51.19 /SY	/SY	/SY	94.48 /SY	947,783	153.35 /SY	1,538,384
					32.40.04.00	Site Improvements, Access Roads, Gravel										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	18,893.00 SY	0.62 /SY	0.35 /SY	-	-	-	0.98 /SY	18,413	1.54 /SY	29,164
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,6"deep	18,893.00 sy	0.94 /sy	0.92 /sy	7.30 /sy	-	-	9.16 /sy	173,037	15.04 /sy	284,064
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	18,893.00 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	18,421	1.54 /sy	29,176
						32.40.04.00 Site Improvements, Access Roads, Gravel	18,893.00 SY	2.13 /SY	1.68 /SY	7.30 /SY	/SY	/SY	11.11 /SY	209,871	18.12 /SY	342,404
					32.40.04.90	Site Improvements, Access Roads, Asphalt										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					32.40.04.90	Site Improvements, Access Roads, Asphalt										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	4,692.00 sy	0.62 /sy	0.35 /sy	-	-	-	0.98 /sy	4,573	1.54 /sy	7,243
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,12"deep	4,692.00 sy	1.34 /sy	1.31 /sy	15.00 /sy	-	-	17.64 /sy	82,773	29.03 /sy	136,204
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	4,692.00 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	4,575	1.54 /sy	7,246
						Plant-mix asphalt paving, for highways and large paved areas, binder course, 2" thick, no hauling included	4,692.00 SY	0.99 /SY	0.39 /SY	7.40 /SY	-	-	8.78 /SY	41,209	14.45 /SY	67,786
						Plant-mix asphalt paving, for highways and large paved areas, wearing course, 2" thick, no hauling included	4,692.00 sy	1.11 /sy	0.43 /sy	8.25 /sy	-	-	9.79 /sy	45,930	16.10 /sy	75,554
						32.40.04.90 Site Improvements, Access Roads, Asphalt	4,692.00 SY	4.62 /SY	2.89 /SY	30.65 /SY	/SY	/SY	38.16 /SY	179,060	62.67 /SY	294,032
						32.12 Paving	33,616.56 SY	14.08 /SY	2.03 /SY	23.66 /SY	/SY	/SY	39.76 /SY	1,336,715	64.69 /SY	2,174,820
				32.31		Fencing										
					32.45.01.00	Fencing, Chain Link										
						Fence,chain link industrial,galvanized steel,3 strands barb wire,2"posts @ 10'oc,9ga wire,6'high,schedule 40,includes excavation,& concrete	1,400.00 LF	6.52 /LF	0.94 /LF	19.95 /LF	-	-	27.41 /LF	38,369	44.85 /LF	62,795
						Fence, chain link industrial, gate, chain link, 8' high, to 18' wide, includes excavation, in concrete	60.00 LF	95.45 /LF	28.04 /LF	176.00 /LF	-	-	299.49 /LF	17,970	487.11 /LF	29,227
						32.45.01.00 Fencing, Chain Link	1,460.00 LF	10.17 /LF	2.05 /LF	26.36 /LF	/LF	/LF	38.59 /LF	56,338	63.03 /LF	92,022
						32.31 Fencing	1,460.00 LF	10.17 /LF	2.05 /LF	26.36 /LF	/LF	/LF	38.59 /LF	56,338	63.03 /LF	92,022
						32.0 Exterior Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,841.80 /LS	2,266,842
						32.00.400 TRR PGP Site Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,841.80 /LS	2,266,842
		33.00.400				TRR PGP Yard Piping										
			33.2			Pipeline Specialties										
				33.01		Pipeline Specialties										
					33.10.99.01	Buried Pipe Specials, Other										
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	36,710.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	161,954	6.99 /cy	256,512
						Pipe bedding and zone, CLSM	20,832.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	1,567,242	124.23 /cy	2,588,005
						Backfill native material	9,350.00 cy	6.18 /cy	1.69 /cy		-	-	7.87 /cy	73,596	12.47 /cy	116,565
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	27,360.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	438,728	25.40 /cy	694,881
						Load excavated spoils	27,360.00 cy	0.77 /cy	0.84 /cy		-	-	1.62 /cy	44,241	2.56 /cy	70,071
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	9,350.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	18,987	3.22 /cy	30,073
						Compaction, water for, 6000 gallon wagon, 6 mile haul	9,350.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	17,332	3.02 /cy	28,265
						Piping, pipe, WSP, plain end, welded, 144" diameter, excludes excavation or backfill	1,850.00 LF	121.97 /LF	62.10 /LF	970.00 /LF	-	-	1,154.07 /LF	2,135,022	1,898.20 /LF	3,511,666
						Pipe Fittings and Connections Allowance	1.00 ls	162,500.00 /ls	162,500.00 /ls	325,000.00 /ls	-	-	650,000.00 /ls	650,000	1,053,067.95 /ls	1,053,068
						33.10.99.01 Buried Pipe Specials, Other	1,850.00 LF	455.79 /LF	364.83 /LF	1,939.98 /LF	/LF	/LF	2,760.60 /LF	5,107,102	4,513.03 /LF	8,349,107
						33.01 Pipeline Specialties	1.00 LS	843,212.34 /LS	674,929.96 /LS	3,588,960.00 /LS	/LS	/LS	5,107,102.30 /LS	5,107,102	8,349,106.77 /LS	8,349,107
						33.2 Pipeline Specialties	1.00 LS	843,212.34 /LS	674,929.96 /LS	3,588,960.00 /LS	/LS	/LS	5,107,102.30 /LS	5,107,102	8,349,106.77 /LS	8,349,107
						33.00.400 TRR PGP Yard Piping	1,850.00 LF	455.79 /LF	364.83 /LF	1,939.98 /LF	/LF	/LF	2,760.60 /LF	5,107,102	4,513.03 /LF	8,349,107
						04.06 Funks Reservoir PGP Sitework	**1.00 LS**	**3,472,440.83 /LS**	**3,184,362.15 /LS**	**5,174,040.18 /LS**	**1,235,250.00 /LS**	**/LS**	**13,066,093.16 /LS**	**13,066,093**	**21,069,908.87 /LS**	**21,069,909**
						04 Terminal Regulating Reservoir (TRR) PGP	***1.00 LS***	***12,684,841.40 /LS***	***3,732,724.47 /LS***	***23,832,141.19 /LS***	***3,402,650.00 /LS***	***21,876,526.00 /LS***	***65,528,883.06 /LS***	***65,528,883***	***96,347,247.71 /LS***	***96,347,248***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	12,684,841		137,176.944 hrs	
Material	23,832,141			
Allowance	3,402,650			
Equipment	3,732,724		36,470.123 hrs	
Subtotal Direct Costs	**43,652,356**	**43,652,356**		
Material Sales Tax, Dunnigan Ca	1,727,830			7.250 %
Subtotal W/ Sales Tax	**1,727,830**	**45,380,186**		
Masonry Work I,OH&P	76,892			20.000 %
Metals Work I,OH&P	232,914			20.000 %
Architectural (Div 6-12)I,OH&P	35,778			20.000 %
Mechanical Work I,OH&P	153,701			20.000 %
Electrical Work I,OH&P	3,104,621			25.000 %
Instruments & Controls I,OH&P				20.000 %
Subtotal W/ Subcontractor OH&P	**3,603,906**	**48,984,092**		
General Conditions	2,449,205			5.000 %
Subtotal W/ General Conditions	**2,449,205**	**51,433,297**		
Mobilization/Demobilization	1,542,999			3.000 %
Prime Contractor Overhead	5,297,630			10.000 %
Prime Contractor Profit	3,496,436			6.000 %
Bonds & Insurance	1,340,417			2.170 %
Subtotal W/ Prime Markups	**11,677,482**	**63,110,779**		
Contractor Contingency	1,893,323			3.000 %
Design Contingency	9,466,617			15.000 %
Subtotal W/ Contingency	**11,359,940**	**74,470,719**		
Non-Markup Items	21,876,526			
Subtotal W/ Non-Markup Items	**21,876,526**	**96,347,245**		
Total Construction Cost		**96,347,245**		
Non-Contract Costs	16,379,032			17.000 %
Total Project Costs	**16,379,032**	**112,726,277**		

Transmission Power Lines - WAPA

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Transmission Lines WAPA Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
10			Transmission Lines for WAPA Connection										
	10.01		Funks to WAPA Connection										
		34.07.MISC	MISC. SUPERVISION, ROADS & MATTING	1.00 LS	241,900.00 /LS	/LS	70,000.00 /LS	451,000.00 /LS	5,000,000.00 /LS	5,762,900.00 /LS	5,762,900	8,983,694.91 /LS	8,983,695
		34.09.FNDT	T-LINE FOUNDATIONS	2.00 MO	312,600.60 /MO	40,244.78 /MO	179,733.40 /MO	/MO	/MO	532,578.78 /MO	1,065,158	842,790.41 /MO	1,685,581
		34.11.STRC	T-LINE STRUCTURES	2.00 MO	502,444.80 /MO	71,615.43 /MO	1,035,000.00 /MO	/MO	/MO	1,609,060.23 /MO	3,218,120	2,581,959.39 /MO	5,163,919
		34.13.WIRE	T-LINE WIRE WORK	1.00 MO	453,640.19 /MO	94,900.30 /MO	239,250.00 /MO	/MO	/MO	787,790.49 /MO	787,790	1,244,726.18 /MO	1,244,726
			10.01 Funks to WAPA Connection	1.30 MI	1,788,946.92 /MI	245,092.85 /MI	2,106,705.23 /MI	346,923.08 /MI	3,846,153.85 /MI	8,333,821.92 /MI	10,833,968	13,136,862.07 /MI	17,077,921
	10.02		Funks to TRR										
		34.07.MISC	MISC. SUPERVISION, ROADS & MATTING	1.00 LS	967,600.00 /LS	/LS	90,000.00 /LS	1,570,000.00 /LS	5,000,000.00 /LS	7,627,600.00 /LS	7,627,600	11,890,354.52 /LS	11,890,355
		34.09.FNDT	T-LINE FOUNDATIONS	7.00 MO	217,372.63 /MO	40,645.89 /MO	119,442.86 /MO	/MO	/MO	377,461.37 /MO	2,642,230	596,745.84 /MO	4,177,221
		34.11.STRC	T-LINE STRUCTURES	4.00 MO	676,587.60 /MO	126,576.10 /MO	1,303,750.00 /MO	/MO	/MO	2,106,913.70 /MO	8,427,655	3,377,101.35 /MO	13,508,405
		34.13.WIRE	T-LINE WIRE WORK	7.00 MO	170,166.51 /MO	53,612.51 /MO	100,714.29 /MO	/MO	/MO	324,493.30 /MO	2,271,453	512,863.57 /MO	3,590,045
			10.02 Funks to TRR	4.10 MI	1,557,737.64 /MI	284,417.84 /MI	1,669,780.49 /MI	382,926.83 /MI	1,219,512.20 /MI	5,114,375.00 /MI	20,968,937	8,089,274.59 /MI	33,166,026
			10 Transmission Lines for WAPA Connection	5.40 MI	1,613,399.14 /MI	274,950.71 /MI	1,774,966.07 /MI	374,259.26 /MI	1,851,851.85 /MI	5,889,427.03 /MI	31,802,906	9,304,434.54 /MI	50,243,947

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	13,573,882		73,075.707 hrs	
Material	15,628,080			
Allowance	3,148,726			
Equipment	2,313,221		15,280.000 hrs	
Other	15,580,038			
Total Construction Cost	**50,243,947**	**50,243,947**		
Non-Contract Costs	7,536,592			15.000 %
Total Project Costs	**7,536,592**	**57,780,539**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Transmission Lines WAPA Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
10						***Transmission Lines for WAPA Connection***										
	10.01					**Funks to WAPA Connection**										
		34.07.MISC				*MISC, SUPERVISION, ROADS & MATTING*										
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Matting Structure Work Pad 50'x50'	14.00 ea		-		7,000.00 /ea	-	7,000.00 /ea	98,000	10,906.03 /ea	152,684
						Matting per foot (through wetlands)	1,300.00 lf		-		150.00 /lf	-	150.00 /lf	195,000	233.70 /lf	303,811
						Access Road per foot	3,500.00 lf		-		40.00 /lf	-	40.00 /lf	140,000	62.32 /lf	218,121
						ROW clearing	6.00 acre		-		3,000.00 /acre	-	3,000.00 /acre	18,000	4,674.01 /acre	28,044
						Field Construction Coordinator	1,600.00 hr	118.95 /hr	-			-	118.95 /hr	190,320	185.32 /hr	296,519
						General Supervision	400.00 hr	128.95 /hr	-			-	128.95 /hr	51,580	200.90 /hr	80,362
						Misc Material	1.00 ls		-	70,000.00 /ls		-	70,000.00 /ls	70,000	114,135.27 /ls	114,135
						Allowance at BUDGET LEVEL (Other cost type)	1.00 ls		-			5,000,000.00 /ls	5,000,000.00 /ls	5,000,000	7,790,018.83 /ls	7,790,019
						33.71.91.00 Transmission Line	***1.00*** *LS*	*241,900.00 /LS*	*/LS*	*70,000.00 /LS*	*451,000.00 /LS*	*5,000,000.00 /LS*	*5,762,900.00 /LS*	*5,762,900*	*8,983,694.91 /LS*	*8,983,695*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*5,762,900*	*/SF*	*8,983,695*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*5,762,900*	*/LF*	*8,983,695*
						34.07.MISC MISC, SUPERVISION, ROADS & MATTING	***1.00*** *LS*	*241,900.00 /LS*	*/LS*	*70,000.00 /LS*	*451,000.00 /LS*	*5,000,000.00 /LS*	*5,762,900.00 /LS*	*5,762,900*	*8,983,694.91 /LS*	*8,983,695*
		34.09.FNDT				*T-LINE FOUNDATIONS*										
			26.0			*Electrical Work*										
				26.00		*Electrical*										
					01.01.06.03	*GC Equip, Tools, & Consumables*										
						Rent auger, truck-mounted, for caissons, water wells	43.00 day	-	771.10 /day	-	-	-	771.10 /day	33,157	1,201.38 /day	51,659
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	43.00 day	-	629.75 /day	-	-	-	629.75 /day	27,079	981.15 /day	42,190
						Rent crane truck mounted, hydraulic, 12 ton capacity	43.00 day	-	471.00 /day	-	-	-	471.00 /day	20,253	733.82 /day	31,554
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*80,489.55 /LS*	*/LS*	*/LS*	*/LS*	*80,489.55 /LS*	*80,490*	*125,403.02 /LS*	*125,403*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*80,490*	*/SF*	*125,403*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*80,490*	*/SF*	*125,403*
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Mobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,358.42 /ls	33,358
						Foundation 7' dia x 30' caisson	6.00 ea	19,032.00 /ea	-	12,477.00 /ea	-	-	31,509.00 /ea	189,054	49,995.72 /ea	299,974
						Foundation 8' dia x 30' caisson	2.00 ea	28,548.00 /ea	-	14,532.40 /ea	-	-	43,080.40 /ea	86,161	68,173.02 /ea	136,346
						Foundation 10' dia x 30' caisson	12.00 ea	34,257.60 /ea	-	21,295.00 /ea	-	-	55,552.60 /ea	666,631	88,095.05 /ea	1,057,141
						Demobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,358.42 /ls	33,358
						33.71.91.00 Transmission Line	***1.00*** *LS*	*625,201.20 /LS*	*/LS*	*359,466.80 /LS*	*/LS*	*/LS*	*984,668.00 /LS*	*984,668*	*1,560,177.80 /LS*	*1,560,178*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*984,668*	*/SF*	*1,560,178*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*984,668*	*/LF*	*1,560,178*
						34.09.FNDT T-LINE FOUNDATIONS	***2.00*** *MO*	*312,600.60 /MO*	*40,244.78 /MO*	*179,733.40 /MO*	*/MO*	*/MO*	*532,578.78 /MO*	*1,065,158*	*842,790.41 /MO*	*1,685,581*
		34.11.STRC				*T-LINE STRUCTURES*										
			26.0			*Electrical Work*										
				26.00		*Electrical*										
					01.01.06.03	*GC Equip, Tools, & Consumables*										
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	43.00 day	-	629.75 /day	-	-	-	629.75 /day	27,079	981.15 /day	42,190
						Rent forklift, for rough terrain, 42' lift, 35' reach, 9000 lb., 110 H.P.	43.00 day	-	534.20 /day	-	-	-	534.20 /day	22,971	832.29 /day	35,788
						Rent crane truck mount, cable 8x4 drive 90 ton, 15' radius	43.00 day	-	1,696.00 /day	-	-	-	1,696.00 /day	72,928	2,642.37 /day	113,622
						Rent crane truck mounted, hydraulic, 12 ton capacity	43.00 day	-	471.00 /day	-	-	-	471.00 /day	20,253	733.82 /day	31,554
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*143,230.85 /LS*	*/LS*	*/LS*	*/LS*	*143,230.85 /LS*	*143,231*	*223,154.20 /LS*	*223,154*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*143,231*	*/SF*	*223,154*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*143,231*	*/SF*	*223,154*
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Mobilization	1.00 LS	57,096.00 /LS	-		-	-	57,096.00 /LS	57,096	88,955.78 /LS	88,956
						Install Steel Double Circuit Suspension Pole	4.00 ea	45,676.80 /ea	-	85,000.00 /ea	-	-	130,676.80 /ea	522,707	209,757.45 /ea	839,030
						Install Steel Double Circuit Light Angle Pole	2.00 ea	57,096.00 /ea	-	130,000.00 /ea	-	-	187,096.00 /ea	374,192	300,921.27 /ea	601,843
						Install Steel Double Circuit Heavy Angle Pole	6.00 ea	68,515.20 /ea	-	170,000.00 /ea	-	-	238,515.20 /ea	1,431,091	383,932.58 /ea	2,303,595
						Install Steel Single Circuit H-Deadend Structure	1.00 ea	45,676.80 /ea	-	50,000.00 /ea	-	-	95,676.80 /ea	95,677	152,889.82 /ea	152,690
						Install Steel Single Circuit 3P Structure	2.00 ea	68,515.20 /ea	-	200,000.00 /ea	-	-	268,515.20 /ea	537,030	432,847.70 /ea	865,695
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,955.78 /ls	88,956
						33.71.91.00 Transmission Line	*1.00 LS*	*1,004,889.60 /LS*	*/LS*	*2,070,000.00 /LS*	*/LS*	*/LS*	*3,074,889.60 /LS*	*3,074,890*	*4,940,764.58 /LS*	*4,940,765*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*3,074,890*	*/SF*	*4,940,765*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*3,074,890*	*/LF*	*4,940,765*
						34.11.STRC T-LINE STRUCTURES	***2.00*** *MO*	*502,444.80 /MO*	*71,615.43 /MO*	*1,035,000.00 /MO*	*/MO*	*/MO*	*1,609,060.23 /MO*	*3,218,120*	*2,581,959.39 /MO*	*5,163,919*
		34.13.WIRE				*T-LINE WIRE WORK*										
			26.0			*Electrical Work*										
				26.00		*Electrical*										
					01.01.06.03	*GC Equip, Tools, & Consumables*										
						Rent dozer, crawler, torque converter, diesel 200 HP	22.00 day	-	1,504.00 /day	-	-	-	1,504.00 /day	33,088	2,343.24 /day	51,551
						Rent trailer with cable reel for high voltage line work	22.00 day	-	64.10 /day	-	-	-	64.10 /day	1,410	99.87 /day	2,197
						Rent trailer with cable tensioning rig, for high voltage line work	22.00 day	-	110.40 /day	-	-	-	110.40 /day	2,429	172.00 /day	3,784
						Rent trailer with cable pulling rig, for high voltage line work	22.00 day	-	607.15 /day	-	-	-	607.15 /day	13,357	945.94 /day	20,811
						Rent crane truck mount, cable 8x4 drive 40 ton, 12' radius	22.00 day	-	2,028.00 /day	-	-	-	2,028.00 /day	44,616	3,159.63 /day	69,512
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*94,900.30 /LS*	*/LS*	*/LS*	*/LS*	*94,900.30 /LS*	*94,900*	*147,855.00 /LS*	*147,855*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*94,900*	*/SF*	*147,855*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*94,900*	*/SF*	*147,855*
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Overhead line conductors & devices, conductors, primary circuits, per wire, 1000 to 1600 kcmil	37,000.00 lf	5.15 /lf		2.25 /lf	-	-	7.40 /lf	273,600	11.68 /lf	432,305
						Overhead line conductors & devices, insulators and hardware, primary circuits, disk insulators, 345 to 500 kV	15.00 ea	2,854.80 /ea		9,000.00 /ea	-	-	11,854.80 /ea	177,822	19,122.32 /ea	286,835
						Overhead line conductors & devices, overhead ground wire	14,000.00 lf	7.59 /lf		1.50 /lf	-	-	9.09 /lf	127,276	14.27 /lf	199,820
						Mobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,955.79 /ls	88,956
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,955.79 /ls	88,956
						33.71.91.00 Transmission Line	***1.00*** *LS*	*453,640.19 /LS*	*/LS*	*239,250.00 /LS*	*/LS*	*/LS*	*692,890.19 /LS*	*692,890*	*1,096,871.18 /LS*	*1,096,871*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*692,890*	*/SF*	*1,096,871*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*692,890*	*/LF*	*1,096,871*
						34.13.WIRE T-LINE WIRE WORK	***1.00*** *MO*	*453,640.19 /MO*	*94,900.30 /MO*	*239,250.00 /MO*	*/MO*	*/MO*	*787,790.49 /MO*	*787,790*	*1,244,726.18 /MO*	*1,244,726*
						10.01 Funks to WAPA Connection	***1.30*** **MI**	**1,788,946.92 /MI**	**245,092.85 /MI**	**2,106,705.23 /MI**	**346,923.08 /MI**	**3,846,153.85 /MI**	**8,333,821.92 /MI**	**10,833,968**	**13,136,862.07 /MI**	**17,077,921**
	10.02					**Funks to TRB**										
		34.07.MISC				*MISC, SUPERVISION, ROADS & MATTING*										
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Matting Structure Work Pad 50'x50'	49.00 ea		-		7,000.00 /ea	-	7,000.00 /ea	343,000	10,906.03 /ea	534,395
						Matting per foot (through wetlands)	4,500.00 lf		-		150.00 /lf	-	150.00 /lf	675,000	233.70 /lf	1,051,653
						Access Road per foot	12,000.00 lf		-		40.00 /lf	-	40.00 /lf	480,000	62.32 /lf	747,842
						ROW clearing	24.00 acre		-		3,000.00 /acre	-	3,000.00 /acre	72,000	4,674.01 /acre	112,176
						Field Construction Coordinator	6,400.00 hr	118.95 /hr	-			-	118.95 /hr	761,280	185.32 /hr	1,186,077
						General Supervision	1,600.00 hr	128.95 /hr	-			-	128.95 /hr	206,320	200.90 /hr	321,447
						Misc Material	1.00 ls		-	90,000.00 /ls		-	90,000.00 /ls	90,000	146,745.34 /ls	146,745
						Allowance at BUDGET LEVEL (Other cost type)	1.00 ls		-			5,000,000.00 /ls	5,000,000.00 /ls	5,000,000	7,790,018.84 /ls	7,790,019
						33.71.91.00 Transmission Line	***1.00*** *LS*	*967,600.00 /LS*	*/LS*	*90,000.00 /LS*	*1,570,000.00 /LS*	*5,000,000.00 /LS*	*7,627,600.00 /LS*	*7,627,600*	*11,890,354.52 /LS*	*11,890,355*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*7,627,600*	*/SF*	*11,890,355*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*7,627,600*	*/LF*	*11,890,355*

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Transmission Lines WAPA Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						34.07.MISC MISC, SUPERVISION, ROADS & MATTING	1.00 LS	967,600.00 /LS	/LS	90,000.00 /LS	1,570,000.00 /LS	5,000,000.00 /LS	7,627,600.00 /LS	7,627,600	11,890,354.52 /LS	11,890,355
		34.09.FNDT				T-LINE FOUNDATIONS										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent auger, truck-mounted, for caissons, water wells	152.00 day	-	771.10 /day	-	-	-	771.10 /day	117,207	1,201.38 /day	182,609
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	152.00 day	-	629.75 /day	-	-	-	629.75 /day	95,722	981.15 /day	149,135
						Rent crane truck mounted, hydraulic, 12 ton capacity	152.00 day	-	471.00 /day	-	-	-	471.00 /day	71,592	733.82 /day	111,541
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	284,521.20 /LS	/LS	/LS	/LS	284,521.20 /LS	284,521	443,285.11 /LS	443,285
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	284,521	/SF	443,285
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	284,521	/SF	443,285
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,358.42 /ls	33,358
						Foundation 7' dia x 30' caisson	39.00 ea	22,838.40 /ea	-	12,477.00 /ea	-	-	35,315.40 /ea	1,377,301	55,926.11 /ea	2,181,118
						Foundation 8' dia x 30' caisson	5.00 ea	28,548.00 /ea	-	14,532.40 /ea	-	-	43,080.40 /ea	215,402	68,173.03 /ea	340,865
						Foundation 10' dia x 30' caisson	13.00 ea	34,257.60 /ea	-	21,295.00 /ea	-	-	55,552.60 /ea	722,184	88,095.05 /ea	1,145,236
						Demobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,358.40 /ls	33,358
						33.71.91.00 Transmission Line	1.00 LS	1,521,608.40 /LS	/LS	836,100.00 /LS	/LS	/LS	2,357,708.40 /LS	2,357,708	3,733,935.80 /LS	3,733,936
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	2,357,708	/SF	3,733,936
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,357,708	/LF	3,733,936
						34.09.FNDT T-LINE FOUNDATIONS	7.00 MO	217,372.63 /MO	40,645.89 /MO	119,442.86 /MO	/MO	/MO	377,461.37 /MO	2,642,230	596,745.84 /MO	4,177,221
		34.11.STRC				T-LINE STRUCTURES										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	152.00 day	-	629.75 /day	-	-	-	629.75 /day	95,722	981.15 /day	149,135
						Rent forklift, for rough terrain, 42' lift, 35' reach, 9000 lb., 110 H.P.	152.00 day	-	534.20 /day	-	-	-	534.20 /day	81,198	832.29 /day	126,507
						Rent crane truck mount, cable 8x4 drive 90 ton, 15' radius	152.00 day	-	1,696.00 /day	-	-	-	1,696.00 /day	257,792	2,642.37 /day	401,641
						Rent crane truck mounted, hydraulic, 12 ton capacity	152.00 day	-	471.00 /day	-	-	-	471.00 /day	71,592	733.82 /day	111,541
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	506,304.40 /LS	/LS	/LS	/LS	506,304.40 /LS	506,304	788,824.17 /LS	788,824
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	506,304	/SF	788,824
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	506,304	/SF	788,824
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 LS	57,096.00 /LS	-		-	-	57,096.00 /LS	57,096	88,955.78 /LS	88,956
						Install Steel Double Circuit Suspension Pole	23.00 ea	45,676.80 /ea	-	85,000.00 /ea	-	-	130,676.80 /ea	3,005,566	209,757.45 /ea	4,824,421
						Install Steel Double Circuit Light Angle Pole	5.00 ea	57,096.00 /ea	-	130,000.00 /ea	-	-	187,096.00 /ea	935,480	300,921.27 /ea	1,504,606
						Install Steel Double Circuit Heavy Angle Pole	13.00 ea	68,515.20 /ea	-	170,000.00 /ea	-	-	238,515.20 /ea	3,100,698	383,932.58 /ea	4,991,124
						Install Steel Single Circuit H-Deadend Structure	8.00 ea	45,676.80 /ea	-	50,000.00 /ea	-	-	95,676.80 /ea	765,414	152,689.81 /ea	1,221,519
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,955.76 /ls	88,956
						33.71.91.00 Transmission Line	1.00 LS	2,706,350.40 /LS	/LS	5,215,000.00 /LS	/LS	/LS	7,921,350.40 /LS	7,921,350	12,719,581.24 /LS	12,719,581
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	7,921,350	/SF	12,719,581
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,921,350	/LF	12,719,581
						34.11.STRC T-LINE STRUCTURES	4.00 MO	676,587.60 /MO	126,576.10 /MO	1,303,750.00 /MO	/MO	/MO	2,106,913.70 /MO	8,427,655	3,377,101.35 /MO	13,508,405
		34.13.WIRE				T-LINE WIRE WORK										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent dozer, crawler, torque converter, diesel 200 HP	87.00 day	-	1,504.00 /day	-	-	-	1,504.00 /day	130,848	2,343.24 /day	203,862
						Rent trailer with cable reel for high voltage line work	87.00 day	-	64.10 /day	-	-	-	64.10 /day	5,577	99.87 /day	8,689
						Rent trailer with cable tensioning rig, for high voltage line work	87.00 day	-	110.40 /day	-	-	-	110.40 /day	9,605	172.00 /day	14,964
						Rent trailer with cable pulling rig, for high voltage line work	87.00 day	-	607.15 /day	-	-	-	607.15 /day	52,822	945.94 /day	82,297
						Rent crane truck mount, cable 8x4 drive 40 ton, 12' radius	87.00 day	-	2,028.00 /day	-	-	-	2,028.00 /day	176,436	3,159.63 /day	274,888
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	375,287.55 /LS	/LS	/LS	/LS	375,287.55 /LS	375,288	584,699.44 /LS	584,699
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	375,288	/SF	584,699
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	375,288	/SF	584,699
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Overhead line conductors & devices, conductors, primary circuits, per wire, 795 to 954 kcmil	132,000.00 lf	4.57 /lf		1.50 /lf	-	-	6.07 /lf	801,077	9.56 /lf	1,262,435
						Overhead line conductors & devices, insulators and hardware, primary circuits, disk insulators, 345 to 500 kV	49.00 ea	2,854.80 /ea		9,000.00 /ea	-	-	11,854.80 /ea	580,885	19,122.32 /ea	936,994
						Overhead line conductors & devices, overhead ground wire	44,000.00 lf	7.59 /lf		1.50 /lf	-	-	9.09 /lf	400,012	14.27 /lf	628,005
						Mobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,955.79 /ls	88,956
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,955.78 /ls	88,956
						33.71.91.00 Transmission Line	1.00 LS	1,191,165.54 /LS	/LS	705,000.00 /LS	/LS	/LS	1,896,165.54 /LS	1,896,166	3,005,345.55 /LS	3,005,346
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,896,166	/SF	3,005,346
						33.0 Utilities	44,000.00 LF	27.07 /LF	/LF	16.02 /LF	/LF	/LF	43.10 /LF	1,896,166	68.30 /LF	3,005,346
						34.13.WIRE T-LINE WIRE WORK	7.00 MO	170,166.51 /MO	53,612.51 /MO	100,714.29 /MO	/MO	/MO	324,493.30 /MO	2,271,453	512,863.57 /MO	3,590,045
						10.02 Funks to TRR	4.10 MI	1,557,737.64 /MI	284,417.84 /MI	1,669,780.49 /MI	382,926.83 /MI	1,219,512.20 /MI	5,114,375.00 /MI	20,968,937	8,089,274.59 /MI	33,166,026
						10 Transmission Lines for WAPA Connection	**5.40 MI**	**1,613,399.14 /MI**	**274,950.71 /MI**	**1,774,966.07 /MI**	**374,259.26 /MI**	**1,851,851.85 /MI**	**5,889,427.03 /MI**	**31,802,906**	**9,304,434.54 /MI**	**50,243,947**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	8,712,355		73,075.707 hrs	
Material	9,584,817			
Allowance	2,021,000			
Equipment	1,484,734		15,280.000 hrs	
Other	10,000,000			
Subtotal Direct Costs	**31,802,906**	**31,802,906**		
Material Sales Tax, Dunnigan Ca	694,899			7.250 %
Subtotal W/ Sales Tax	**694,899**	**32,497,805**		
General Conditions	1,624,890			5.000 %
Subtotal W/ General Conditions	**1,624,890**	**34,122,695**		
Mobilization/Demobilization	1,023,681			3.000 %
Prime Contractor Overhead	3,514,638			10.000 %
Prime Contractor Profit	2,319,661			6.000 %
Bonds & Insurance	889,281			2.170 %
Subtotal W/ Prime Markups	**7,747,261**	**41,869,956**		
Contractor Contingency	2,093,498			5.000 %
Design Contingency	6,280,493			15.000 %
Subtotal W/ Contingency	**8,373,991**	**50,243,947**		
Total Construction Cost		**50,243,947**		
Non-Contract Costs	7,536,592			15.000 %
Total Project Costs	**7,536,592**	**57,780,539**		

Transmission Power Lines - PGE

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Transmission Lines PG&E Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
11			***Transmission Lines for PG&E Connection***										
	11.01		TRR to PGE Connection										
		34.07.MISC	MISC. SUPERVISION, ROADS & MATTING	1.00 LS	423,325.00 /LS	/LS	70,000.00 /LS	703,000.00 /LS	5,000,000.00 /LS	6,196,325.00 /LS	6,196,325	9,658,809.97 /LS	9,658,810
		34.09.FNDT	T-LINE FOUNDATIONS	3.00 MO	259,152.40 /MO	40,556.75 /MO	147,516.80 /MO	/MO	/MO	447,225.95 /MO	1,341,678	707,462.94 /MO	2,122,389
		34.11.STRC	T-LINE STRUCTURES	3.00 MO	369,220.80 /MO	72,170.58 /MO	773,333.33 /MO	/MO	/MO	1,214,724.72 /MO	3,644,174	1,948,580.45 /MO	5,845,741
		34.13.WIRE	T-LINE WIRE WORK	2.00 MO	288,743.04 /MO	92,743.48 /MO	156,750.00 /MO	/MO	/MO	538,236.52 /MO	1,076,473	849,924.76 /MO	1,699,850
			11.01 TRR to PGE Connection	1.80 MI	1,603,294.82 /MI	290,927.19 /MI	1,747,805.78 /MI	390,555.56 /MI	2,777,777.78 /MI	6,810,361.13 /MI	12,258,650	10,737,105.36 /MI	19,326,790
	11.02		TRR to Funks										
		34.07.MISC	MISC. SUPERVISION, ROADS & MATTING	1.00 LS	967,600.00 /LS	/LS	90,000.00 /LS	1,570,000.00 /LS	5,000,000.00 /LS	7,627,600.00 /LS	7,627,600	11,890,154.22 /LS	11,890,154
		34.09.FNDT	T-LINE FOUNDATIONS	7.00 MO	217,372.63 /MO	40,645.89 /MO	119,442.86 /MO	/MO	/MO	377,461.37 /MO	2,642,230	596,735.94 /MO	4,177,152
		34.11.STRC	T-LINE STRUCTURES	4.00 MO	676,587.60 /MO	126,576.10 /MO	1,303,750.00 /MO	/MO	/MO	2,106,913.70 /MO	8,427,655	3,377,046.02 /MO	13,508,184
		34.13.WIRE	T-LINE WIRE WORK	7.00 MO	170,166.51 /MO	53,612.51 /MO	100,714.29 /MO	/MO	/MO	324,493.30 /MO	2,271,453	512,855.05 /MO	3,589,985
			11.02 TRR to Funks	4.10 MI	1,557,737.64 /MI	284,417.84 /MI	1,669,780.49 /MI	382,926.83 /MI	1,219,512.20 /MI	5,114,375.00 /MI	20,968,937	8,089,140.29 /MI	33,165,475
			11 Transmission Lines for PG&E Connection	***5.90 MI***	***1,571,636.44 /MI***	***286,403.75 /MI***	***1,693,584.81 /MI***	***385,254.24 /MI***	***1,694,915.25 /MI***	***5,631,794.50 /MI***	***33,227,588***	***8,896,994.04 /MI***	***52,492,265***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	14,446,588		77,760.866 hrs	
Material	16,291,976			
Allowance	3,541,283			
Equipment	2,632,643		17,352.000 hrs	
Other	15,579,775			
Total Construction Cost	**52,492,265**	**52,492,265**		
Non-Contract Costs	7,873,840			15.000 %
Total Project Costs	**7,873,840**	**60,366,105**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Transmission Lines PG&E Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
11						***Transmission Lines for PG&E Connection***										
	11.01					TRR to PGE Connection										
		34.07.MISC				MISC, SUPERVISION, ROADS & MATTING										
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Matting Structure Work Pad 50'x50'	19.00 ea		-		7,000.00 /ea	-	7,000.00 /ea	133,000	10,905.84 /ea	207,211
						Matting per foot (through wetlands)	2,000.00 lf		-		150.00 /lf	-	150.00 /lf	300,000	233.70 /lf	467,393
						Access Road per foot	6,000.00 lf		-		40.00 /lf	-	40.00 /lf	240,000	62.32 /lf	373,915
						ROW clearing	10.00 acre		-		3,000.00 /acre	-	3,000.00 /acre	30,000	4,673.93 /acre	46,739
						Field Construction Coordinator	2,800.00 hr	118.95 /hr	-			-	118.95 /hr	333,060	185.32 /hr	518,900
						General Supervision	700.00 hr	128.95 /hr	-			-	128.95 /hr	90,265	200.90 /hr	140,631
						Misc Material	1.00 ls		-	70,000.00 /ls			70,000.00 /ls	70,000	114,133.43 /ls	114,133
						Allowance at BUDGET LEVEL (Other cost type)	1.00 ls		-			5,000,000.00 /ls	5,000,000.00 /ls	5,000,000	7,789,887.52 /ls	7,789,888
						33.71.91.00 Transmission Line	**1.00** LS	423,325.00 /LS	/LS	70,000.00 /LS	703,000.00 /LS	5,000,000.00 /LS	6,196,325.00 /LS	6,196,325	9,658,809.97 /LS	9,658,810
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	6,196,325	/SF	9,658,810
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	6,196,325	/LF	9,658,810
						34.07.MISC MISC, SUPERVISION, ROADS & MATTING	**1.00** LS	423,325.00 /LS	/LS	70,000.00 /LS	703,000.00 /LS	5,000,000.00 /LS	6,196,325.00 /LS	6,196,325	9,658,809.97 /LS	9,658,810
		34.09.FNDT				T-LINE FOUNDATIONS										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent auger, truck-mounted, for caissons, water wells	65.00 day	-	771.10 /day	-	-	-	771.10 /day	50,122	1,201.36 /day	78,088
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	65.00 day	-	629.75 /day	-	-	-	629.75 /day	40,934	981.14 /day	63,774
						Rent crane truck mounted, hydraulic, 12 ton capacity	65.00 day	-	471.00 /day	-	-	-	471.00 /day	30,615	733.81 /day	47,697
						01.01.06.03 GC Equip, Tools, & Consumables	**1.00** LS	/LS	121,670.25 /LS	/LS	/LS	/LS	121,670.25 /LS	121,670	189,559.52 /LS	189,560
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	121,670	/SF	189,560
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	121,670	/SF	189,560
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,357.85 /ls	33,358
						Foundation 7' dia x 30' caisson	8.00 ea	19,032.00 /ea	-	12,477.00 /ea	-	-	31,509.00 /ea	252,072	49,994.89 /ea	399,959
						Foundation 8' dia x 30' caisson	6.00 ea	28,548.00 /ea	-	14,532.40 /ea	-	-	43,080.40 /ea	258,482	68,171.90 /ea	409,031
						Foundation 10' dia x 30' caisson	12.00 ea	34,257.60 /ea	-	21,295.00 /ea	-	-	55,552.60 /ea	666,631	88,093.59 /ea	1,057,123
						Demobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,357.85 /ls	33,358
						33.71.91.00 Transmission Line	**1.00** LS	777,457.29 /LS	/LS	442,550.40 /LS	/LS	/LS	1,220,007.69 /LS	1,220,008	1,932,829.29 /LS	1,932,829
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,220,008	/SF	1,932,829
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,220,008	/LF	1,932,829
						34.09.FNDT T-LINE FOUNDATIONS	**3.00** MO	259,152.40 /MO	40,556.75 /MO	147,516.80 /MO	/MO	/MO	447,225.95 /MO	1,341,678	707,462.94 /MO	2,122,389
		34.11.STRC				T-LINE STRUCTURES										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	65.00 day	-	629.75 /day	-	-	-	629.75 /day	40,934	981.14 /day	63,774
						Rent forklift, for rough terrain, 42' lift, 35' reach, 9000 lb., 110 H.P.	65.00 day	-	534.20 /day	-	-	-	534.20 /day	34,723	832.27 /day	54,098
						Rent crane truck mount, cable 8x4 drive 90 ton, 15' radius	65.00 day	-	1,696.00 /day	-	-	-	1,696.00 /day	110,240	2,642.33 /day	171,751
						Rent crane truck mounted, hydraulic, 12 ton capacity	65.00 day	-	471.00 /day	-	-	-	471.00 /day	30,615	733.81 /day	47,697
						01.01.06.03 GC Equip, Tools, & Consumables	**1.00** LS	/LS	216,511.75 /LS	/LS	/LS	/LS	216,511.75 /LS	216,512	337,320.44 /LS	337,320
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	216,512	/SF	337,320
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	216,512	/SF	337,320
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 LS	57,096.00 /LS	-		-	-	57,096.00 /LS	57,096	88,954.28 /LS	88,954
						Install Steel Double Circuit Suspension Pole	6.00 ea	45,676.80 /ea	-	85,000.00 /ea	-	-	130,676.80 /ea	784,061	209,754.02 /ea	1,258,524
						Install Steel Double Circuit Light Angle Pole	3.00 ea	57,096.00 /ea	-	130,000.00 /ea	-	-	187,096.00 /ea	561,288	300,916.36 /ea	902,749
						Install Steel Double Circuit Heavy Angle Pole	6.00 ea	68,515.20 /ea	-	170,000.00 /ea	-	-	238,515.20 /ea	1,431,091	383,926.32 /ea	2,303,558
						Install Steel Single Circuit 3P Structure	2.00 ea	68,515.20 /ea	-	200,000.00 /ea	-	-	268,515.20 /ea	537,030	432,840.64 /ea	865,681
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,954.27 /ls	88,954
						33.71.91.00 Transmission Line	1.00 LS	1,107,662.40 /LS	/LS	2,320,000.00 /LS	/LS	/LS	3,427,662.40 /LS	3,427,662	5,508,420.91 /LS	5,508,421
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,427,662	/SF	5,508,421
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	3,427,662	/LF	5,508,421
						34.11.STRC T-LINE STRUCTURES	**3.00** MO	369,220.80 /MO	72,170.58 /MO	773,333.33 /MO	/MO	/MO	1,214,724.72 /MO	3,644,174	1,948,580.45 /MO	5,845,741
		34.13.WIRE				T-LINE WIRE WORK										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent dozer, crawler, torque converter, diesel 200 HP	43.00 day	-	1,504.00 /day	-	-	-	1,504.00 /day	64,672	2,343.20 /day	100,758
						Rent trailer with cable reel for high voltage line work	43.00 day	-	64.10 /day	-	-	-	64.10 /day	2,756	99.87 /day	4,294
						Rent trailer with cable tensioning rig, for high voltage line work	43.00 day	-	110.40 /day	-	-	-	110.40 /day	4,747	172.00 /day	7,396
						Rent trailer with cable pulling rig, for high voltage line work	43.00 day	-	607.15 /day	-	-	-	607.15 /day	26,107	945.93 /day	40,675
						Rent crane truck mount, cable 8x4 drive 40 ton, 12' radius	43.00 day	-	2,028.00 /day	-	-	-	2,028.00 /day	87,204	3,159.58 /day	135,862
						01.01.06.03 GC Equip, Tools, & Consumables	**1.00** LS	/LS	185,486.95 /LS	/LS	/LS	/LS	185,486.95 /LS	185,487	288,984.51 /LS	288,985
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	185,487	/SF	288,985
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	185,487	/SF	288,985
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Overhead line conductors & devices, conductors, primary circuits, per wire, 1000 to 1600 kcmil	50,000.00 lf	5.15 /lf		2.25 /lf	-	-	7.40 /lf	369,729	11.68 /lf	584,186
						Overhead line conductors & devices, insulators and hardware, primary circuits, disk insulators, 345 to 500 kV	19.00 ea	2,854.80 /ea		9,000.00 /ea	-	-	11,854.80 /ea	225,241	19,122.01 /ea	363,318
						Overhead line conductors & devices, overhead ground wire	20,000.00 lf	7.59 /lf		1.50 /lf	-	-	9.09 /lf	181,824	14.27 /lf	285,452
						Mobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,954.27 /ls	88,954
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,954.28 /ls	88,954
						33.71.91.00 Transmission Line	**1.00** LS	577,486.08 /LS	/LS	313,500.00 /LS	/LS	/LS	890,986.08 /LS	890,986	1,410,865.01 /LS	1,410,865
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	890,986	/SF	1,410,865
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	890,986	/LF	1,410,865
						34.13.WIRE T-LINE WIRE WORK	**2.00** MO	288,743.04 /MO	92,743.48 /MO	156,750.00 /MO	/MO	/MO	538,236.52 /MO	1,076,473	849,924.76 /MO	1,699,850
						11.01 TRR to PGE Connection	**1.80** MI	1,603,294.82 /MI	290,927.19 /MI	1,747,805.78 /MI	390,555.56 /MI	2,777,777.78 /MI	6,810,361.13 /MI	12,258,650	10,737,105.36 /MI	19,326,790
	11.02					**TRR to Funks**										
		34.07.MISC				MISC, SUPERVISION, ROADS & MATTING										
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Matting Structure Work Pad 50'x50'	49.00 ea		-		7,000.00 /ea	-	7,000.00 /ea	343,000	10,905.84 /ea	534,386
						Matting per foot (through wetlands)	4,500.00 lf		-		150.00 /lf	-	150.00 /lf	675,000	233.70 /lf	1,051,635
						Access Road per foot	12,000.00 lf		-		40.00 /lf	-	40.00 /lf	480,000	62.32 /lf	747,829
						ROW clearing	24.00 acre		-		3,000.00 /acre	-	3,000.00 /acre	72,000	4,673.93 /acre	112,174
						Field Construction Coordinator	6,400.00 hr	118.95 /hr	-			-	118.95 /hr	761,280	185.32 /hr	1,186,057
						General Supervision	1,600.00 hr	128.95 /hr	-			-	128.95 /hr	206,320	200.90 /hr	321,442
						Misc Material	1.00 ls		-	90,000.00 /ls			90,000.00 /ls	90,000	146,742.97 /ls	146,743
						Allowance at BUDGET LEVEL (Other cost type)	1.00 ls		-			5,000,000.00 /ls	5,000,000.00 /ls	5,000,000	7,789,887.53 /ls	7,789,888
						33.71.91.00 Transmission Line	**1.00** LS	967,600.00 /LS	/LS	90,000.00 /LS	1,570,000.00 /LS	5,000,000.00 /LS	7,627,600.00 /LS	7,627,600	11,890,154.22 /LS	11,890,154
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	7,627,600	/SF	11,890,154
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,627,600	/LF	11,890,154
						34.07.MISC MISC, SUPERVISION, ROADS & MATTING	**1.00** LS	967,600.00 /LS	/LS	90,000.00 /LS	1,570,000.00 /LS	5,000,000.00 /LS	7,627,600.00 /LS	7,627,600	11,890,154.22 /LS	11,890,154
		34.09.FNDT				T-LINE FOUNDATIONS										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent auger, truck-mounted, for caissons, water wells	152.00 day	-	771.10 /day	-	-	-	771.10 /day	117,207	1,201.36 /day	182,606
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	152.00 day	-	629.75 /day	-	-	-	629.75 /day	95,722	981.14 /day	149,133
						Rent crane truck mounted, hydraulic, 12 ton capacity	152.00 day	-	471.00 /day	-	-	-	471.00 /day	71,592	733.81 /day	111,539
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	284,521.20 /LS	/LS	/LS	/LS	284,521.20 /LS	284,521	443,277.64 /LS	443,278
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	284,521	/SF	443,278
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	284,521	/SF	443,278
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,357.86 /ls	33,358
						Foundation 7' dia x 30' caisson	39.00 ea	22,838.40 /ea	-	12,477.00 /ea	-	-	35,315.40 /ea	1,377,301	55,925.18 /ea	2,181,082
						Foundation 8' dia x 30' caisson	5.00 ea	28,548.00 /ea	-	14,532.40 /ea	-	-	43,080.40 /ea	215,402	68,171.89 /ea	340,859
						Foundation 10' dia x 30' caisson	13.00 ea	34,257.60 /ea	-	21,295.00 /ea	-	-	55,552.60 /ea	722,184	88,093.59 /ea	1,145,217
						Demobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,357.86 /ls	33,358
						33.71.91.00 Transmission Line	1.00 LS	1,521,608.40 /LS	-	836,100.00 /LS	/LS	/LS	2,357,708.40 /LS	2,357,708	3,733,873.91 /LS	3,733,874
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	2,357,708	/SF	3,733,874
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,357,708	/LF	3,733,874
						34.09.FNDT T-LINE FOUNDATIONS	7.00 MO	217,372.63 /MO	40,645.89 /MO	119,442.86 /MO	/MO	/MO	377,461.37 /MO	2,642,230	596,735.94 /MO	4,177,152
		34.11.STRC				T-LINE STRUCTURES										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	152.00 day	-	629.75 /day	-	-	-	629.75 /day	95,722	981.14 /day	149,133
						Rent forklift, for rough terrain, 42' lift, 35' reach, 9000 lb., 110 H.P.	152.00 day	-	534.20 /day	-	-	-	534.20 /day	81,198	832.27 /day	126,505
						Rent crane truck mount, cable 8x4 drive 90 ton, 15' radius	152.00 day	-	1,696.00 /day	-	-	-	1,696.00 /day	257,792	2,642.33 /day	401,634
						Rent crane truck mounted, hydraulic, 12 ton capacity	152.00 day	-	471.00 /day	-	-	-	471.00 /day	71,592	733.81 /day	111,539
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	506,304.40 /LS	/LS	/LS	/LS	506,304.40 /LS	506,304	788,810.86 /LS	788,811
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	506,304	/SF	788,811
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	506,304	/SF	788,811
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 LS	57,096.00 /LS	-		-	-	57,096.00 /LS	57,096	88,954.28 /LS	88,954
						Install Steel Double Circuit Suspension Pole	23.00 ea	45,676.80 /ea	-	85,000.00 /ea	-	-	130,676.80 /ea	3,005,566	209,754.02 /ea	4,824,342
						Install Steel Double Circuit Light Angle Pole	5.00 ea	57,096.00 /ea	-	130,000.00 /ea	-	-	187,096.00 /ea	935,480	300,916.36 /ea	1,504,582
						Install Steel Double Circuit Heavy Angle Pole	13.00 ea	68,515.20 /ea	-	170,000.00 /ea	-	-	238,515.20 /ea	3,100,698	383,926.32 /ea	4,991,042
						Install Steel Single Circuit H-Deadend Structure	8.00 ea	45,676.80 /ea	-	50,000.00 /ea	-	-	95,676.80 /ea	765,414	152,687.30 /ea	1,221,498
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,954.27 /ls	88,954
						33.71.91.00 Transmission Line	1.00 LS	2,706,350.40 /LS	-	5,215,000.00 /LS	/LS	/LS	7,921,350.40 /LS	7,921,350	12,719,373.24 /LS	12,719,373
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	7,921,350	/SF	12,719,373
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,921,350	/LF	12,719,373
						34.11.STRC T-LINE STRUCTURES	4.00 MO	676,587.60 /MO	126,576.10 /MO	1,303,750.00 /MO	/MO	/MO	2,106,913.70 /MO	8,427,655	3,377,046.02 /MO	13,508,184
		34.13.WIRE				T-LINE WIRE WORK										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent dozer, crawler, torque converter, diesel 200 HP	87.00 day	-	1,504.00 /day	-	-	-	1,504.00 /day	130,848	2,343.20 /day	203,858
						Rent trailer with cable reel for high voltage line work	87.00 day	-	64.10 /day	-	-	-	64.10 /day	5,577	99.87 /day	8,688
						Rent trailer with cable tensioning rig, for high voltage line work	87.00 day	-	110.40 /day	-	-	-	110.40 /day	9,605	172.00 /day	14,964
						Rent trailer with cable pulling rig, for high voltage line work	87.00 day	-	607.15 /day	-	-	-	607.15 /day	52,822	945.93 /day	82,296
						Rent crane truck mount, cable 8x4 drive 40 ton, 12' radius	87.00 day	-	2,028.00 /day	-	-	-	2,028.00 /day	176,436	3,159.58 /day	274,883
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	375,287.55 /LS	/LS	/LS	/LS	375,287.55 /LS	375,288	584,689.58 /LS	584,690
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	375,288	/SF	584,690
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	375,288	/SF	584,690
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Overhead line conductors & devices, conductors, primary circuits, per wire, 795 to 954 kcmil	132,000.00 lf	4.57 /lf		1.50 /lf	-	-	6.07 /lf	801,077	9.56 /lf	1,262,414
						Overhead line conductors & devices, insulators and hardware, primary circuits, disk insulators, 345 to 500 kV	49.00 ea	2,854.80 /ea		9,000.00 /ea	-	-	11,854.80 /ea	580,885	19,122.01 /ea	936,979
						Overhead line conductors & devices, overhead ground wire	44,000.00 lf	7.59 /lf		1.50 /lf	-	-	9.09 /lf	400,012	14.27 /lf	627,994
						Mobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,954.26 /ls	88,954
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,954.30 /ls	88,954
						33.71.91.00 Transmission Line	1.00 LS	1,191,165.54 /LS	-	705,000.00 /LS	/LS	/LS	1,896,165.54 /LS	1,896,166	3,005,295.75 /LS	3,005,296
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,896,166	/SF	3,005,296
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,896,166	/LF	3,005,296
						34.13.WIRE T-LINE WIRE WORK	7.00 MO	170,166.51 /MO	53,612.51 /MO	100,714.29 /MO	/MO	/MO	324,493.30 /MO	2,271,453	512,855.05 /MO	3,589,985
						11.02 TRR to Funks	4.10 MI	1,557,737.64 /MI	284,417.84 /MI	1,669,780.49 /MI	382,926.83 /MI	1,219,512.20 /MI	5,114,375.00 /MI	20,968,937	8,089,140.29 /MI	33,165,475
						11 Transmission Lines for PG&E Connection	**5.90 MI**	**1,571,636.44 /MI**	**286,403.75 /MI**	**1,693,584.81 /MI**	**385,254.24 /MI**	**1,694,915.25 /MI**	**5,631,794.50 /MI**	**33,227,588**	**8,896,994.04 /MI**	**52,492,265**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	9,272,655		77,760.866 hrs	
Material	9,992,150			
Allowance	2,273,000			
Equipment	1,689,782		17,352.000 hrs	
Other	10,000,000			
Subtotal Direct Costs	**33,227,587**	**33,227,587**		
Material Sales Tax, Dunnigan Ca	724,431			7.250 %
Subtotal W/ Sales Tax	**724,431**	**33,952,018**		
General Conditions	1,697,601			5.000 %
Subtotal W/ General Conditions	**1,697,601**	**35,649,619**		
Mobilization/Demobilization	1,069,489			3.000 %
Prime Contractor Overhead	3,671,911			10.000 %
Prime Contractor Profit	2,423,461			6.000 %
Bonds & Insurance	929,074			2.170 %
Subtotal W/ Prime Markups	**8,093,935**	**43,743,554**		
Contractor Contingency	2,187,178			5.000 %
Design Contingency	6,561,533			15.000 %
Subtotal W/ Contingency	**8,748,711**	**52,492,265**		
Escalation				
Subtotal W/ Escalation		**52,492,265**		
Total Construction Cost		**52,492,265**		
Non-Contract Costs	7,873,840			15.000 %
Total Project Costs	**7,873,840**	**60,366,105**		

Substations - WAPA

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Substations for WAPA Connections
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
08			Substations for WAPA Connection									
	08.01		Three Breaker Substation									
		32.00.004	Substation Fencing	1,158.00 LF	9.09 /LF	1.70 /LF	24.39 /LF	/LF	35.18 /LF	40,741	64.20 /LF	74,347
		32.00.006	Substation Gravel Surfacing	9,240.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.10 /SY	139,541	27.33 /SY	252,518
		34.10.STEEL	SUBSTATION STEEL	1.00 LS	594,750.00 /LS	/LS	2,100,000.00 /LS	/LS	2,694,750.00 /LS	2,694,750	4,395,380.12 /LS	4,395,380
		34.10.SUBEQ	SUBSTATION EQUIPMENT/WORK PACKAGES	1.00 LS	2,045,940.00 /LS	/LS	12,690,000.00 /LS	/LS	14,735,940.00 /LS	14,735,940	24,123,109.02 /LS	24,123,109
		34.30.FNDT	SUBSTATION FOUNDATIONS	1.00 LS	1,308,450.00 /LS	/LS	350,000.00 /LS	/LS	1,658,450.00 /LS	1,658,450	2,636,756.05 /LS	2,636,756
		34.90.CX	ENGINEERING, STARTUP, COMMISSIONING	1.00 LS	1,415,160.00 /LS	/LS	150,000.00 /LS	/LS	1,565,160.00 /LS	1,565,160	2,475,362.46 /LS	2,475,362
		34.95.CONEQ	CONSTRUCTION EQUIPMENT	1.00 LS	2,766.57 /LS	697,053.40 /LS	/LS	/LS	699,819.97 /LS	699,820	1,101,930.49 /LS	1,101,930
			08.01 Three Breaker Substation	1.00 LS	5,412,152.32 /LS	736,552.76 /LS	15,385,696.90 /LS	/LS	21,534,401.98 /LS	21,534,402	35,059,403.06 /LS	35,059,403
	08.02		Six Breaker Substation									
		32.00.004	Substation Fencing	1,632.00 LF	9.21 /LF	1.75 /LF	24.63 /LF	/LF	35.59 /LF	58,085	64.95 /LF	105,992
		32.00.006	Substation Gravel Surfacing	18,096.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.11 /SY	273,378	27.34 /SY	494,712
		34.10.STEEL	SUBSTATION STEEL	1.00 LS	951,600.00 /LS	/LS	2,400,000.00 /LS	/LS	3,351,600.00 /LS	3,351,600	5,451,400.44 /LS	5,451,400
		34.10.SUBEQ	SUBSTATION EQUIPMENT/WORK PACKAGES	1.00 LS	3,065,936.25 /LS	/LS	16,485,000.00 /LS	/LS	19,550,936.25 /LS	19,550,936	31,979,898.09 /LS	31,979,898
		34.30.FNDT	SUBSTATION FOUNDATIONS	1.00 LS	3,106,974.00 /LS	/LS	700,000.00 /LS	/LS	3,806,974.00 /LS	3,806,974	6,045,178.43 /LS	6,045,178
		34.90.CX	ENGINEERING, STARTUP, COMMISSIONING	1.00 LS	1,462,740.00 /LS	/LS	150,000.00 /LS	/LS	1,612,740.00 /LS	1,612,740	2,550,281.51 /LS	2,550,282
		34.95.CONEQ	CONSTRUCTION EQUIPMENT	1.00 LS	2,766.57 /LS	762,098.68 /LS	/LS	/LS	764,865.25 /LS	764,865	1,204,350.21 /LS	1,204,350
			08.02 Six Breaker Substation	1.00 LS	8,672,779.59 /LS	838,500.42 /LS	19,907,298.80 /LS	/LS	29,418,578.81 /LS	29,418,579	47,831,812.27 /LS	47,831,812
			08 Substations for WAPA Connection	1.00 LS	14,084,931.91 /LS	1,575,053.18 /LS	35,292,995.70 /LS	/LS	50,952,980.79 /LS	50,952,981	82,891,215.33 /LS	82,891,215

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	22,203,582		123,609.120 hrs	
Material	58,184,388			
Allowance				
Equipment	2,503,245		17,035.797 hrs	
Other				
Total Construction Cost	**82,891,215**	**82,891,215**		
Non-Contract Costs	12,433,682			15.000 %
Total Project Costs	**12,433,682**	**95,324,897**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Substations for WAPA Connections
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
08						**Substations for WAPA Connection**									
	08.01					Three Breaker Substation									
		32.00.004				Substation Fencing									
			32.0			Exterior Improvements									
				32.31		Fencing									
					32.45.01.00	Fencing, Chain Link									
						Fence,chain link industrial,galvanized steel,3 strands barb wire,2"posts @ 10'oc,9ga wire,6'high,schedule 40,includes excavation,& concrete	1,122.00 lf	6.52 /lf	0.94 /lf	19.95 /lf	-	27.41 /lf	30,750	50.08 /lf	56,191
						Fence, chain link industrial, gate, galvanized steel, 4' wide, 5' high, 2" frame, includes excavation, in concrete	1.00 ea	156.42 /ea	22.53 /ea	229.00 /ea	-	407.95 /ea	408	740.55 /ea	741
						Fence, chain link industrial, overhead slide gate, cantilever type, chain link, 8' high, to 18' wide, includes excavation, in concrete	32.00 lf	95.45 /lf	28.04 /lf	176.00 /lf	-	299.49 /lf	9,584	544.24 /lf	17,416
						32.45.01.00 Fencing, Chain Link	1,158.00 LF	9.09 /LF	1.70 /LF	24.39 /LF	/LF	35.18 /LF	40,741	64.20 /LF	74,347
						32.31 Fencing	1,158.00 LF	9.09 /LF	1.70 /LF	24.39 /LF	/LF	35.18 /LF	40,741	64.20 /LF	74,347
						32.0 Exterior Improvements	1.00 LS	10,523.21 /LS	1,973.23 /LS	28,244.90 /LS	/LS	40,741.34 /LS	40,741	74,346.98 /LS	74,347
						32.00.004 Substation Fencing	1,158.00 LF	9.09 /LF	1.70 /LF	24.39 /LF	/LF	35.18 /LF	40,741	64.20 /LF	74,347
		32.00.006				Substation Gravel Surfacing									
			32.0			Exterior Improvements									
				32.12		Paving									
					32.40.04.00	Site Improvements, Access Roads, Gravel									
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	9,240.00 SY	0.62 /SY	0.35 /SY	-	-	0.98 /SY	9,005	1.73 /SY	15,981
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	1,540.00 cy	1.68 /cy	4.63 /cy	-	-	6.31 /cy	9,714	11.19 /cy	17,239
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	1,540.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	24,694	28.46 /cy	43,823
						Load excavated spoils	1,540.00 cy	0.77 /cy	0.84 /cy		-	1.62 /cy	2,490	2.87 /cy	4,419
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,6"deep	9,240.00 sy	0.94 /sy	0.92 /sy	7.30 /sy	-	9.16 /sy	84,627	16.78 /sy	155,069
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	9,240.00 sy	0.57 /sy	0.41 /sy	-	-	0.98 /sy	9,009	1.73 /sy	15,988
						32.40.04.00 Site Improvements, Access Roads, Gravel	9,240.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.10 /SY	139,541	27.33 /SY	252,518
						32.12 Paving	9,240.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.10 /SY	139,541	27.33 /SY	252,518
						32.0 Exterior Improvements	1.00 LS	34,562.54 /LS	37,526.13 /LS	67,452.00 /LS	/LS	139,540.67 /LS	139,541	252,517.94 /LS	252,518
						32.00.006 Substation Gravel Surfacing	9,240.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.10 /SY	139,541	27.33 /SY	252,518
		34.10.STEEL				SUBSTATION STEEL									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Substation Steel	1.00 ea	594,750.00 /ea	-	2,100,000.00 /ea	-	2,694,750.00 /ea	2,694,750	4,395,380.12 /ea	4,395,380
						33.71.91.01 Power Substation	1.00 LS	594,750.00 /LS	/LS	2,100,000.00 /LS	/LS	2,694,750.00 /LS	2,694,750	4,395,380.12 /LS	4,395,380
						26.20 Facility Electrical	83,160.00 SF	7.15 /SF	/SF	25.25 /SF	/SF	32.40 /SF	2,694,750	52.85 /SF	4,395,380
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	2,694,750	/LF	4,395,380
						34.10.STEEL SUBSTATION STEEL	1.00 LS	594,750.00 /LS	/LS	2,100,000.00 /LS	/LS	2,694,750.00 /LS	2,694,750	4,395,380.12 /LS	4,395,380
		34.10.SUBEQ				SUBSTATION EQUIPMENT/WORK PACKAGES									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Power Transformer, 100MVA 230kV-13.2kV	2.00 ea	118,950.00 /ea	-	2,500,000.00 /ea	-	2,618,950.00 /ea	5,237,900	4,305,026.08 /ea	8,610,052
						SF6 CB 3000A 230kV	3.00 ea	35,685.00 /ea	-	180,000.00 /ea	-	215,685.00 /ea	647,055	352,665.74 /ea	1,057,997
						Air Disconnect Switch 3000A motorized 3ph 230kV	10.00 ea	11,895.00 /ea	-	50,000.00 /ea	-	61,895.00 /ea	618,950	101,084.33 /ea	1,010,843
						CCVT / CT / VT / SA 230kV	4.00 ea	14,868.75 /ea	-	175,000.00 /ea	-	189,868.75 /ea	759,475	311,653.20 /ea	1,246,613
						Control Building (Relays, CP, HVAC. AC/DC)	1.00 ea	237,900.00 /ea	-	1,750,000.00 /ea	-	1,987,900.00 /ea	1,987,900	3,257,005.22 /ea	3,257,005
						Surface and Below Grade Package (Fence, Rock, Conduit, Grdg, Ltg)	1.00 ea	475,800.00 /ea	-	1,700,000.00 /ea	-	2,175,800.00 /ea	2,175,800	3,549,245.90 /ea	3,549,246
						Above Grade Package (Bus, Jumpers, Fittings)	1.00 ea	475,800.00 /ea	-	1,800,000.00 /ea	-	2,275,800.00 /ea	2,275,800	3,713,955.05 /ea	3,713,955
						Above/Below Conduit, Cable Trench, Cables	1.00 ea	333,060.00 /ea	-	700,000.00 /ea	-	1,033,060.00 /ea	1,033,060	1,677,397.37 /ea	1,677,397
						33.71.91.01 Power Substation	1.00 LS	2,045,940.00 /LS	/LS	12,690,000.00 /LS	/LS	14,735,940.00 /LS	14,735,940	24,123,109.02 /LS	24,123,109
						26.20 Facility Electrical	83,160.00 SF	24.60 /SF	/SF	152.60 /SF	/SF	177.20 /SF	14,735,940	290.08 /SF	24,123,109
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	14,735,940	/LF	24,123,109
						34.10.SUBEQ SUBSTATION EQUIPMENT/WORK PACKAGES	1.00 LS	2,045,940.00 /LS	/LS	12,690,000.00 /LS	/LS	14,735,940.00 /LS	14,735,940	24,123,109.02 /LS	24,123,109
		34.30.FNDT				SUBSTATION FOUNDATIONS									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Transformer Foundations 100MVA	2.00 ea	47,580.00 /ea	-	20,000.00 /ea	-	67,580.00 /ea	135,160	107,860.89 /ea	215,722
						Breaker Foundations	3.00 ea	23,790.00 /ea	-	10,000.00 /ea	-	33,790.00 /ea	101,370	53,930.44 /ea	161,791
						Takeoff Structure Foundations	4.00 ea	28,548.00 /ea	-	25,000.00 /ea	-	53,548.00 /ea	214,192	86,128.72 /ea	344,515
						Bus Support / CCVT / CT-VT / SA /AS Foundations	36.00 ea	28,548.00 /ea	-	5,000.00 /ea	-	33,548.00 /ea	1,207,728	53,186.89 /ea	1,914,728
						33.71.91.01 Power Substation	1.00 LS	1,308,450.00 /LS	/LS	350,000.00 /LS	/LS	1,658,450.00 /LS	1,658,450	2,636,756.05 /LS	2,636,756
						26.20 Facility Electrical	83,160.00 SF	15.73 /SF	/SF	4.21 /SF	/SF	19.94 /SF	1,658,450	31.71 /SF	2,636,756
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	1,658,450	/LF	2,636,756
						34.30.FNDT SUBSTATION FOUNDATIONS	1.00 LS	1,308,450.00 /LS	/LS	350,000.00 /LS	/LS	1,658,450.00 /LS	1,658,450	2,636,756.05 /LS	2,636,756
		34.90.CX				ENGINEERING, STARTUP, COMMISSIONING									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Testing	400.00 hrs	118.95 /hrs	-		-	118.95 /hrs	47,580	187.30 /hrs	74,919
						Startup, Commissioning, Training, Documentation, Warranty	400.00 hrs	118.95 /hrs	-		-	118.95 /hrs	47,580	187.30 /hrs	74,919
						Power Engineering, Seismic Engineering	2,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	490,000	387.59 /hrs	775,175
						Protective Device Coordination Stidy	2,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	490,000	387.59 /hrs	775,175
						Protective Device Coordination Stidy	2,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	490,000	387.59 /hrs	775,175
						33.71.91.01 Power Substation	1.00 LS	1,415,160.00 /LS	/LS	150,000.00 /LS	/LS	1,565,160.00 /LS	1,565,160	2,475,362.46 /LS	2,475,362
						26.20 Facility Electrical	83,160.00 SF	17.02 /SF	/SF	1.80 /SF	/SF	18.82 /SF	1,565,160	29.77 /SF	2,475,362
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	1,565,160	/LF	2,475,362
						34.90.CX ENGINEERING, STARTUP, COMMISSIONING	1.00 LS	1,415,160.00 /LS	/LS	150,000.00 /LS	/LS	1,565,160.00 /LS	1,565,160	2,475,362.46 /LS	2,475,362
		34.95.CONEQ				CONSTRUCTION EQUIPMENT									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	104.00 week		2,663.32 /week	-	-	2,663.32 /week	276,985	4,193.64 /week	436,139
						Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	250.00 day		835.38 /day	-	-	835.38 /day	208,846	1,315.39 /day	328,847
						Crane crew, daily use for small jobs, 100-ton truck-mounted hydraulic crane, portal to portal	60.00 day		2,168.18 /day	-	-	2,168.18 /day	130,091	3,413.99 /day	204,839
						Rent crawler mounted, lattice boom crane, 165 ton, 60' boom	30.00 day	-	2,649.00 /day	-	-	2,649.00 /day	79,470	4,171.09 /day	125,133
						Mobilization or demobilization, delivery charge for equipment, on flatbed trailer behind pickup truck	2.00 ea	122.38 /ea	71.41 /ea	-	-	193.79 /ea	388	305.14 /ea	610

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					33.71.91.01	Power Substation									
						Mobilization or demobilization, crane, truck-mounted, up to 75 ton, (driver only, one-way)	2.00 ea	82.95 /ea	-	-	-	82.95 /ea	166	130.62 /ea	261
						Mobilization or demobilization, crane, truck-mounted, over 75 ton	2.00 ea	441.74 /ea	55.72 /ea	-	-	497.46 /ea	995	783.29 /ea	1,567
						Mobilization or demobilization, crane, crawler-mounted, over 75 ton	2.00 ea	736.23 /ea	703.65 /ea	-	-	1,439.88 /ea	2,880	2,267.22 /ea	4,534
						33.71.91.01 Power Substation	1.00 LS	2,766.57 /LS	697,053.40 /LS	/LS	/LS	699,819.97 /LS	699,820	1,101,930.49 /LS	1,101,930
						26.20 Facility Electrical	83,160.00 SF	0.03 /SF	8.38 /SF	/SF	/SF	8.42 /SF	699,820	13.25 /SF	1,101,930
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	699,820	/LF	1,101,930
						34.95.CONEQ CONSTRUCTION EQUIPMENT	1.00 LS	2,766.57 /LS	697,053.40 /LS	/LS	/LS	699,819.97 /LS	699,820	1,101,930.49 /LS	1,101,930
						08.01 Three Breaker Substation	1.00 LS	5,412,152.32 /LS	736,552.76 /LS	15,385,696.90 /LS	/LS	21,534,401.98 /LS	21,534,402	35,059,403.06 /LS	35,059,403
	08.02					Six Breaker Substation									
		32.00.004				Substation Fencing									
			32.0			Exterior Improvements									
				32.31		Fencing									
					32.45.01.00	Fencing, Chain Link									
						Fence,chain link industrial,galvanized steel,3 strands barb wire,2"posts @ 10'oc,9ga wire,6'high,schedule 40,includes excavation,& concrete	1,580.00 lf	6.52 /lf	0.94 /lf	19.95 /lf	-	27.41 /lf	43,302	50.08 /lf	79,128
						Fence, chain link industrial, gate, galvanized steel, 4' wide, 5' high, 2" frame, includes excavation, in concrete	1.00 ea	156.42 /ea	22.53 /ea	229.00 /ea	-	407.95 /ea	408	740.54 /ea	741
						Fence, chain link industrial, overhead slide gate, cantilever type, chain link, 8' high, to 18' wide, includes excavation, in concrete	48.00 lf	95.45 /lf	28.04 /lf	176.00 /lf	-	299.49 /lf	14,376	544.24 /lf	26,123
						32.45.01.00 Fencing, Chain Link	1,632.00 LF	9.21 /LF	1.75 /LF	24.63 /LF	/LF	35.59 /LF	58,085	64.95 /LF	105,992
						32.31 Fencing	1,632.00 LF	9.21 /LF	1.75 /LF	24.63 /LF	/LF	35.59 /LF	58,085	64.95 /LF	105,992
						32.0 Exterior Improvements	1.00 LS	15,035.32 /LS	2,851.88 /LS	40,198.00 /LS	/LS	58,085.20 /LS	58,085	105,991.84 /LS	105,992
						32.00.004 Substation Fencing	1,632.00 LF	9.21 /LF	1.75 /LF	24.63 /LF	/LF	35.59 /LF	58,085	64.95 /LF	105,992
		32.00.006				Substation Gravel Surfacing									
			32.0			Exterior Improvements									
				32.12		Paving									
					32.40.04.00	Site Improvements, Access Roads, Gravel									
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	18,096.00 SY	0.62 /SY	0.35 /SY	-	-	0.98 /SY	17,637	1.73 /SY	31,298
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	3,020.00 cy	1.68 /cy	4.63 /cy	-	-	6.31 /cy	19,050	11.19 /cy	33,807
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	3,020.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	48,427	28.46 /cy	85,938
						Load excavated spoils	3,020.00 cy	0.77 /cy	0.84 /cy		-	1.62 /cy	4,883	2.87 /cy	8,666
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,6"deep	18,096.00 sy	0.94 /sy	0.92 /sy	7.30 /sy	-	9.16 /sy	165,737	16.78 /sy	303,693
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	18,096.00 sy	0.57 /sy	0.41 /sy	-	-	0.98 /sy	17,644	1.73 /sy	31,311
						32.40.04.00 Site Improvements, Access Roads, Gravel	18,096.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.11 /SY	273,378	27.34 /SY	494,712
						32.12 Paving	18,096.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.11 /SY	273,378	27.34 /SY	494,712
						32.0 Exterior Improvements	1.00 LS	67,727.45 /LS	73,549.86 /LS	132,100.80 /LS	/LS	273,378.11 /LS	273,378	494,711.75 /LS	494,712
						32.00.006 Substation Gravel Surfacing	18,096.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.11 /SY	273,378	27.34 /SY	494,712
		34.10.STEEL				SUBSTATION STEEL									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Substation Steel	1.00 ea	951,600.00 /ea	-	2,400,000.00 /ea	-	3,351,600.00 /ea	3,351,600	5,451,400.44 /ea	5,451,400
						33.71.91.01 Power Substation	1.00 LS	951,600.00 /LS	/LS	2,400,000.00 /LS	/LS	3,351,600.00 /LS	3,351,600	5,451,400.44 /LS	5,451,400
						26.20 Facility Electrical	162,864.00 SF	5.84 /SF	/SF	14.74 /SF	/SF	20.58 /SF	3,351,600	33.47 /SF	5,451,400
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	3,351,600	/LF	5,451,400
						34.10.STEEL SUBSTATION STEEL	1.00 LS	951,600.00 /LS	/LS	2,400,000.00 /LS	/LS	3,351,600.00 /LS	3,351,600	5,451,400.44 /LS	5,451,400
		34.10.SUBEQ				SUBSTATION EQUIPMENT/WORK PACKAGES									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Power Transformer, 100MVA 230kV-13.2kV	2.00 ea	118,950.00 /ea	-	2,500,000.00 /ea	-	2,618,950.00 /ea	5,237,900	4,305,026.08 /ea	8,610,052
						SF6 CB 3000A 230kV	7.00 ea	35,685.00 /ea	-	180,000.00 /ea	-	215,685.00 /ea	1,509,795	352,665.74 /ea	2,468,660
						Air Disconnect Switch 3000A motorized 3ph 230kV	20.00 ea	11,895.00 /ea	-	50,000.00 /ea	-	61,895.00 /ea	1,237,900	101,084.33 /ea	2,021,687
						CCVT / CT / VT / SA 230kV	7.00 ea	14,868.75 /ea	-	175,000.00 /ea	-	189,868.75 /ea	1,329,081	311,653.20 /ea	2,181,572
						Control Building (Relays, CP, HVAC. AC/DC)	1.00 ea	356,850.00 /ea	-	2,500,000.00 /ea	-	2,856,850.00 /ea	2,856,850	4,679,621.37 /ea	4,679,621
						Surface and Below Grade Package (Fence, Rock, Conduit, Grdg, Ltg)	1.00 ea	713,700.00 /ea	-	2,100,000.00 /ea	-	2,813,700.00 /ea	2,813,700	4,582,677.74 /ea	4,582,678
						Above Grade Package (Bus, Jumpers, Fittings)	1.00 ea	785,070.00 /ea	-	2,400,000.00 /ea	-	3,185,070.00 /ea	3,185,070	5,189,183.77 /ea	5,189,184
						Above/Below Conduit, Cable Trench, Cables	1.00 ea	380,640.00 /ea	-	1,000,000.00 /ea	-	1,380,640.00 /ea	1,380,640	2,246,443.82 /ea	2,246,444
						33.71.91.01 Power Substation	1.00 LS	3,065,936.25 /LS	/LS	16,485,000.00 /LS	/LS	19,550,936.25 /LS	19,550,936	31,979,898.09 /LS	31,979,898
						26.20 Facility Electrical	162,864.00 SF	18.83 /SF	/SF	101.22 /SF	/SF	120.05 /SF	19,550,936	196.36 /SF	31,979,898
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	19,550,936	/LF	31,979,898
						34.10.SUBEQ SUBSTATION EQUIPMENT/WORK PACKAGES	1.00 LS	3,065,936.25 /LS	/LS	16,485,000.00 /LS	/LS	19,550,936.25 /LS	19,550,936	31,979,898.09 /LS	31,979,898
		34.30.FNDT				SUBSTATION FOUNDATIONS									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Transformer Foundations 100MVA	2.00 ea	47,580.00 /ea	-	20,000.00 /ea	-	67,580.00 /ea	135,160	107,860.90 /ea	215,722
						Breaker Foundations	9.00 ea	23,790.00 /ea	-	10,000.00 /ea	-	33,790.00 /ea	304,110	53,930.44 /ea	485,374
						Takeoff Structure Foundations	4.00 ea	28,548.00 /ea	-	25,000.00 /ea	-	53,548.00 /ea	214,192	86,128.72 /ea	344,515
						Bus Support / CCVT / CT-VT / SA / AS Foundations	94.00 ea	28,548.00 /ea	-	5,000.00 /ea	-	33,548.00 /ea	3,153,512	53,186.89 /ea	4,999,568
						33.71.91.01 Power Substation	1.00 LS	3,106,974.00 /LS	/LS	700,000.00 /LS	/LS	3,806,974.00 /LS	3,806,974	6,045,178.43 /LS	6,045,178
						26.20 Facility Electrical	162,864.00 SF	19.08 /SF	/SF	4.30 /SF	/SF	23.38 /SF	3,806,974	37.12 /SF	6,045,178
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	3,806,974	/LF	6,045,178
						34.30.FND SUBSTATION FOUNDATIONS	1.00 LS	3,106,974.00 /LS	/LS	700,000.00 /LS	/LS	3,806,974.00 /LS	3,806,974	6,045,178.43 /LS	6,045,178
		34.90.CX				ENGINEERING, STARTUP, COMMISSIONING									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Testing	600.00 hrs	118.95 /hrs	-		-	118.95 /hrs	71,370	187.30 /hrs	112,379
						Startup, Commissioning, Training, Documentation, Warranty	600.00 hrs	118.95 /hrs	-		-	118.95 /hrs	71,370	187.30 /hrs	112,379
						Power Engineering, Seismic Engineering	3,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	735,000	387.59 /hrs	1,162,762
						Protective Device Coordination Stidy	3,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	735,000	387.59 /hrs	1,162,762
						33.71.91.01 Power Substation	1.00 LS	1,462,740.00 /LS	/LS	150,000.00 /LS	/LS	1,612,740.00 /LS	1,612,740	2,550,281.51 /LS	2,550,282
						26.20 Facility Electrical	162,864.00 SF	8.98 /SF	/SF	0.92 /SF	/SF	9.90 /SF	1,612,740	15.66 /SF	2,550,282
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	1,612,740	/LF	2,550,282
						34.90.CX ENGINEERING, STARTUP, COMMISSIONING	1.00 LS	1,462,740.00 /LS	/LS	150,000.00 /LS	/LS	1,612,740.00 /LS	1,612,740	2,550,281.51 /LS	2,550,282
		34.95.CONEQ				CONSTRUCTION EQUIPMENT									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	104.00 week		2,663.32 /week	-	-	2,663.32 /week	276,985	4,193.64 /week	436,139

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					33.71.91.01	Power Substation									
						Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	250.00 day		835.38 /day	-	-	835.38 /day	208,846	1,315.39 /day	328,847
						Crane crew, daily use for small jobs, 100-ton truck-mounted hydraulic crane, portal to portal	90.00 day		2,168.18 /day	-	-	2,168.18 /day	195,136	3,413.99 /day	307,259
						Rent crawler mounted, lattice boom crane, 165 ton, 60' boom	30.00 day	-	2,649.00 /day	-	-	2,649.00 /day	79,470	4,171.09 /day	125,133
						Mobilization or demobilization, delivery charge for equipment, on flatbed trailer behind pickup truck	2.00 ea	122.38 /ea	71.41 /ea	-	-	193.79 /ea	388	305.15 /ea	610
						Mobilization or demobilization, crane, truck-mounted, up to 75 ton, (driver only, one-way)	2.00 ea	82.95 /ea	-	-	-	82.95 /ea	166	130.60 /ea	261
						Mobilization or demobilization, crane, truck-mounted, over 75 ton	2.00 ea	441.74 /ea	55.72 /ea	-	-	497.46 /ea	995	783.29 /ea	1,567
						Mobilization or demobilization, crane, crawler-mounted, over 75 ton	2.00 ea	736.23 /ea	703.65 /ea	-	-	1,439.88 /ea	2,880	2,267.22 /ea	4,534
						33.71.91.01 Power Substation	1.00 LS	2,766.57 /LS	762,098.68 /LS	/LS	/LS	764,865.25 /LS	764,865	1,204,350.21 /LS	1,204,350
						26.20 Facility Electrical	162,864.00 SF	0.02 /SF	4.68 /SF	/SF	/SF	4.70 /SF	764,865	7.39 /SF	1,204,350
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	764,865	/LF	1,204,350
						34.95.CONEO CONSTRUCTION EQUIPMENT	1.00 LS	2,766.57 /LS	762,098.68 /LS	/LS	/LS	764,865.25 /LS	764,865	1,204,350.21 /LS	1,204,350
						06.02 Six Breaker Substation	1.00 LS	8,672,779.59 /LS	838,500.42 /LS	19,907,298.80 /LS	/LS	29,418,578.81 /LS	29,418,579	47,831,812.27 /LS	47,831,812
						08 Substations for WAPA Connection	**1.00 LS**	**14,084,931.91 /LS**	**1,575,053.18 /LS**	**35,292,995.70 /LS**	**/LS**	**50,952,980.79 /LS**	**50,952,981**	**82,891,215.33 /LS**	**82,891,215**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	14,084,932		123,609.120 hrs	
Material	35,292,996			
Allowance				
Equipment	1,575,053		17,035.797 hrs	
Other				
Subtotal Direct Costs	**50,952,981**	**50,952,981**		
Material Sales Tax, Dunnigan Ca	2,558,742			7.250 %
Subtotal W/ Sales Tax	**2,558,742**	**53,511,723**		
Site/Civil I,OH&P	102,349			20.000 %
Subtotal W/ Subcontractor OH&P	**102,349**	**53,614,072**		
General Conditions	2,680,704			5.000 %
Subtotal W/ General Conditions	**2,680,704**	**56,294,776**		
Mobilization/Demobilization	1,688,843			3.000 %
Prime Contractor Overhead	5,798,362			10.000 %
Prime Contractor Profit	3,826,919			6.000 %
Bonds & Insurance	1,467,113			2.170 %
Subtotal W/ Prime Markups	**12,781,237**	**69,076,013**		
Contractor Contingency	3,453,801			5.000 %
Design Contingency	10,361,402			15.000 %
Subtotal W/ Contingency	**13,815,203**	**82,891,216**		
Total Construction Cost		**82,891,216**		
Non-Contract Costs	12,433,682			15.000 %
Total Project Costs	**12,433,682**	**95,324,898**		

Substations - PGE

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Substations for PG&E Connections
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
09			Substations for PG&E Connection									
	09.01		Three Breaker Substation									
		32.00.004	Substation Fencing	1,158.00 LF	9.09 /LF	1.70 /LF	24.39 /LF	/LF	35.18 /LF	40,741	64.20 /LF	74,347
		32.00.006	Substation Gravel Surfacing	9,240.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.10 /SY	139,541	27.33 /SY	252,518
		34.10.STEEL	SUBSTATION STEEL	1.00 LS	594,750.00 /LS	/LS	2,100,000.00 /LS	/LS	2,694,750.00 /LS	2,694,750	4,395,380.12 /LS	4,395,380
		34.10.SUBEQ	SUBSTATION EQUIPMENT/WORK PACKAGES	1.00 LS	2,045,940.00 /LS	/LS	12,690,000.00 /LS	/LS	14,735,940.00 /LS	14,735,940	24,123,109.02 /LS	24,123,109
		34.30.FNDT	SUBSTATION FOUNDATIONS	1.00 LS	1,308,450.00 /LS	/LS	350,000.00 /LS	/LS	1,658,450.00 /LS	1,658,450	2,636,756.05 /LS	2,636,756
		34.90.CX	ENGINEERING, STARTUP, COMMISSIONING	1.00 LS	1,415,160.00 /LS	/LS	150,000.00 /LS	/LS	1,565,160.00 /LS	1,565,160	2,475,362.46 /LS	2,475,362
		34.95.CONEQ	CONSTRUCTION EQUIPMENT	1.00 LS	2,766.57 /LS	697,053.40 /LS	/LS	/LS	699,819.97 /LS	699,820	1,101,930.49 /LS	1,101,930
			09.01 Three Breaker Substation	1.00 LS	5,412,152.32 /LS	736,552.76 /LS	15,385,696.90 /LS	/LS	21,534,401.98 /LS	21,534,402	35,059,403.06 /LS	35,059,403
	09.02		Six Breaker Substation									
		32.00.004	Substation Fencing	1,632.00 LF	9.21 /LF	1.75 /LF	24.63 /LF	/LF	35.59 /LF	58,085	64.95 /LF	105,992
		32.00.006	Substation Gravel Surfacing	18,096.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.11 /SY	273,378	27.34 /SY	494,712
		34.10.STEEL	SUBSTATION STEEL	1.00 LS	951,600.00 /LS	/LS	2,400,000.00 /LS	/LS	3,351,600.00 /LS	3,351,600	5,451,400.44 /LS	5,451,400
		34.10.SUBEQ	SUBSTATION EQUIPMENT/WORK PACKAGES	1.00 LS	3,065,936.25 /LS	/LS	16,485,000.00 /LS	/LS	19,550,936.25 /LS	19,550,936	31,979,898.09 /LS	31,979,898
		34.30.FNDT	SUBSTATION FOUNDATIONS	1.00 LS	3,106,974.00 /LS	/LS	700,000.00 /LS	/LS	3,806,974.00 /LS	3,806,974	6,045,178.43 /LS	6,045,178
		34.90.CX	ENGINEERING, STARTUP, COMMISSIONING	1.00 LS	1,462,740.00 /LS	/LS	150,000.00 /LS	/LS	1,612,740.00 /LS	1,612,740	2,550,281.51 /LS	2,550,282
		34.95.CONEQ	CONSTRUCTION EQUIPMENT	1.00 LS	2,766.57 /LS	762,098.68 /LS	/LS	/LS	764,865.25 /LS	764,865	1,204,350.21 /LS	1,204,350
			09.02 Six Breaker Substation	1.00 LS	8,672,779.59 /LS	838,500.42 /LS	19,907,298.80 /LS	/LS	29,418,578.81 /LS	29,418,579	47,831,812.27 /LS	47,831,812
			09 Substations for PG&E Connection	1.00 LS	14,084,931.91 /LS	1,575,053.18 /LS	35,292,995.70 /LS	/LS	50,952,980.79 /LS	50,952,981	82,891,215.33 /LS	82,891,215

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	22,203,582		123,609.120 hrs	
Material	58,184,388			
Allowance				
Equipment	2,503,245		17,035.797 hrs	
Other				
Total Construction Cost	**82,891,215**	**82,891,215**		
Non-Contract Costs	12,433,682			15.000 %
Total Project Costs	**12,433,682**	**95,324,897**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Substations for PG&E Connections
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
09						**Substations for PG&E Connection**									
	09.01					Three Breaker Substation									
		32.00.004				Substation Fencing									
			32.0			Exterior Improvements									
				32.31		Fencing									
					32.45.01.00	Fencing, Chain Link									
						Fence,chain link industrial,galvanized steel,3 strands barb wire,2"posts @ 10'oc,9ga wire,6'high,schedule 40,includes excavation,& concrete	1,122.00 lf	6.52 /lf	0.94 /lf	19.95 /lf	-	27.41 /lf	30,750	50.08 /lf	56,191
						Fence, chain link industrial, gate, galvanized steel, 4' wide, 5' high, 2" frame, includes excavation, in concrete	1.00 ea	156.42 /ea	22.53 /ea	229.00 /ea	-	407.95 /ea	408	740.55 /ea	741
						Fence, chain link industrial, overhead slide gate, cantilever type, chain link, 8' high, to 18' wide, includes excavation, in concrete	32.00 lf	95.45 /lf	28.04 /lf	176.00 /lf	-	299.49 /lf	9,584	544.24 /lf	17,416
						32.45.01.00 Fencing, Chain Link	**1,158.00** LF	9.09 /LF	1.70 /LF	24.39 /LF	/LF	35.18 /LF	40,741	64.20 /LF	74,347
						32.31 Fencing	**1,158.00** LF	9.09 /LF	1.70 /LF	24.39 /LF	/LF	35.18 /LF	40,741	64.20 /LF	74,347
						32.0 Exterior Improvements	**1.00** LS	10,523.21 /LS	1,973.23 /LS	28,244.90 /LS	/LS	40,741.34 /LS	40,741	74,346.98 /LS	74,347
						32.00.004 Substation Fencing	**1,158.00** LF	9.09 /LF	1.70 /LF	24.39 /LF	/LF	35.18 /LF	40,741	64.20 /LF	74,347
		32.00.006				Substation Gravel Surfacing									
			32.0			Exterior Improvements									
				32.12		Paving									
					32.40.04.00	Site Improvements, Access Roads, Gravel									
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	9,240.00 SY	0.62 /SY	0.35 /SY	-	-	0.98 /SY	9,005	1.73 /SY	15,981
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	1,540.00 cy	1.68 /cy	4.63 /cy	-	-	6.31 /cy	9,714	11.19 /cy	17,239
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	1,540.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	24,694	28.46 /cy	43,823
						Load excavated spoils	1,540.00 cy	0.77 /cy	0.84 /cy		-	1.62 /cy	2,490	2.87 /cy	4,419
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,6"deep	9,240.00 sy	0.94 /sy	0.92 /sy	7.30 /sy	-	9.16 /sy	84,627	16.78 /sy	155,069
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	9,240.00 sy	0.57 /sy	0.41 /sy	-	-	0.98 /sy	9,009	1.73 /sy	15,988
						32.40.04.00 Site Improvements, Access Roads, Gravel	9,240.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.10 /SY	139,541	27.33 /SY	252,518
						32.12 Paving	9,240.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.10 /SY	139,541	27.33 /SY	252,518
						32.0 Exterior Improvements	**1.00** LS	34,562.54 /LS	37,526.13 /LS	67,452.00 /LS	/LS	139,540.67 /LS	139,541	252,517.94 /LS	252,518
						32.00.006 Substation Gravel Surfacing	9,240.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.10 /SY	139,541	27.33 /SY	252,518
		34.10.STEEL				SUBSTATION STEEL									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Substation Steel	1.00 ea	594,750.00 /ea	-	2,100,000.00 /ea	-	2,694,750.00 /ea	2,694,750	4,395,380.12 /ea	4,395,380
						33.71.91.01 Power Substation	**1.00** LS	594,750.00 /LS	/LS	2,100,000.00 /LS	/LS	2,694,750.00 /LS	2,694,750	4,395,380.12 /LS	4,395,380
						26.20 Facility Electrical	**83,160.00** SF	7.15 /SF	/SF	25.25 /SF	/SF	32.40 /SF	2,694,750	52.85 /SF	4,395,380
						33.0 Utilities	0.00		/LF		/LF		2,694,750	/LF	4,395,380
						34.10.STEEL SUBSTATION STEEL	**1.00** LS	594,750.00 /LS	/LS	2,100,000.00 /LS	/LS	2,694,750.00 /LS	2,694,750	4,395,380.12 /LS	4,395,380
		34.10.SUBEQ				SUBSTATION EQUIPMENT/WORK PACKAGES									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Power Transformer, 100MVA 230kV-13.2kV	2.00 ea	118,950.00 /ea	-	2,500,000.00 /ea	-	2,618,950.00 /ea	5,237,900	4,305,026.08 /ea	8,610,052
						SF6 CB 3000A 230kV	3.00 ea	35,685.00 /ea	-	180,000.00 /ea	-	215,685.00 /ea	647,055	352,665.74 /ea	1,057,997
						Air Disconnect Switch 3000A motorized 3ph 230kV	10.00 ea	11,895.00 /ea	-	50,000.00 /ea	-	61,895.00 /ea	618,950	101,084.33 /ea	1,010,843
						CCVT / CT / VT / SA 230kV	4.00 ea	14,868.75 /ea	-	175,000.00 /ea	-	189,868.75 /ea	759,475	311,653.20 /ea	1,246,613
						Control Building (Relays, CP, HVAC. AC/DC)	1.00 ea	237,900.00 /ea	-	1,750,000.00 /ea	-	1,987,900.00 /ea	1,987,900	3,257,005.22 /ea	3,257,005
						Surface and Below Grade Package (Fence, Rock, Conduit, Grdg, Ltg)	1.00 ea	475,800.00 /ea	-	1,700,000.00 /ea	-	2,175,800.00 /ea	2,175,800	3,549,245.90 /ea	3,549,246
						Above Grade Package (Bus, Jumpers, Fittings)	1.00 ea	475,800.00 /ea	-	1,800,000.00 /ea	-	2,275,800.00 /ea	2,275,800	3,713,955.05 /ea	3,713,955
						Above/Below Conduit, Cable Trench, Cables	1.00 ea	333,060.00 /ea	-	700,000.00 /ea	-	1,033,060.00 /ea	1,033,060	1,677,397.37 /ea	1,677,397
						33.71.91.01 Power Substation	**1.00** LS	2,045,940.00 /LS	/LS	12,690,000.00 /LS	/LS	14,735,940.00 /LS	14,735,940	24,123,109.02 /LS	24,123,109
						26.20 Facility Electrical	**83,160.00** SF	24.60 /SF	/SF	152.60 /SF	/SF	177.20 /SF	14,735,940	290.08 /SF	24,123,109
						33.0 Utilities	0.00		/LF		/LF		14,735,940	/LF	24,123,109
						34.10.SUBEQ SUBSTATION EQUIPMENT/WORK PACKAGES	**1.00** LS	2,045,940.00 /LS	/LS	12,690,000.00 /LS	/LS	14,735,940.00 /LS	14,735,940	24,123,109.02 /LS	24,123,109
		34.30.FNDT				SUBSTATION FOUNDATIONS									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Transformer Foundations 100MVA	2.00 ea	47,580.00 /ea	-	20,000.00 /ea	-	67,580.00 /ea	135,160	107,860.89 /ea	215,722
						Breaker Foundations	3.00 ea	23,790.00 /ea	-	10,000.00 /ea	-	33,790.00 /ea	101,370	53,930.44 /ea	161,791
						Takeoff Structure Foundations	4.00 ea	28,548.00 /ea	-	25,000.00 /ea	-	53,548.00 /ea	214,192	86,128.72 /ea	344,515
						Bus Support / CCVT / CT-VT / SA /AS Foundations	36.00 ea	28,548.00 /ea	-	5,000.00 /ea	-	33,548.00 /ea	1,207,728	53,186.89 /ea	1,914,728
						33.71.91.01 Power Substation	**1.00** LS	1,308,450.00 /LS	/LS	350,000.00 /LS	/LS	1,658,450.00 /LS	1,658,450	2,636,756.05 /LS	2,636,756
						26.20 Facility Electrical	**83,160.00** SF	15.73 /SF	/SF	4.21 /SF	/SF	19.94 /SF	1,658,450	31.71 /SF	2,636,756
						33.0 Utilities			/LF		/LF		1,658,450	/LF	2,636,756
						34.30.FNDT SUBSTATION FOUNDATIONS	**1.00** LS	1,308,450.00 /LS	/LS	350,000.00 /LS	/LS	1,658,450.00 /LS	1,658,450	2,636,756.05 /LS	2,636,756
		34.90.CX				ENGINEERING, STARTUP, COMMISSIONING									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Testing	400.00 hrs	118.95 /hrs	-		-	118.95 /hrs	47,580	187.30 /hrs	74,919
						Startup, Commissioning, Training, Documentation, Warranty	400.00 hrs	118.95 /hrs	-		-	118.95 /hrs	47,580	187.30 /hrs	74,919
						Power Engineering, Seismic Engineering	2,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	490,000	387.59 /hrs	775,175
						Protective Device Coordination Stidy	2,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	490,000	387.59 /hrs	775,175
						Protective Device Coordination Stidy	2,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	490,000	387.59 /hrs	775,175
						33.71.91.01 Power Substation	**1.00** LS	1,415,160.00 /LS	/LS	150,000.00 /LS	/LS	1,565,160.00 /LS	1,565,160	2,475,362.46 /LS	2,475,362
						26.20 Facility Electrical	**83,160.00** SF	17.02 /SF	/SF	1.80 /SF	/SF	18.82 /SF	1,565,160	29.77 /SF	2,475,362
						33.0 Utilities	0.00		/LF		/LF		1,565,160	/LF	2,475,362
						34.90.CX ENGINEERING, STARTUP, COMMISSIONING	**1.00** LS	1,415,160.00 /LS	/LS	150,000.00 /LS	/LS	1,565,160.00 /LS	1,565,160	2,475,362.46 /LS	2,475,362
		34.95.CONEQ				CONSTRUCTION EQUIPMENT									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	104.00 week		2,663.32 /week	-	-	2,663.32 /week	276,985	4,193.64 /week	436,139
						Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	250.00 day		835.38 /day	-	-	835.38 /day	208,846	1,315.39 /day	328,847
						Crane crew, daily use for small jobs, 100-ton truck-mounted hydraulic crane, portal to portal	60.00 day		2,168.18 /day	-	-	2,168.18 /day	130,091	3,413.99 /day	204,839
						Rent crawler mounted, lattice boom crane, 165 ton, 60' boom	30.00 day	-	2,649.00 /day	-	-	2,649.00 /day	79,470	4,171.09 /day	125,133
						Mobilization or demobilization, delivery charge for equipment, on flatbed trailer behind pickup truck	2.00 ea	122.38 /ea	71.41 /ea	-	-	193.79 /ea	388	305.14 /ea	610

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					33.71.91.01	Power Substation									
						Mobilization or demobilization, crane, truck-mounted, up to 75 ton, (driver only, one-way)	2.00 ea	82.95 /ea	-	-	-	82.95 /ea	166	130.62 /ea	261
						Mobilization or demobilization, crane, truck-mounted, over 75 ton	2.00 ea	441.74 /ea	55.72 /ea	-	-	497.46 /ea	995	783.29 /ea	1,567
						Mobilization or demobilization, crane, crawler-mounted, over 75 ton	2.00 ea	736.23 /ea	703.65 /ea	-	-	1,439.88 /ea	2,880	2,267.22 /ea	4,534
						33.71.91.01 Power Substation	1.00 LS	2,766.57 /LS	697,053.40 /LS	/LS	/LS	699,819.97 /LS	699,820	1,101,930.49 /LS	1,101,930
						26.20 Facility Electrical	83,160.00 SF	0.03 /SF	8.38 /SF	/SF	/SF	8.42 /SF	699,820	13.25 /SF	1,101,930
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	699,820	/LF	1,101,930
						34.95.CONEQ CONSTRUCTION EQUIPMENT	1.00 LS	2,766.57 /LS	697,053.40 /LS	/LS	/LS	699,819.97 /LS	699,820	1,101,930.49 /LS	1,101,930
						09.01 Three Breaker Substation	**1.00 LS**	**5,412,152.32 /LS**	**736,552.76 /LS**	**15,385,696.90 /LS**	**/LS**	**21,534,401.98 /LS**	**21,534,402**	**35,059,403.06 /LS**	**35,059,403**
	09.02					**Six Breaker Substation**									
		32.00.004				Substation Fencing									
			32.0			Exterior Improvements									
				32.31		Fencing									
					32.45.01.00	Fencing, Chain Link									
						Fence,chain link industrial,galvanized steel,3 strands barb wire,2"posts @ 10'oc,9ga wire,6'high,schedule 40,includes excavation,& concrete	1,580.00 lf	6.52 /lf	0.94 /lf	19.95 /lf	-	27.41 /lf	43,302	50.08 /lf	79,128
						Fence, chain link industrial, gate, galvanized steel, 4' wide, 5' high, 2" frame, includes excavation, in concrete	1.00 ea	156.42 /ea	22.53 /ea	229.00 /ea	-	407.95 /ea	408	740.54 /ea	741
						Fence, chain link industrial, overhead slide gate, cantilever type, chain link, 8' high, to 18' wide, includes excavation, in concrete	48.00 lf	95.45 /lf	28.04 /lf	176.00 /lf	-	299.49 /lf	14,376	544.24 /lf	26,123
						32.45.01.00 Fencing, Chain Link	1,632.00 LF	9.21 /LF	1.75 /LF	24.63 /LF	/LF	35.59 /LF	58,085	64.95 /LF	105,992
						32.31 Fencing	1,632.00 LF	9.21 /LF	1.75 /LF	24.63 /LF	/LF	35.59 /LF	58,085	64.95 /LF	105,992
						32.0 Exterior Improvements	1.00 LS	15,035.32 /LS	2,851.88 /LS	40,198.00 /LS	/LS	58,085.20 /LS	58,085	105,991.84 /LS	105,992
						32.00.004 Substation Fencing	1,632.00 LF	9.21 /LF	1.75 /LF	24.63 /LF	/LF	35.59 /LF	58,085	64.95 /LF	105,992
		32.00.006				Substation Gravel Surfacing									
			32.0			Exterior Improvements									
				32.12		Paving									
					32.40.04.00	Site Improvements, Access Roads, Gravel									
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	18,096.00 SY	0.62 /SY	0.35 /SY	-	-	0.98 /SY	17,637	1.73 /SY	31,298
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	3,020.00 cy	1.68 /cy	4.63 /cy	-	-	6.31 /cy	19,050	11.19 /cy	33,807
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	3,020.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	48,427	28.46 /cy	85,938
						Load excavated spoils	3,020.00 cy	0.77 /cy	0.84 /cy		-	1.62 /cy	4,883	2.87 /cy	8,666
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,6"deep	18,096.00 sy	0.94 /sy	0.92 /sy	7.30 /sy	-	9.16 /sy	165,737	16.78 /sy	303,693
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	18,096.00 sy	0.57 /sy	0.41 /sy	-	-	0.98 /sy	17,644	1.73 /sy	31,311
						32.40.04.00 Site Improvements, Access Roads, Gravel	18,096.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.11 /SY	273,378	27.34 /SY	494,712
						32.12 Paving	18,096.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.11 /SY	273,378	27.34 /SY	494,712
						32.0 Exterior Improvements	1.00 LS	67,727.45 /LS	73,549.86 /LS	132,100.80 /LS	/LS	273,378.11 /LS	273,378	494,711.75 /LS	494,712
						32.00.006 Substation Gravel Surfacing	18,096.00 SY	3.74 /SY	4.06 /SY	7.30 /SY	/SY	15.11 /SY	273,378	27.34 /SY	494,712
		34.10.STEEL				SUBSTATION STEEL									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Substation Steel	1.00 ea	951,600.00 /ea	-	2,400,000.00 /ea	-	3,351,600.00 /ea	3,351,600	5,451,400.44 /ea	5,451,400
						33.71.91.01 Power Substation	1.00 LS	951,600.00 /LS	/LS	2,400,000.00 /LS	/LS	3,351,600.00 /LS	3,351,600	5,451,400.44 /LS	5,451,400
						26.20 Facility Electrical	162,864.00 SF	5.84 /SF	/SF	14.74 /SF	/SF	20.58 /SF	3,351,600	33.47 /SF	5,451,400
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	3,351,600	/LF	5,451,400
						34.10.STEEL SUBSTATION STEEL	1.00 LS	951,600.00 /LS	/LS	2,400,000.00 /LS	/LS	3,351,600.00 /LS	3,351,600	5,451,400.44 /LS	5,451,400
		34.10.SUBEQ				SUBSTATION EQUIPMENT/WORK PACKAGES									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Power Transformer, 100MVA 230kV-13.2kV	2.00 ea	118,950.00 /ea	-	2,500,000.00 /ea	-	2,618,950.00 /ea	5,237,900	4,305,026.08 /ea	8,610,052
						SF6 CB 3000A 230kV	7.00 ea	35,685.00 /ea	-	180,000.00 /ea	-	215,685.00 /ea	1,509,795	352,665.74 /ea	2,468,660
						Air Disconnect Switch 3000A motorized 3ph 230kV	20.00 ea	11,895.00 /ea	-	50,000.00 /ea	-	61,895.00 /ea	1,237,900	101,084.33 /ea	2,021,687
						CCVT / CT / VT / SA 230kV	7.00 ea	14,868.75 /ea	-	175,000.00 /ea	-	189,868.75 /ea	1,329,081	311,653.20 /ea	2,181,572
						Control Building (Relays, CP, HVAC. AC/DC)	1.00 ea	356,850.00 /ea	-	2,500,000.00 /ea	-	2,856,850.00 /ea	2,856,850	4,679,621.37 /ea	4,679,621
						Surface and Below Grade Package (Fence, Rock, Conduit, Grdg, Ltg)	1.00 ea	713,700.00 /ea	-	2,100,000.00 /ea	-	2,813,700.00 /ea	2,813,700	4,582,677.74 /ea	4,582,678
						Above Grade Package (Bus, Jumpers, Fittings)	1.00 ea	785,070.00 /ea	-	2,400,000.00 /ea	-	3,185,070.00 /ea	3,185,070	5,189,183.77 /ea	5,189,184
						Above/Below Conduit, Cable Trench, Cables	1.00 ea	380,640.00 /ea	-	1,000,000.00 /ea	-	1,380,640.00 /ea	1,380,640	2,246,443.82 /ea	2,246,444
						33.71.91.01 Power Substation	1.00 LS	3,065,936.25 /LS	/LS	16,485,000.00 /LS	/LS	19,550,936.25 /LS	19,550,936	31,979,898.09 /LS	31,979,898
						26.20 Facility Electrical	162,864.00 SF	18.83 /SF	/SF	101.22 /SF	/SF	120.05 /SF	19,550,936	196.36 /SF	31,979,898
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	19,550,936	/LF	31,979,898
						34.10.SUBEQ SUBSTATION EQUIPMENT/WORK PACKAGES	1.00 LS	3,065,936.25 /LS	/LS	16,485,000.00 /LS	/LS	19,550,936.25 /LS	19,550,936	31,979,898.09 /LS	31,979,898
		34.30.FNDT				SUBSTATION FOUNDATIONS									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Transformer Foundations 100MVA	2.00 ea	47,580.00 /ea	-	20,000.00 /ea	-	67,580.00 /ea	135,160	107,860.90 /ea	215,722
						Breaker Foundations	9.00 ea	23,790.00 /ea	-	10,000.00 /ea	-	33,790.00 /ea	304,110	53,930.44 /ea	485,374
						Takeoff Structure Foundations	4.00 ea	28,548.00 /ea	-	25,000.00 /ea	-	53,548.00 /ea	214,192	86,128.72 /ea	344,515
						Bus Support / CCVT / CT-VT / SA / AS Foundations	94.00 ea	28,548.00 /ea	-	5,000.00 /ea	-	33,548.00 /ea	3,153,512	53,186.89 /ea	4,999,568
						33.71.91.01 Power Substation	1.00 LS	3,106,974.00 /LS	/LS	700,000.00 /LS	/LS	3,806,974.00 /LS	3,806,974	6,045,178.43 /LS	6,045,178
						26.20 Facility Electrical	162,864.00 SF	19.08 /SF	/SF	4.30 /SF	/SF	23.38 /SF	3,806,974	37.12 /SF	6,045,178
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	3,806,974	/LF	6,045,178
						34.30.FNDT SUBSTATION FOUNDATIONS	1.00 LS	3,106,974.00 /LS	/LS	700,000.00 /LS	/LS	3,806,974.00 /LS	3,806,974	6,045,178.43 /LS	6,045,178
		34.90.CX				ENGINEERING, STARTUP, COMMISSIONING									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Testing	600.00 hrs	118.95 /hrs	-		-	118.95 /hrs	71,370	187.30 /hrs	112,379
						Startup, Commissioning, Training, Documentation, Warranty	600.00 hrs	118.95 /hrs	-		-	118.95 /hrs	71,370	187.30 /hrs	112,379
						Power Engineering, Seismic Engineering	3,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	735,000	387.59 /hrs	1,162,762
						Protective Device Coordination Stidy	3,000.00 hrs	220.00 /hrs	-	25.00 /hrs	-	245.00 /hrs	735,000	387.59 /hrs	1,162,762
						33.71.91.01 Power Substation	1.00 LS	1,462,740.00 /LS	/LS	150,000.00 /LS	/LS	1,612,740.00 /LS	1,612,740	2,550,281.51 /LS	2,550,282
						26.20 Facility Electrical	162,864.00 SF	8.98 /SF	/SF	0.92 /SF	/SF	9.90 /SF	1,612,740	15.66 /SF	2,550,282
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	1,612,740	/LF	2,550,282
						34.90.CX ENGINEERING, STARTUP, COMMISSIONING	1.00 LS	1,462,740.00 /LS	/LS	150,000.00 /LS	/LS	1,612,740.00 /LS	1,612,740	2,550,281.51 /LS	2,550,282
		34.95.CONEQ				CONSTRUCTION EQUIPMENT									
			33.0			Utilities									
				26.20		Facility Electrical									
					33.71.91.01	Power Substation									
						Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	104.00 week		2,663.32 /week	-	-	2,663.32 /week	276,985	4,193.64 /week	436,139

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					33.71.91.01	Power Substation									
						Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	250.00 day		835.38 /day	-	-	835.38 /day	208,846	1,315.39 /day	328,847
						Crane crew, daily use for small jobs, 100-ton truck-mounted hydraulic crane, portal to portal	90.00 day		2,168.18 /day	-	-	2,168.18 /day	195,136	3,413.99 /day	307,259
						Rent crawler mounted, lattice boom crane, 165 ton, 60' boom	30.00 day	-	2,649.00 /day	-	-	2,649.00 /day	79,470	4,171.09 /day	125,133
						Mobilization or demobilization, delivery charge for equipment, on flatbed trailer behind pickup truck	2.00 ea	122.38 /ea	71.41 /ea	-	-	193.79 /ea	388	305.15 /ea	610
						Mobilization or demobilization, crane, truck-mounted, up to 75 ton, (driver only, one-way)	2.00 ea	82.95 /ea	-	-	-	82.95 /ea	166	130.60 /ea	261
						Mobilization or demobilization, crane, truck-mounted, over 75 ton	2.00 ea	441.74 /ea	55.72 /ea	-	-	497.46 /ea	995	783.29 /ea	1,567
						Mobilization or demobilization, crane, crawler-mounted, over 75 ton	2.00 ea	736.23 /ea	703.65 /ea	-	-	1,439.88 /ea	2,880	2,267.22 /ea	4,534
						33.71.91.01 Power Substation	1.00 LS	2,766.57 /LS	762,098.68 /LS	/LS	/LS	764,865.25 /LS	764,865	1,204,350.21 /LS	1,204,350
						26.20 Facility Electrical	162,864.00 SF	0.02 /SF	4.68 /SF	/SF	/SF	4.70 /SF	764,865	7.39 /SF	1,204,350
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	764,865	/LF	1,204,350
						34.95.CONEO CONSTRUCTION EQUIPMENT	1.00 LS	2,766.57 /LS	762,098.68 /LS	/LS	/LS	764,865.25 /LS	764,865	1,204,350.21 /LS	1,204,350
						09.02 Six Breaker Substation	1.00 LS	8,672,779.59 /LS	838,500.42 /LS	19,907,298.80 /LS	/LS	29,418,578.81 /LS	29,418,579	47,831,812.27 /LS	47,831,812
						09 Substations for PG&E Connection	**1.00 LS**	**14,084,931.91 /LS**	**1,575,053.18 /LS**	**35,292,995.70 /LS**	**/LS**	**50,952,980.79 /LS**	**50,952,981**	**82,891,215.33 /LS**	**82,891,215**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	14,084,932		123,609.120 hrs	
Material	35,292,996			
Allowance				
Equipment	1,575,053		17,035.797 hrs	
Other				
Subtotal Direct Costs	**50,952,981**	**50,952,981**		
Material Sales Tax, Dunnigan Ca	2,558,742			7.250 %
Subtotal W/ Sales Tax	**2,558,742**	**53,511,723**		
Site/Civil I,OH&P	102,349			20.000 %
Subtotal W/ Subcontractor OH&P	**102,349**	**53,614,072**		
General Conditions	2,680,704			5.000 %
Subtotal W/ General Conditions	**2,680,704**	**56,294,776**		
Mobilization/Demobilization	1,688,843			3.000 %
Prime Contractor Overhead	5,798,362			10.000 %
Prime Contractor Profit	3,826,919			6.000 %
Bonds & Insurance	1,467,113			2.170 %
Subtotal W/ Prime Markups	**12,781,237**	**69,076,013**		
Contractor Contingency	3,453,801			5.000 %
Design Contingency	10,361,402			15.000 %
Subtotal W/ Contingency	**13,815,203**	**82,891,216**		
Total Construction Cost		**82,891,216**		
Non-Contract Costs	12,433,682			15.000 %
Total Project Costs	**12,433,682**	**95,324,898**		

Red Bluff Improvements

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Red Bluff Pumping Plant Improvements
Project Number: D3380602
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Mar 1, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
12			***Red Bluff Pumping Plant Improvements***									
	12.01		Red Bluff Add Pumps									
		44.40.500	*Red Bluff Pumping Plant, Furnish and Install Pumps*	***2.00*** *EA*	*41,660.68 /EA*	*9,816.20 /EA*	*1,206,870.00 /EA*	*4,200.00 /EA*	*1,262,546.88 /EA*	*2,525,094*	*2,092,332.87 /EA*	*4,184,666*
			12.01 Red Bluff Add Pumps	***2.00*** EA	41,660.68 /EA	9,816.20 /EA	1,206,870.00 /EA	4,200.00 /EA	1,262,546.88 /EA	2,525,094	2,092,332.87 /EA	4,184,666
			12 Red Bluff Pumping Plant Improvements	***1.00 LS***	***83,321.35 /LS***	***19,632.40 /LS***	***2,413,740.00 /LS***	***8,400.00 /LS***	***2,525,093.75 /LS***	***2,525,094***	***4,184,665.74 /LS***	***4,184,666***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	132,308		902.400 hrs	
Material	4,007,844			
Allowance	13,339			
Equipment	31,175		312.000 hrs	
Other				
Total Construction Cost	**4,184,666**	**4,184,666**		
Non-Contract Costs	627,700			15.000 %
Total Project Costs	**627,700**	**4,812,366**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Red Bluff Pumping Plant Improvements
Project Number: D3380602
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Mar 1, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
12						**Red Bluff Pumping Plant Improvements**									
	12.01					Red Bluff Add Pumps									
		44.40.500				Red Bluff Pumping Plant, Furnish and Install Pumps									
			26.0			Electrical Work									
				26.00		Electrical									
					26.00.99.00	Electrical, Other									
						Electric Power - Install	1.00 LS	9,891.48 /LS	1,000.00 /LS	10,000.00 /LS		20,891.48 /LS	20,891	33,899.18 /LS	33,899
						26.00.99.00 Electrical, Other	1.00 LS	9,891.48 /LS	1,000.00 /LS	10,000.00 /LS	/LS	20,891.48 /LS	20,891	33,899.18 /LS	33,899
						26.00 Electrical	1.00 LS	9,891.48 /LS	1,000.00 /LS	10,000.00 /LS	/LS	20,891.48 /LS	20,891	33,899.18 /LS	33,899
						26.0 Electrical Work	1.00 LS	9,891.48 /LS	1,000.00 /LS	10,000.00 /LS	/LS	20,891.48 /LS	20,891	33,899.18 /LS	33,899
			40.9			Instrumentation & Controls									
				40.90		Instrumentation & Controls									
					40.90.99.01	I&C, Other									
						I&C Allowance	1.00 LS	6,594.32 /LS	1,000.00 /LS	10,000.00 /LS		17,594.32 /LS	17,594	28,663.54 /LS	28,664
						40.90.99.01 I&C, Other	1.00 LS	6,594.32 /LS	1,000.00 /LS	10,000.00 /LS	/LS	17,594.32 /LS	17,594	28,663.54 /LS	28,664
						40.90 Instrumentation & Controls	1.00 LS	6,594.32 /LS	1,000.00 /LS	10,000.00 /LS	/LS	17,594.32 /LS	17,594	28,663.54 /LS	28,664
						40.9 Instrumentation & Controls	1.00 LS	6,594.32 /LS	1,000.00 /LS	10,000.00 /LS	/LS	17,594.32 /LS	17,594	28,663.54 /LS	28,664
			46.0			Water and Wastewater Equipment									
				40.55		Water Control Gates, Other Gates									
					40.30.06.01	Other Gates									
						Flap gates, hydraulic structures, 84" diameter	2.00 EA	11,093.40 /EA	3,676.20 /EA	16,000.00 /EA	-	30,769.60 /EA	61,539	50,019.93 /EA	100,040
						40.30.06.01 Other Gates	2.00 EA	11,093.40 /EA	3,676.20 /EA	16,000.00 /EA	/EA	30,769.60 /EA	61,539	50,019.93 /EA	100,040
						40.55 Water Control Gates, Other Gates	2.00 EA	11,093.40 /EA	3,676.20 /EA	16,000.00 /EA	/EA	30,769.60 /EA	61,539	50,019.93 /EA	100,040
				44.40		Process Equipment - Pumps									
					44.05.42.05	Vertical Turbine Pump: 501hp-1000hp									
						Functional Testing, Pumps, >1000 hp	2.00 ea	3,068.99 /ea	-	100.00 /ea	-	3,168.99 /ea	6,338	5,039.38 /ea	10,079
						Align Pump & Motor, >1000 hp	2.00 ea	3,836.24 /ea	-	-	2,800.00 /ea	6,636.24 /ea	13,272	10,537.88 /ea	21,076
						Vibration Testing, Pumps, >1000 hp	2.00 ea	1,534.50 /ea	-	-	1,400.00 /ea	2,934.50 /ea	5,869	4,659.77 /ea	9,320
						Sleeved anchor bolts - Large	24.00 ea	95.91 /ea	-	28.00 /ea	-	123.91 /ea	2,974	198.78 /ea	4,771
						Anchor bolts for leveling pump cans	8.00 ea	383.62 /ea	-	150.00 /ea	-	533.62 /ea	4,269	858.23 /ea	6,866
						Non-Shrink Machine Grout	32.00 cuft	91.11 /cuft	-	74.00 /cuft	-	165.11 /cuft	5,284	267.55 /cuft	8,562
						Grease, Oil, and Lube Pumps, >1000 hp	2.00 ea	1,534.50 /ea	-	150.00 /ea	-	1,684.50 /ea	3,369	2,685.74 /ea	5,371
						FURNISH Vertical Turbine Pump and Motor	2.00 EA	-	-	1,060,000.00 /EA	-	1,060,000.00 /EA	2,120,000	1,760,054.74 /EA	3,520,109
						Remove Existing Blockout Plates to Install Pumps	2.00 ea	1,823.10 /ea	1,300.00 /ea	500.00 /ea	-	3,623.10 /ea	7,246	5,789.48 /ea	11,579
						Remove Existing Blind Flanges	2.00 ea	1,458.48 /ea	520.00 /ea	250.00 /ea	-	2,228.48 /ea	4,457	3,556.79 /ea	7,114
						Harnessed Sleeve	2.00 ea	2,187.72 /ea	1,560.00 /ea	52,000.00 /ea	-	55,747.72 /ea	111,495	92,293.42 /ea	184,587
						Butterfly Valves	2.00 ea	2,187.72 /ea	1,560.00 /ea	65,000.00 /ea	-	68,747.72 /ea	137,495	113,878.99 /ea	227,758
						Pump Equipment Pads	2.00 ea	550.00 /ea	200.00 /ea	750.00 /ea	-	1,500.00 /ea	3,000	2,436.28 /ea	4,873
						44.05.42.05 Vertical Turbine Pump: 501hp-1000hp	2.00 EA	22,324.38 /EA	5,140.00 /EA	1,180,870.00 /EA	4,200.00 /EA	1,212,534.38 /EA	2,425,069	2,011,031.57 /EA	4,022,063
						44.40 Process Equipment - Pumps	2.00 EA	22,324.38 /EA	5,140.00 /EA	1,180,870.00 /EA	4,200.00 /EA	1,212,534.38 /EA	2,425,069	2,011,031.57 /EA	4,022,063
						46.0 Water and Wastewater Equipment	2.00 EA	33,417.78 /EA	8,816.20 /EA	1,196,870.00 /EA	4,200.00 /EA	1,243,303.98 /EA	2,486,608	2,061,051.51 /EA	4,122,103
						44.40.500 Red Bluff Pumping Plant, Furnish and Install Pumps	2.00 EA	41,660.68 /EA	9,816.20 /EA	1,206,870.00 /EA	4,200.00 /EA	1,262,546.88 /EA	2,525,094	2,092,332.87 /EA	4,184,666
						12.01 Red Bluff Add Pumps	2.00 EA	41,660.68 /EA	9,816.20 /EA	1,206,870.00 /EA	4,200.00 /EA	1,262,546.88 /EA	2,525,094	2,092,332.87 /EA	4,184,666
						12 Red Bluff Pumping Plant Improvements	**1.00 LS**	**83,321.35 /LS**	**19,632.40 /LS**	**2,413,740.00 /LS**	**8,400.00 /LS**	**2,525,093.75 /LS**	**2,525,094**	**4,184,665.74 /LS**	**4,184,666**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	83,321		902.400 hrs	
Material	2,413,740			
Allowance	8,400			
Equipment	19,632		312.000 hrs	
Other				
Subtotal Direct Costs	**2,525,093**	**2,525,093**		
Material Sales Tax, Dunnigan Ca	174,996			7.250 %
Subtotal W/ Sales Tax	**174,996**	**2,700,089**		
General Conditions	135,005			5.000 %
Subtotal W/ General Conditions	**135,005**	**2,835,094**		
Mobilization/Demobilization	141,755			5.000 %
Prime Contractor Overhead	297,685			10.000 %
Prime Contractor Profit	196,472			6.000 %
Bonds & Insurance	75,321			2.170 %
Subtotal W/ Prime Markups	**711,233**	**3,546,327**		
Contractor Contingency	106,390			3.000 %
Design Contingency	531,949			15.000 %
Subtotal W/ Contingency	**638,339**	**4,184,666**		
Total Construction Cost		**4,184,666**		
Non-Contract Costs	627,700			15.000 %
Total Project Costs	**627,700**	**4,812,366**		

GCID Improvements

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 GCID Canal Improvements Rev 3
Project Number: D3380602
Design Stage: Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Mar 1, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
13			GCID Canal Improvements									
	13.01		GCID MP 1.52 Headgates Structure									
		01.00.900	Gate Structure Removal and Control of Water	6.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	270,000	69,658.17 /MO	417,949
		02.00.900	Gate Structure Demolish Existing Canal Lining	17,952.00 SF	1.61 /SF	0.56 /SF	0.82 /SF	/SF	2.99 /SF	53,681	4.69 /SF	84,165
		03.00.500	Foundation Slab	697.00 CY	171.45 /CY	6.78 /CY	242.78 /CY	/CY	421.01 /CY	293,442	669.30 /CY	466,505
		03.00.502	Gate Structure End Walls	94.00 CY	437.12 /CY	9.12 /CY	389.68 /CY	/CY	835.92 /CY	78,577	1,322.23 /CY	124,289
		03.00.504	Gate Structure Pier Walls	271.00 CY	437.74 /CY	9.12 /CY	389.64 /CY	/CY	836.50 /CY	226,692	1,323.12 /CY	358,566
		03.00.506	Gate Structure Walls	384.00 CY	446.68 /CY	9.12 /CY	391.07 /CY	/CY	846.87 /CY	325,198	1,339.27 /CY	514,281
		03.00.507	Gate Structure Elevated Slab	156.00 CY	396.44 /CY	7.00 /CY	266.25 /CY	/CY	669.69 /CY	104,472	1,055.96 /CY	164,729
		03.00.510	Gate Structure Concrete Canal Lining	283.00 CY	208.98 /CY	10.84 /CY	246.47 /CY	/CY	466.29 /CY	131,960	739.67 /CY	209,326
		05.00.900	Gate Structure Metals	1.00 LS	10,190.06 /LS	380.03 /LS	33,932.00 /LS	/LS	44,502.09 /LS	44,502	71,347.49 /LS	71,347
		26.20.GATE	GATE Actuators	1.00 LS	/LS	/LS	/LS	80,000.00 /LS	80,000.00 /LS	80,000	143,836.73 /LS	143,837
		31.25.900	Gate Structure Earthworks	2,670.00 CY	7.55 /CY	5.05 /CY	16.11 /CY	/CY	28.72 /CY	76,679	45.62 /CY	121,814
		40.00.900	Gate Structure Water Control Gates	8.00 EA	8,217.33 /EA	2,042.33 /EA	20,000.00 /EA	/EA	30,259.67 /EA	242,077	48,290.73 /EA	386,326
		40.90.ALLOW	Allowance for SCADA at GCID	1.00 LS	/LS	/LS	/LS	185,000.00 /LS	185,000.00 /LS	185,000	332,622.48 /LS	332,622
			13.01 GCID MP 1.52 Headgates Structure	1.00 LS	696,736.17 /LS	55,950.01 /LS	824,594.42 /LS	535,000.00 /LS	2,112,280.60 /LS	2,112,281	3,395,757.40 /LS	3,395,757
	13.05		GCID Main Canal Bank Improvements									
		31.00.716	Construct Embankment	32,710.00 CY	9.83 /CY	7.24 /CY	27.24 /CY	0.76 /CY	45.07 /CY	1,474,249	71.74 /CY	2,346,674
			13.05 GCID Main Canal Bank Improvements	32,710.00 CY	9.83 /CY	7.24 /CY	27.24 /CY	0.76 /CY	45.07 /CY	1,474,249	71.74 /CY	2,346,674
			13 GCID Canal Improvements	1.00 LS	1,018,301.63 /LS	292,633.25 /LS	1,715,594.42 /LS	560,000.00 /LS	3,586,529.30 /LS	3,586,529	5,742,431.79 /LS	5,742,432

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	1,576,290		12,456.246 hrs	
Material	2,780,051			
Allowance	933,107			
Equipment	452,984		3,372.175 hrs	
Other				
Total Construction Cost	**5,742,432**	**5,742,432**		
Non-Contract Costs	861,365			15.000 %
Total Project Costs	**861,365**	**6,603,797**		

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
13						GCID Canal Improvements									
	13.01					GCID MP 1.52 Headgates Structure									
		01.00.900				Gate Structure Removal and Control of Water									
			01.0			General Requirements									
				01.01		Construction Operations									
					31.15.02.00	Dewatering									
						CBD Discharge Structure, Removal and Control of Water	6.00 MO		-		45,000.00 /MO	45,000.00 /MO	270,000	69,658.17 /MO	417,949
						31.15.02.00 Dewatering	6.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	270,000	69,658.17 /MO	417,949
						01.01 Construction Operations	6.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	270,000	69,658.17 /MO	417,949
						01.0 General Requirements	6.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	270,000	69,658.17 /MO	417,949
						01.00.900 Gate Structure Removal and Control of Water	6.00 MO	/MO	/MO	/MO	45,000.00 /MO	45,000.00 /MO	270,000	69,658.17 /MO	417,949
		02.00.900				Gate Structure Demolish Existing Canal Lining									
			02.0			Existing Conditions									
				02.40		Demolition									
					02.01.01.00	General Site Demolition									
						Partial Demolition of Existing Canal Lining	17,952.00 SF	1.38 /SF	0.28 /SF	0.82 /SF	-	2.48 /SF	44,585	3.90 /SF	70,085
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	500.00 cy	7.24 /cy	8.80 /cy	-	-	16.04 /cy	8,018	24.82 /cy	12,411
						Load excavated spoils	500.00 cy	1.03 /cy	1.13 /cy		-	2.16 /cy	1,078	3.34 /cy	1,669
						02.01.01.00 General Site Demolition	17,952.00 SF	1.61 /SF	0.56 /SF	0.82 /SF	/SF	2.99 /SF	53,681	4.69 /SF	84,165
						02.40 Demolition	17,952.00 SF	1.61 /SF	0.56 /SF	0.82 /SF	/SF	2.99 /SF	53,681	4.69 /SF	84,165
						02.0 Existing Conditions	17,952.00 SF	1.61 /SF	0.56 /SF	0.82 /SF	/SF	2.99 /SF	53,681	4.69 /SF	84,165
						02.00.900 Gate Structure Demolish Existing Canal Lining	17,952.00 SF	1.61 /SF	0.56 /SF	0.82 /SF	/SF	2.99 /SF	53,681	4.69 /SF	84,165
		03.00.500				Foundation Slab									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.36	Cast-In-Place Concrete, Slabs on Grade, 36" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,440.00 sfca	7.87 /sfca	-	0.97 /sfca	-	8.84 /sfca	12,723	13.75 /sfca	19,796
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	61.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	156,828	4,066.72 /ton	248,070
						Reinforcing in place, unloading & sorting, add to above - slabs	61.00 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	3,398	86.23 /ton	5,260
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	718.00 cy	-	-	131.00 /cy	-	131.00 /cy	94,058	212.28 /cy	152,417
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	697.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	20,214	44.89 /CY	31,290
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	4,524.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	4,237	1.45 /sf	6,559
						Curing, sprayed membrane curing compound	45.24 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	1,043	36.58 /csf	1,655
						Fine grading, fine grade for slab on grade, machine	502.67 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	942	2.90 /sy	1,458
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	697.00 CY	171.45 /CY	6.78 /CY	242.78 /CY	/CY	421.01 /CY	293,442	669.30 /CY	466,505
						03.18 Cast-In-Place Concrete, Slabs on Grade	697.00 CY	171.45 /CY	6.78 /CY	242.78 /CY	/CY	421.01 /CY	293,442	669.30 /CY	466,505
						03.0 Concrete Work	697.00 CY	171.45 /CY	6.78 /CY	242.78 /CY	/CY	421.01 /CY	293,442	669.30 /CY	466,505
						03.00.500 Foundation Slab	697.00 CY	171.45 /CY	6.78 /CY	242.78 /CY	/CY	421.01 /CY	293,442	669.30 /CY	466,505
		03.00.502				Gate Structure End Walls									
			03.0			Concrete Work									
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.24	Cast-In-Place Concrete, Straight Walls, 24" thick									
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	2,530.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	37,286	23.21 /sfca	58,717
						Form oil, coverage varies greatly, maximum, includes material only	6.75 gal	-	-	23.50 /gal	-	23.50 /gal	159	38.08 /gal	257
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.25 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	21,210	4,066.72 /ton	33,550
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	8.25 ton	49.21 /ton	6.50 /ton	-	-	55.70 /ton	460	86.23 /ton	711
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	97.00 cy	-	-	131.00 /cy	-	131.00 /cy	12,707	212.28 /cy	20,591
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	94.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	4,203	69.21 /CY	6,506
						Finishing: break ties & patch voids (walls, cols or beams)	2,530.00 sf	0.98 /sf	-	0.03 /sf	-	1.01 /sf	2,553	1.56 /sf	3,957
						03.10.06.24 Cast-In-Place Concrete, Straight Walls, 24" thick	94.00 CY	437.12 /CY	9.12 /CY	389.68 /CY	/CY	835.92 /CY	78,577	1,322.23 /CY	124,289
						03.20 Cast-In-Place Concrete, Straight Walls	94.00 CY	437.12 /CY	9.12 /CY	389.68 /CY	/CY	835.92 /CY	78,577	1,322.23 /CY	124,289
						03.0 Concrete Work	94.00 CY	437.12 /CY	9.12 /CY	389.68 /CY	/CY	835.92 /CY	78,577	1,322.23 /CY	124,289
						03.00.502 Gate Structure End Walls	94.00 CY	437.12 /CY	9.12 /CY	389.68 /CY	/CY	835.92 /CY	78,577	1,322.23 /CY	124,289
		03.00.504				Gate Structure Pier Walls									
			03.0			Concrete Work									
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.24	Cast-In-Place Concrete, Straight Walls, 24" thick									
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	7,315.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	107,805	23.21 /sfca	169,768
						Form oil, coverage varies greatly, maximum, includes material only	19.50 gal	-	-	23.50 /gal	-	23.50 /gal	458	38.08 /gal	743
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	23.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	61,060	4,066.72 /ton	96,585
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	23.75 ton	49.21 /ton	6.50 /ton	-	-	55.70 /ton	1,323	86.23 /ton	2,048
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	279.00 cy	-	-	131.00 /cy	-	131.00 /cy	36,549	212.28 /cy	59,226
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	271.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	12,116	69.21 /CY	18,755
						Finishing: break ties & patch voids (walls, cols or beams)	7,315.00 sf	0.98 /sf	-	0.03 /sf	-	1.01 /sf	7,381	1.56 /sf	11,441
						03.10.06.24 Cast-In-Place Concrete, Straight Walls, 24" thick	271.00 CY	437.74 /CY	9.12 /CY	389.64 /CY	/CY	836.50 /CY	226,692	1,323.12 /CY	358,566
						03.20 Cast-In-Place Concrete, Straight Walls	271.00 CY	437.74 /CY	9.12 /CY	389.64 /CY	/CY	836.50 /CY	226,692	1,323.12 /CY	358,566
						03.0 Concrete Work	271.00 CY	437.74 /CY	9.12 /CY	389.64 /CY	/CY	836.50 /CY	226,692	1,323.12 /CY	358,566
						03.00.504 Gate Structure Pier Walls	271.00 CY	437.74 /CY	9.12 /CY	389.64 /CY	/CY	836.50 /CY	226,692	1,323.12 /CY	358,566
		03.00.506				Gate Structure Walls									
			03.0			Concrete Work									
				03.20		Cast-In-Place Concrete, Straight Walls									
					03.10.06.24	Cast-In-Place Concrete, Straight Walls, 24" thick									
						C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	240.00 lf	15.09 /lf	-	2.45 /lf	-	17.54 /lf	4,210	27.33 /lf	6,560
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	10,354.00 sfca	9.29 /sfca	-	5.45 /sfca	-	14.74 /sfca	152,593	23.21 /sfca	240,298
						Form oil, coverage varies greatly, maximum, includes material only	27.60 gal	-	-	23.50 /gal	-	23.50 /gal	649	38.08 /gal	1,051
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	33.60 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	86,384	4,066.72 /ton	136,642
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	33.60 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	1,872	86.23 /ton	2,897

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.06.24	Cast-In-Place Concrete, Straight Walls, 24" thick									
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	396.00 cy	-	-	131.00 /cy	-	131.00 /cy	51,876	212.28 /cy	84,063
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	384.00 CY	36.16 /CY	8.55 /CY	-	-	44.71 /CY	17,168	69.21 /CY	26,576
						Finishing: break ties & patch voids (walls, cols or beams)	10,354.00 sf	0.98 /sf	-	0.03 /sf	-	1.01 /sf	10,447	1.56 /sf	16,194
						03.10.06.24 Cast-In-Place Concrete, Straight Walls, 24" thick	384.00 CY	446.68 /CY	9.12 /CY	391.07 /CY	/CY	846.87 /CY	325,198	1,339.27 /CY	514,281
						03.20 Cast-In-Place Concrete, Straight Walls	384.00 CY	446.68 /CY	9.12 /CY	391.07 /CY	/CY	846.87 /CY	325,198	1,339.27 /CY	514,281
						03.0 Concrete Work	384.00 CY	446.68 /CY	9.12 /CY	391.07 /CY	/CY	846.87 /CY	325,198	1,339.27 /CY	514,281
						03.00.506 Gate Structure Walls	384.00 CY	446.68 /CY	9.12 /CY	391.07 /CY	/CY	846.87 /CY	325,198	1,339.27 /CY	514,281
		03.00.507				Gate Structure Elevated Slab									
			03.0			Concrete Work									
				03.24		Cast-In-Place Concrete, Elevated Slabs									
					03.10.10.18	Cast-In-Place Concrete, Elevated Decks, 18" thick									
						Slab shoring	35,640.00 cf	0.64 /cf	-	0.05 /cf	-	0.69 /cf	24,404	1.06 /cf	37,905
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	1,296.00 sf	7.55 /sf	-	1.33 /sf	-	8.88 /sf	11,504	13.84 /sf	17,933
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	406.00 lf	5.41 /lf	-	0.22 /lf	-	5.63 /lf	2,286	8.73 /lf	3,546
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	13.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	35,350	4,066.72 /ton	55,917
						Reinforcing in place, unloading & sorting, add to above - decks	13.75 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	766	86.23 /ton	1,186
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	161.00 cy	-	-	131.00 /cy	-	131.00 /cy	21,091	212.28 /cy	34,177
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	156.00 CY	24.11 /CY	5.70 /CY	-	-	29.81 /CY	4,650	46.14 /CY	7,198
						Finishing elev slab, bull float, manual float & manual steel trowel	2,804.00 sf	1.23 /sf	-	-	-	1.23 /sf	3,460	1.91 /sf	5,356
						Curing, sprayed membrane curing compound, elevated decks	28.04 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	646	36.58 /csf	1,026
						Fine grading, fine grade for slab on grade, machine	167.56 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	314	2.90 /sy	486
						03.10.10.18 Cast-In-Place Concrete, Elevated Decks, 18" thick	156.00 CY	396.44 /CY	7.00 /CY	266.25 /CY	/CY	669.69 /CY	104,472	1,055.96 /CY	164,729
						03.24 Cast-In-Place Concrete, Elevated Slabs	156.00 CY	396.44 /CY	7.00 /CY	266.25 /CY	/CY	669.69 /CY	104,472	1,055.96 /CY	164,729
						03.0 Concrete Work	156.00 CY	396.44 /CY	7.00 /CY	266.25 /CY	/CY	669.69 /CY	104,472	1,055.96 /CY	164,729
						03.00.507 Gate Structure Elevated Slab	156.00 CY	396.44 /CY	7.00 /CY	266.25 /CY	/CY	669.69 /CY	104,472	1,055.96 /CY	164,729
		03.00.510				Gate Structure Concrete Canal Lining									
			03.0			Concrete Work									
				03.18		Cast-In-Place Concrete, Slabs on Grade									
					03.10.05.07	Cast-In-Place Concrete, Slabs on Grade, 7" thick									
						C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	514.00 lf	4.51 /lf	-	0.33 /lf	-	4.84 /lf	2,488	7.52 /lf	3,863
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	24.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	2,570.94 /ton	63,631	4,066.72 /ton	100,651
						Reinforcing in place, unloading & sorting, add to above - slabs	24.75 ton	49.21 /ton	6.50 /ton	-	-	55.71 /ton	1,379	86.23 /ton	2,134
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	292.00 cy	-	-	131.00 /cy	-	131.00 /cy	38,252	212.28 /cy	61,986
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	283.00 CY	23.45 /CY	5.55 /CY	-	-	29.00 /CY	8,207	44.89 /CY	12,704
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	13,090.00 sf	0.91 /sf	0.03 /sf	-	-	0.94 /sf	12,261	1.45 /sf	18,979
						Curing, sprayed membrane curing compound	130.90 csf	10.60 /csf	-	12.45 /csf	-	23.05 /csf	3,017	36.58 /csf	4,788
						Fine grading, fine grade for slab on grade, machine	1,454.44 sy	1.19 /sy	0.68 /sy	-	-	1.87 /sy	2,726	2.90 /sy	4,220
						03.10.05.07 Cast-In-Place Concrete, Slabs on Grade, 7" thick	283.00 CY	208.98 /CY	10.84 /CY	246.47 /CY	/CY	466.29 /CY	131,960	739.67 /CY	209,326
						03.18 Cast-In-Place Concrete, Slabs on Grade	283.00 CY	208.98 /CY	10.84 /CY	246.47 /CY	/CY	466.29 /CY	131,960	739.67 /CY	209,326
						03.0 Concrete Work	283.00 CY	208.98 /CY	10.84 /CY	246.47 /CY	/CY	466.29 /CY	131,960	739.67 /CY	209,326
						03.00.510 Gate Structure Concrete Canal Lining	283.00 CY	208.98 /CY	10.84 /CY	246.47 /CY	/CY	466.29 /CY	131,960	739.67 /CY	209,326
		05.00.900				Gate Structure Metals									
			05.0			Metals									
				05.50		Metal Fabrications									
					05.00.99.00	Metals, Other									
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	344.00 lf	21.19 /lf	0.79 /lf	90.50 /lf	-	112.48 /lf	38,691	180.67 /lf	62,150
						Checker Plate Deck Cover	8.00 ea	362.80 /ea	13.53 /ea	350.00 /ea	-	726.33 /ea	5,811	1,149.70 /ea	9,198
						05.00.99.00 Metals, Other	4,524.00 SF	2.25 /SF	0.08 /SF	7.50 /SF	/SF	9.84 /SF	44,502	15.77 /SF	71,347
						05.50 Metal Fabrications	4,524.00 SF	2.25 /SF	0.08 /SF	7.50 /SF	/SF	9.84 /SF	44,502	15.77 /SF	71,347
						05.0 Metals	4,524.00 SF	2.25 /SF	0.08 /SF	7.50 /SF	/SF	9.84 /SF	44,502	15.77 /SF	71,347
						05.00.900 Gate Structure Metals	1.00 LS	10,190.06 /LS	380.03 /LS	33,932.00 /LS	/LS	44,502.09 /LS	44,502	71,347.49 /LS	71,347
		26.20.GATE				GATE Actuators									
			26.0			Electrical Work									
				26.20		Facility Electrical									
					26.00.99.00	Electrical, Other									
						Electrical service and building	1.00 LS				30,000.00 /LS	30,000.00 /LS	30,000	53,938.78 /LS	53,939
						Circuits to 8 Gate Actuators (Power and Controls)	1.00 LS				50,000.00 /LS	50,000.00 /LS	50,000	89,897.95 /LS	89,898
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	80,000	/SF	143,837
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	80,000	/SF	143,837
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	80,000	/SF	143,837
						26.20.GATE GATE Actuators	1.00 LS	/LS	/LS	/LS	80,000.00 /LS	80,000.00 /LS	80,000	143,836.73 /LS	143,837
		31.25.900				Gate Structure Earthworks									
			31.0			Earthwork									
				31.25		Earthworks, Structural									
					31.25.01.00	Earthworks, Structural, Excavation									
						Structural Excavation, excludes sheeting or dewatering	740.00 CY	2.65 /CY	3.23 /CY	-	-	5.88 /CY	4,353	9.11 /CY	6,738
						Stockpile Excavated Spoils	740.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	2.84 /cy	2,100	4.41 /cy	3,263
						31.25.01.00 Earthworks, Structural, Excavation	740.00 CY	3.89 /CY	4.58 /CY	0.25 /CY	/CY	8.72 /CY	6,452	13.52 /CY	10,001
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)									
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	200.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	50.50 /CY	10,100	80.71 /CY	16,142
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	200.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	50.50 /CY	10,100	80.71 /CY	16,142
					31.25.03.00	Earthworks, Structural, Backfill									
						Backfill, Select Granular material	990.00 CY	6.66 /CY	2.18 /CY	35.00 /CY	-	43.85 /CY	43,406	70.41 /CY	69,703
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	990.00 cy	1.29 /cy	0.15 /cy	-	-	1.44 /cy	1,423	2.23 /cy	2,203
						Compaction, water for, 6000 gallon wagon, 6 mile haul	990.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	1.85 /cy	1,835	2.96 /cy	2,927
						31.25.03.00 Earthworks, Structural, Backfill	990.00 CY	8.31 /CY	2.63 /CY	36.20 /CY	/CY	47.14 /CY	46,664	75.59 /CY	74,833
					31.25.05.00	Earthworks, Structural, Hauling and Disposal									
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	740.00 CY	7.24 /CY	8.80 /CY	-	-	16.04 /CY	11,866	24.82 /CY	18,368

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					31.25.05.00	Earthworks, Structural, Hauling and Disposal									
						Load excavated spoils	740.00 cy	1.03 /cy	1.13 /cy		-	2.16 /cy	1,595	3.34 /cy	2,470
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	740.00 CY	8.27 /CY	9.92 /CY	/CY	/CY	18.19 /CY	13,462	28.16 /CY	20,838
						31.25 Earthworks, Structural	2,670.00 CY	7.55 /CY	5.05 /CY	16.11 /CY	/CY	28.72 /CY	76,679	45.62 /CY	121,814
						31.0 Earthwork	2,670.00 CY	7.55 /CY	5.05 /CY	16.11 /CY	/CY	28.72 /CY	76,679	45.62 /CY	121,814
						31.25.900 Gate Structure Earthworks	2,670.00 CY	7.55 /CY	5.05 /CY	16.11 /CY	/CY	28.72 /CY	76,679	45.62 /CY	121,814
		40.00.900				Gate Structure Water Control Gates									
			46.0			Water and Wastewater Equipment									
				40.51		Water Control Gates, Slide/Weir Gates									
					40.30.03.99	Slide or Weir Gate, Rectangular									
						Slide gates, hydraulic structures, steel, self contained, 84" x 96", incl. anchor bolts & grout	8.00 EA	8,217.33 /EA	2,042.33 /EA	20,000.00 /EA	-	30,259.67 /EA	242,077	48,290.73 /EA	386,326
						40.30.03.99 Slide or Weir Gate, Rectangular	8.00 EA	8,217.33 /EA	2,042.33 /EA	20,000.00 /EA	/EA	30,259.67 /EA	242,077	48,290.73 /EA	386,326
						40.51 Water Control Gates, Slide/Weir Gates	8.00 EA	8,217.33 /EA	2,042.33 /EA	20,000.00 /EA	/EA	30,259.67 /EA	242,077	48,290.73 /EA	386,326
						46.0 Water and Wastewater Equipment	8.00 EA	8,217.33 /EA	2,042.33 /EA	20,000.00 /EA	/EA	30,259.67 /EA	242,077	48,290.73 /EA	386,326
						40.00.900 Gate Structure Water Control Gates	8.00 EA	8,217.33 /EA	2,042.33 /EA	20,000.00 /EA	/EA	30,259.67 /EA	242,077	48,290.73 /EA	386,326
		40.90.ALLOW				Allowance for SCADA at GCID									
			26.0			Electrical Work									
				26.20		Facility Electrical									
					26.00.99.00	Electrical, Other									
						Testing, Startup, Commissioning, Training, Documentation, Warranty	1.00 LS				50,000.00 /LS	50,000.00 /LS	50,000	89,897.97 /LS	89,898
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	50,000	/SF	89,898
					40.90.99.01	I&C, Other									
						Radio Equipment at Canal - Allowance	1.00 LS				20,000.00 /LS	20,000.00 /LS	20,000	35,959.17 /LS	35,959
						Instrumentation at Canal - Allowance	1.00 LS				40,000.00 /LS	40,000.00 /LS	40,000	71,918.38 /LS	71,918
						Radio Equipment at [Funks] - Allowance	1.00 LS				20,000.00 /LS	20,000.00 /LS	20,000	35,959.19 /LS	35,959
						Software, Licenses	1.00 LS				5,000.00 /LS	5,000.00 /LS	5,000	8,989.80 /LS	8,990
						Programming	1.00 LS				50,000.00 /LS	50,000.00 /LS	50,000	89,897.97 /LS	89,898
						40.90.99.01 I&C, Other	0.00	/SF	/SF	/SF	/SF	/SF	135,000	/SF	242,725
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	185,000	/SF	332,622
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	185,000	/SF	332,622
						40.90.ALLOW Allowance for SCADA at GCID	**1.00** LS	/LS	/LS	/LS	185,000.00 /LS	185,000.00 /LS	185,000	332,622.48 /LS	332,622
						13.01 GCID MP 1.52 Headgates Structure	**1.00 LS**	**696,736.17 /LS**	**55,950.01 /LS**	**824,594.42 /LS**	**535,000.00 /LS**	**2,112,280.60 /LS**	**2,112,281**	**3,395,757.40 /LS**	**3,395,757**
	13.05					**GCID Main Canal Bank Improvements**									
		31.00.716				Construct Embankment									
			31.0			Earthwork									
				31.22		Earthworks, Site									
					31.20.09.40	Earthworks, Sitework, Embankments/Berms									
						Construct cofferdam embankment w/200 HP dozer	5,710.00 CY	1.35 /CY	1.90 /CY	-	-	3.25 /CY	18,562	5.03 /CY	28,733
						Load excavated spoils	5,710.00 cy	0.62 /cy	0.68 /cy		-	1.29 /cy	7,386	2.00 /cy	11,434
						Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	5,710.00 cy	0.96 /cy	3.45 /cy	-	-	4.41 /cy	25,180	6.83 /cy	38,977
						Compaction, water for, 3000 gallon truck, 3 mile haul	5,710.00 cy	0.65 /cy	0.44 /cy		-	1.09 /cy	6,239	1.69 /cy	9,658
						Compaction, structural, common fill, 8" lifts, sheepsfoot	5,710.00 cy	0.74 /cy	1.09 /cy	-	-	1.83 /cy	10,436	2.83 /cy	16,154
						Cut & finish cofferdam top/sideslopes w/dozer	2,695.12 sy	0.74 /sy	1.05 /sy	-	-	1.79 /sy	4,830	2.77 /sy	7,477
						Mobilizations to 11 Sites	1.00 ls			-	25,000.00 /ls	25,000.00 /ls	25,000	38,699.00 /ls	38,699
						31.20.09.40 Earthworks, Sitework, Embankments/Berms	5,710.00 CY	4.67 /CY	8.05 /CY	/CY	4.38 /CY	17.10 /CY	97,633	26.47 /CY	151,133
					32.40.04.00	Site Improvements, Access Roads, Gravel									
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	162,000.00 SY	0.62 /SY	0.35 /SY	-	-	0.98 /SY	157,886	1.51 /SY	244,402
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,6"deep	162,000.00 sy	0.64 /sy	0.41 /sy	5.50 /sy	-	6.55 /sy	1,060,775	10.53 /sy	1,706,634
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	162,000.00 sy	0.57 /sy	0.41 /sy	-	-	0.98 /sy	157,954	1.51 /sy	244,506
						32.40.04.00 Site Improvements, Access Roads, Gravel	162,000.00 SY	1.82 /SY	1.18 /SY	5.50 /SY	/SY	8.50 /SY	1,376,615	13.55 /SY	2,195,542
						31.22 Earthworks, Site	**32,710.00** CY	9.83 /CY	7.24 /CY	27.24 /CY	0.76 /CY	45.07 /CY	1,474,249	71.74 /CY	2,346,674
						31.0 Earthwork	**32,710.00** CY	9.83 /CY	7.24 /CY	27.24 /CY	0.76 /CY	45.07 /CY	1,474,249	71.74 /CY	2,346,674
						31.00.716 Construct Embankment	**32,710.00** CY	9.83 /CY	7.24 /CY	27.24 /CY	0.76 /CY	45.07 /CY	1,474,249	71.74 /CY	2,346,674
						13.05 GCID Main Canal Bank Improvements	**32,710.00 CY**	**9.83 /CY**	**7.24 /CY**	**27.24 /CY**	**0.76 /CY**	**45.07 /CY**	**1,474,249**	**71.74 /CY**	**2,346,674**
						13 GCID Canal Improvements	***1.00 LS***	***1,018,301.63 /LS***	***292,633.25 /LS***	***1,715,594.42 /LS***	***560,000.00 /LS***	***3,586,529.30 /LS***	***3,586,529***	***5,742,431.79 /LS***	***5,742,432***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	1,018,302		12,456.246 hrs	
Material	1,715,594			
Allowance	560,000			
Equipment	292,633		3,372.175 hrs	
Other				
Subtotal Direct Costs	**3,586,529**	**3,586,529**		
Material Sales Tax, Dunnigan Ca	124,381			7.250 %
Subtotal W/ Sales Tax	**124,381**	**3,710,910**		
Electrical Work I,OH&P	66,250			25.000 %
Subtotal W/ Subcontractor OH&P	**66,250**	**3,777,160**		
General Conditions	188,858			5.000 %
Subtotal W/ General Conditions	**188,858**	**3,966,018**		
Mobilization/Demobilization	118,981			3.000 %
Prime Contractor Overhead	408,500			10.000 %
Prime Contractor Profit	269,610			6.000 %
Bonds & Insurance	103,359			2.170 %
Subtotal W/ Prime Markups	**900,450**	**4,866,468**		
Contractor Contingency	145,994			3.000 %
Design Contingency	729,970			15.000 %
Subtotal W/ Contingency	**875,964**	**5,742,432**		
Total Construction Cost		**5,742,432**		
Non-Contract Costs	861,365			15.000 %
Total Project Costs	**861,365**	**6,603,797**		

Interconnecting Facilities WAPA and PGE
Prepared by Z Global

Sites Reservoir Project

Interconnection Facilities

Budgetary Cost Estimate

And

High Level Power Flow Analysis

December 2020

By ZGlobal Inc.

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1. Introduction

The Sites Reservoir Project is located in Northern California within the Pacific Gas &Electric Co. (PG&E) service territory. The project is situated such that transmission level (230 kV) interconnection can be made to PG&E as well as Western Area Power Administration (WAPA) transmission lines that run north to south between the Terminal Regulating Reservoir and Funks Reservoir.

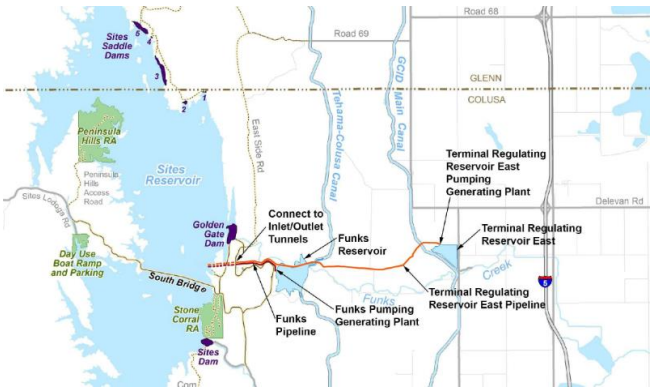


Figure 1 –Overview Diagram of Sties Project Facilities and Surrounding Area

The final determination of which entity to interconnect with is pending and both remain possible options. This document provides a budgetary (+/- 25%) cost estimate for the interconnection facilities required to loop in one of the existing 230 kV transmission lines into a new Breaker-and-a-half substation as well as providing bay positions for the lines feeding the TRR and Funks Pumping Generating Plants. Separate cost estimates are provided for PG&E and WAPA based on published cost information and ZGlobal experience working with both entities.

2. Executive Summary

The 230 kV Breaker-And-A-Half switching station required to loop in a single existing 230 kV line and provide two bays each for the TRR and Funks substations is estimated at **$16.81 Million** for WAPA and **$18.68 Million** for PG&E. The difference is attributed to historically higher costs and overhead associated with PG&E interconnection facilities. Both estimates should be considered +/- 25% budgetary estimates and do not include the cost for land or permitting.

A high level power flow analysis under N-0 conditions found that only one of the four PG&E lines, the Delevan – Cortina 230 kV line, experienced an overload. This line should not be selected during the interconnection request process. The overload occurred during pumping operations only. There were no overloads or observed issues on the WAPA lines under pumping or generating scenarios.

3. Detailed Cost Estimates

Figure 2 provides the general configuration and arrangement of the proposed BAAH switching station. The detailed estimate is specific to the area circled in red.

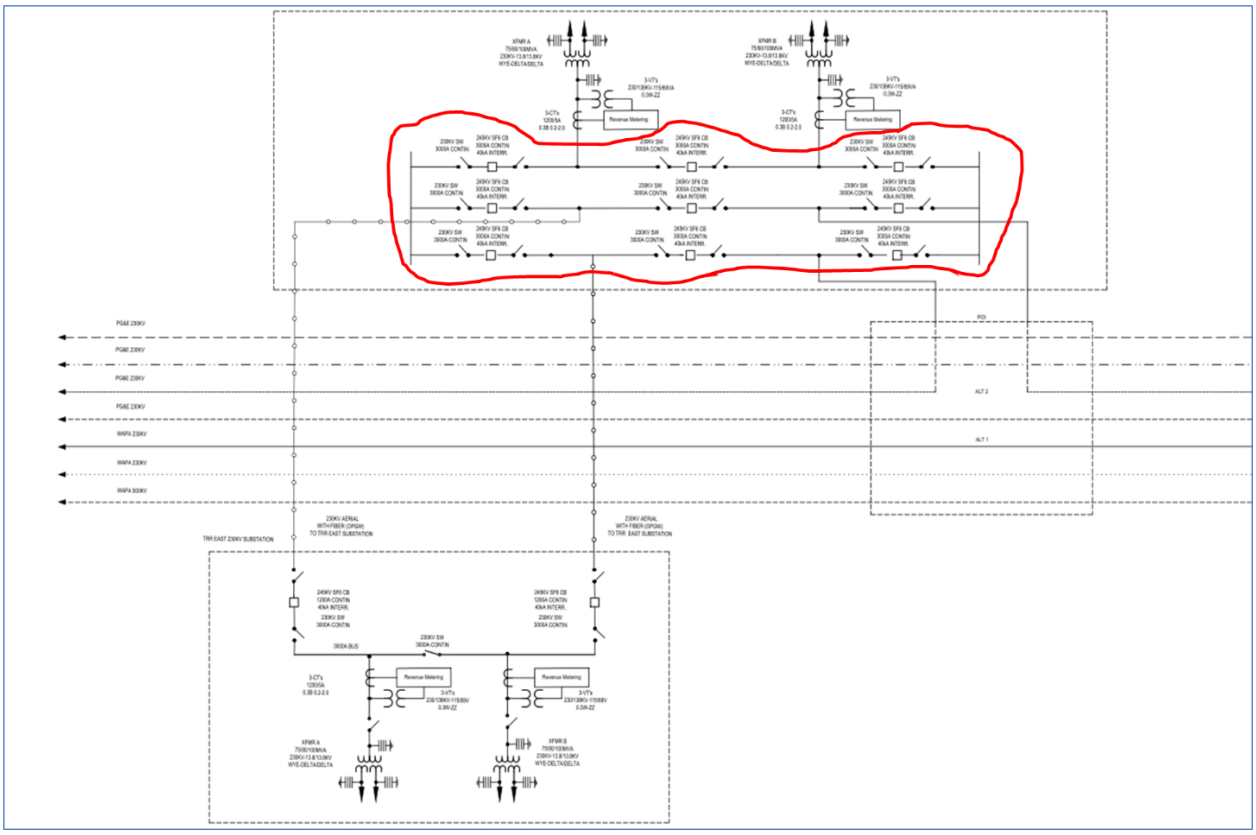


Figure 2 – Single Line Diagram of BAAH switching Station

The BAAH station will require a total of six (6) 230 kV bays to enable looping in of the existing transmission line (specific line yet to be determined) and to provide two feeds to both the Funks and TRR Pump Generating Plants (PGPs). The following Table lists all the major equipment associated with the BAAH station.

3.1 PG&E Cost Estimate

The following table provides a breakdown of the cost estimate for an interconnection with PG&E via the CAISO interconnection study process. The basis for these costs is the CAISO published "Per-Unit Cost Guide" and are inclusive of equipment and labor costs. The cost for land and permitting is not included and costs are based on low impact factors and relatively easy access to site. PG&E apples factors of 1.2 and 1.5 to the total cost when considering medium to high impact factors.

6 Position 230 kV BAAH Switching Station (PG&E)					
Item #	**Description**	**Count**	**Units**	**Unit Cost**	**Total Cost**
1	230 kV SF6 Circuit Breaker	9	each	$ 200,000	$ 1,800,000
2	230 kV switches (motor operated)	18	each	$ 75,000	$ 1,350,000
3	Grounding Switches	9	each	$ 55,000	$ 495,000
4	Surge Arrestors (230 kV, 152 kV MCOV)	6	each	$ 35,000	$ 210,000
5	230 kV CT / VT and Station Protection Relays	6	each	$ 1,000,000	$ 6,000,000
6	230 kV Switching Station Structures / Foundations	1	each	$ 4,000,000	$ 4,000,000
7	Station and Control Building Lighting	1	lot	$ 85,000	$ 85,000
8	Lighting Protection	3	lot	$ 100,000	$ 300,000
9	Control Building, control Panels, HVAC, security	1	each	$ 1,000,000	$ 1,000,000
10	DC Station Service (125 VDC Battery and Chargers)	1	each	$ 250,000	$ 250,000
11	Station AC Main and Back-up Service	1	each	$ 250,000	$ 250,000
12	Perimeter Fence, Gates, and Security Features	1	each	$ 500,000	$ 500,000
13	conductor and Wire	5000	LF	$ 2.50	$ 12,500
14	Ground Grid	1	each	$ 1,500,000	$ 1,500,000
15	Steel Poles	6	each	$ 55,000	$ 330,000
16	Conduit and misc. hardware	1	lot	$ 100,000	$ 100,000
17	PG&E Engineering and	1		$ 500,000	$ 500,000
	Total Cost Estimate				**$ 18,682,500**

Table 1 – Equipment List and PG&E Cost Estimate[1]

3.2 WAPA Cost Estimate

Historically, WAPA cost estimates for similar facilities have been roughly 10% below those of PG&E. PG&E tends to apply a higher overhead than WAPA and PG&E Per-Unit Cost Guide is intended to set a maximum cost exposure, consequently the PG&E Costs are above cost typically seen in practice.

[1] This cost estimate is based on 2020 PG&E per-unit cost guide.
http://www.caiso.com/informed/Pages/StakeholderProcesses/ParticipatingTransmissionOwnerPerUnitCosts.aspx

6 Position 230 kV BAAH Switching Station (WAPA)					
Item #	**Description**	**Count**	**Units**	**Unit Cost**	**Total Cost**
1	230 kV SF6 Circuit Breaker	9	each	$ 180,000	$ 1,620,000
2	230 kV switches (motor operated)	18	each	$ 67,500	$ 1,215,000
3	Grounding Switches	9	each	$ 49,500	$ 445,500
4	Surge Arrestors (230 kV, 152 kV MCOV)	6	each	$ 31,500	$ 189,000
5	230 kV CT / VT and Station Protection Relays	6	each	$ 900,000	$ 5,400,000
6	230 kV Switching Station Structures / Foundations	1	each	$ 3,600,000	$ 3,600,000
7	Station and Control Building Lighting	1	lot	$ 76,500	$ 76,500
8	Lighting Protection	3	lot	$ 90,000	$ 270,000
9	Control Building, control Panels, HVAC, security	1	each	$ 900,000	$ 900,000
10	DC Station Service (125 VDC Battery and Chargers)	1	each	$ 225,000	$ 225,000
11	Station AC Main and Back-up Service	1	each	$ 225,000	$ 225,000
12	Perimeter Fence, Gates, and Security Features	1	each	$ 450,000	$ 450,000
13	conductor and Wire	5000	LF	$ 2	$ 11,250
14	Ground Grid	1	each	$ 1,350,000	$ 1,350,000
15	Steel Poles	6	each	$ 49,500	$ 297,000
16	Conduit and misc. hardware	1	lot	$ 90,000	$ 90,000
17	PG&E Engineering and	1		$ 450,000	$ 450,000
	Total Cost Estimate				**$ 16,814,250**

Table 2 – Equipment List and WAPA Cost Estimate

4. High Level Power Flow Analysis

The following high level power flow analysis was performed on the 230 kV PG&E and WAPA lines near the Sites Reservoir Project to make an initial determination of which line may be the best choice for interconnection.

This area has 4 main PGE lines: Delevan-Vaca 230 kV #1, #2, #3 and Delevan-Cortina 230kV. Next to these lines 3 WAPA lines can be found: Keswick-O'Banion 230kV, Olinda-Obanion 230kV and Olinda-Tracy 500 kV.

Using the CAISO Cluster base case *2024Peak_QC12P2*, 75 MW of generation is added and using the off-peak CAISO Cluster base case *2024_OP_QC12P2*, 170 MW of load is added at different locations. A pre- and post- line rating comparison is done only under normal conditions (N-0).

The only overload detected under normal conditions is on PG&E Delevan-Cortina 230 KV line, all lines flow (MW) and loading (%) are shown in the table below. The other three PG&E lines were found to have roughly the same loading under both the generation and pumping scenarios. There were no overloads observed on any of the WAPA lines under generating or pumping scenarios.

2024peak_QC12P2 Base Case injection of 75 MW GEN												
Lines	KV	LINE RATING MVA	MW/%RATING BEFORE INJECTION	MW/%RATING AFTER INJECTION								
				injection in DELEVN 230kV bus	injection by tapping DELEVAN-VACA #1	injection by tapping DELEVAN-VACA #3	injection by tapping DELEVAN-LOGAN	injection by tapping DELEVAN-CORTINA	injection by tapping DELEVAN-GLENN	injection by tapping DELEVAN-COTTONWOOD E#1	injection by tapping DELEVAN-COTTONWOOD F#2	injection by tapping DELEVAN-DELEVANB1
DELEVAN-VACA #1	230	300	152.7/49.7	152.7/49.6	109/36 184/60	146.6/47.6	152.2/49.5	150.9/48.9	151.2/49.1	149.5/48.6	149.5/48.6	152.7/49.6
DELEVAN-VACA #2	230	300	152.7/49.7	152.7/49.6	146.6/47.6	146.6/47.6	152.2/49.5	150.9/48.9	151.2/49.1	149.5/48.6	149.5/48.6	152.7/49.6
DELEVAN-VACA #3	230	300	155.2/50.6	155.3/50.5	149.1/48.5	112/37 187/61	154.8/50.4	153.4/49.8	153.7/50	152/49.5	152/49.5	155.2/50.5
DELEVAN-CORTINA	230	331	259.8/76.8	259.9/76.8	252.6/74.6	252.5/74.6	259.3/76.6	195/57 268/80	258.1/76.2	255.9/75.6	255.9/75.6	259.9/76.8
DELEVAN-GLENN	230	300	5.5/6.7	5.4/7	2.6/7.1	2.5/7.1	4.7/7.0	4.4/7.3	(55/18) 20/12	1/6.8	1/6.8	5.4/7
DELEVAN-COTTONWOOD E#1	230	313	(77/24.8)	(77.1/24.9)	(80.8/26.1)	(80.8/26.1)	(78/25.2)	(76.8/25.9)	(79.8/25.8)	(121/38 47/19	(82.9/26.7)	(77.1/24.9)
DELEVAN-COTTONWOOD F#2	230	300	(75.3/25.3)	(75.5/25.4)	(79.1/26.6)	(79.1/26.6)	(76.4/25.7)	(78.4/25.4)	(78.2/26.3)	(81.1/27.2)	(121/40 46/19)	(75.5/25.4)
DELEVAN-LOGAN CREEK	230	300	(50.7/18.4)	(50.8/18.6)	(54.7/19.9)	(54.7/19.9)	(121/40 46/18)	(52.2/19.2)	(53.8/19.6)	(56.7/20.4)	(56.7/20.4)	(50.9/18.6)
DELEVAN-COLUSAPP (SWING BUS)	230	683	(379/55.2)	(303.8/44.7)	(302.5/44.4)	(302.3/44.4)	(304.1/44.7)	(303.3/44.3)	(303.9/44.6)	(304.8/44.9)	(304.8/44.9)	(378/55 303/45)

Table 2 – Line loading before and after 75 MW of Generation under N-0 (CAISO Peak)

2024peak_QC12P2 Base Case injection of 75 MW GEN												
Lines	KV	LINE RATING MVA	MW/%RATING BEFORE INJECTION	MW/%RATING AFTER INJECTION								
				injection in DELEVN 230kV bus	injection by tapping DELEVAN-VACA #1	injection by tapping DELEVAN-VACA #3	injection by tapping DELEVAN-LOGAN	injection by tapping DELEVAN-CORTINA	injection by tapping DELEVAN-GLENN	injection by tapping DELEVAN-COTTONWOOD E#1	injection by tapping DELEVAN-COTTONWOOD F#2	injection by tapping DELEVAN-DELEVANB1
DELEVAN-VACA #1	230	300	152.7/49.7	152.7/49.6	109/36 184/60	146.6/47.6	152.2/49.5	150.9/48.9	151.2/49.1	149.5/48.6	149.5/48.6	152.7/49.6
DELEVAN-VACA #2	230	300	152.7/49.7	152.7/49.6	146.6/47.6	146.6/47.6	152.2/49.5	150.9/48.9	151.2/49.1	149.5/48.6	149.5/48.6	152.7/49.6
DELEVAN-VACA #3	230	300	155.2/50.6	155.3/50.5	149.1/48.5	112/37 187/61	154.8/50.4	153.4/49.8	153.7/50	152/49.5	152/49.5	155.2/50.5
DELEVAN-CORTINA	230	331	259.8/76.8	259.9/76.8	252.6/74.6	252.5/74.6	259.3/76.6	195/57 268/80	258.1/76.2	255.9/75.6	255.9/75.6	259.9/76.8
DELEVAN-GLENN	230	300	5.5/6.7	5.4/7	2.6/7.1	2.5/7.1	4.7/7.0	4.4/7.3	(55/18) 20/12	1/6.8	1/6.8	5.4/7
DELEVAN-COTTONWOOD E#1	230	313	(77/24.8)	(77.1/24.9)	(80.8/26.1)	(80.8/26.1)	(78/25.2)	(76.8/25.9)	(79.8/25.8)	(121/38 47/19	(82.9/26.7)	(77.1/24.9)
DELEVAN-COTTONWOOD F#2	230	300	(75.3/25.3)	(75.5/25.4)	(79.1/26.6)	(79.1/26.6)	(76.4/25.7)	(78.4/25.4)	(78.2/26.3)	(81.1/27.2)	(121/40 46/19)	(75.5/25.4)
DELEVAN-LOGAN CREEK	230	300	(50.7/18.4)	(50.8/18.6)	(54.7/19.9)	(54.7/19.9)	(121/40 46/18)	(52.2/19.2)	(53.8/19.6)	(56.7/20.4)	(56.7/20.4)	(50.9/18.6)
DELEVAN-COLUSAPP (SWING BUS)	230	683	(379/55.2)	(303.8/44.7)	(302.5/44.4)	(302.3/44.4)	(304.1/44.7)	(303.3/44.3)	(303.9/44.6)	(304.8/44.9)	(304.8/44.9)	(378/55 303/45)

Table 3 – Line loading before and after 170 MW of Pumping Demand under N-0 (CAISO Off Peak)

CAISO Interconnection Study Process
Prepared by Z Global

DRAFT

April 7, 2021

CAISO Interconnection Study Process and Financial Considerations for Sites Reservoir Project

Background

In December 2020, ZGlobal developed a budgetary cost estimate for the 230 kV Breaker-And-A-Half (BAAH) switching station required to loop in a single existing 230 kV line and provide two bays each for the TRR and Funks substation connections. The BAAH station was estimated at roughly $17 Million to $19 Million based on published PG&E unit cost guide[1]. However, there are other costs and cash flow considerations related to the CAISO Interconnection Study process that Sites should be aware of in developing an overall budget.

CAISO Study Process

The CAISO Interconnection Study process is a lengthy, 2 ½ year, process staring with the submission of an application and concluding with an interconnection agreement. The following provides an overview of the study process for Cluster 15, the next available opportunity to make an interconnection request. The submission window for Cluster 15 is April 1-15, 2022.

Cluster 15 Application	Scoping Meeting	Phase 1 Study	Phase 1 Meeting	1st Posting	Phase II Study	Phase II Meeting	Transmission Plan Deliverability	2nd Posting	Reassessment Results
Apr 2022	~June 2022	Jul - Dec 2022	Jan 2023	Mar 2023	May - Nov 2023	Dec 2023	Mar 2024	May 2024	Aug 2024

The "Study" is done in two distinct phases, Phase 1 and Phase 2, which both have Interconnection Financial Security (IFS) posting requirements to remain in the study process. Additionally, the study process will identify the following types of facilities and mitigations with corresponding cost assignments that will drive IFS requirements.

Interconnection Facilities (IF): These will include the BAAH interconnection station including all standard elements such as Circuit Breakers, switches, buss work, control building, protection, etc. (see Dec 2020 estimate for detailed list of BAAH equipment)

Reliability Network Upgrades (RNU): These are upgrades to the system the CAISO/PG&E determine are needed to meet reliability standards. Typical types of upgrades include CB replacements to meet Short Circuit Duty requirements, Remedial Action Schemes, and Transfer Trip Schemes.

Local Deliverability Network Upgrades (LDNU): These are typically transmission line and equipment upgrades within the local "electrical" area of the project needed to support the generation or load in a reliable manner.

[1] This cost estimate is based on 2020 PG&E per-unit cost guide.
http://www.caiso.com/informed/Pages/StakeholderProcesses/ParticipatingTransmissionOwnerPerUnitCosts.aspx

Area Deliverability Network Upgrades (ADNU): These are generally large system additions or expansions to add transmission capacity to the bulk electric system so that generators can meet the Full Capacity Deliverability Status (FCDS) needed to provide Resource Adequacy (RA) attributes for Load Serving Entities. These types of upgrades are discretionary and can be avoided if the costs are found to be excessive compared to the value of RA provided in a Power Purchase Agreement. ADNU's are 100% the responsibility of the project and are not refunded as RNU and LDNU costs which are discussed below.

Costs and Cost Assignments

- *Application and Site Control* fees include a $150,000 Study Deposit and potentially a $250,000 "in lieu of" site control deposit. The Study fee is generally not refundable if projects proceed into the Phase 2 study. However, if a project is withdrawn prior to the Phase 2 study , the CAISO will refund 50% or $75,000 of the Study Deposit. The "in lieu of" site control deposit is fully refunded if the project is withdrawn or if site control is demonstrated. These fees are due at the time of the interconnection application, which per the timeline provided above, is April 1-15, 2022.

  Additionally, the preparation of the Interconnection Request package and general process support will typically require the services of an engineering firm such as ZGlobal with cost of roughly $30,000. This covers the full 2 ½ year study process and all steps.

- *1st Interconnection Security Posting*. As noted in the timeline above (1st Posting), there is a financial obligation of roughly 15% of the Identified IF, RUN and LDNU cost estimates. If ADNU's are agreed to, these will also have a 15% IFS requirement. The following section will help quantify what these costs may look like. An important aspect of the IFS posting is that once it is made, any posting for RNU and LDNU become 50% at risk should the project be withdrawn from the study process. The 1st IFS is limited to a maximum of $7.5 Million for IF and $7.5 Million for RNU/LDNU, so the most that could be required is $15 Million.

  Costs associated with RNU's are refunded to the project over a 5-year period from Commercial Operations Date of the respective upgrades with a cap of $70,000 per requested Mega Watt (MW). So, a 50 MW generator will be fully refunded up to $3.5 Million in RNU costs. LDNU's do not have a cap and are fully refunded over 5-year period from the COD.

  An additional factor for all projects to consider at this point is the historical withdraw rate of around 75% of all submitted projects and their respective MW requests. This is an important aspect, as it has a significant influence on the costs that are determined in Phase 2. In general, many of the mitigations identified in Phase 1 do not materialize in Phase 2 due to the high withdrawal rate.

- 2nd Interconnection *Security Posting*. As noted in the timeline above (2st Posting), there is a financial obligation of roughly 30% (15% incremental increase to the 1st IFS) of the Identified IF, RUN and LDNU cost estimates. If ADNU's are agreed to, these will also have a 30% IFS requirement. Again, once posted, these posting are 50% at risk if project is withdrawn. The

magnitude and need for mitigations at Phase 2 are based only on the impacts of projects that proceed past Phase 1.

- The balance of estimated costs are due prior to the commencement of engineering and construction and are generally included in the Interconnection Agreement (IA) and can timing can be negotiated via the milestone schedule within the IA.

Examination of prior cluster studies in the area of Sites Reservoir

The following is a review of the Cluster 12 and 11 Study results for the "North of Greater Bay Area" cluster study report costs. This is only intended to show what cost assignments and IFS postings may look like. However, it is important to note that each cluster study is different, and the costs are driven by the size and location of the clustered generation projects. The actual cost assignments for each project are confidential and based on actual MW flow impacts. For this exercise we have assumed a pro-rata cost assignment based on MW only.

Cluster 12 Phase 1 and 2 PG&E North of Greater Bay Area Interconnection Area Study Reports

This cluster area includes most of Northern California from Round Mountain in the north to Sacramento Area in the South. Cluster 12 Phase 1 (submissions April 1-15, 2019) included 9 projects totaling 2,558 MW ranging in size from 1,500 MW to 30 MW. Below are these projects along with their Points of Interconnection (POI).

Table 1-1: Cluster 12 Projects Connecting to CAISO Controlled Grid

Queue Number	Point of Interconnection	Deliverability Status	Fuel	Max MW	Proposed COD
1541	Brighton-Bellota 230 kV Line	FC	Solar PV/Energy Storage	350	12/31/2022
1542	Bridgeville Substation 115 kV	FC	Wind/Energy Storage	100	6/30/2021
1543	Cortina Substation 115 kV	FC	Solar PV/Energy Storage	150	12/1/2023
1546	Elk-Gualala 60 kV Line	FC	Energy Storage	30	12/1/2021
1556	Rio Oso Substation 115 kV	FC	Solar PV/Energy Storage	100	11/30/2022
1559	Round Mountain Substation 500 kV	FC	Wind/Energy Storage	1500	10/31/2025
1561	Weber-Tesla 230 kV Line	FC	Solar PV/Energy Storage	243	4/15/2023
1565	Tulucay Substation 60 kV	FC	Solar PV	30	6/30/2023
1566	Valley Springs #2 60 kV Line	FC	Solar PV/Energy Storage	55	12/31/2022
			Total	**2,558**	

Note Queue # 1543 with proposed POI at Cortina. This is relatively close to the location of Sites and will beused as a proxy to estimate IFS postings based on Cluster 12. Again, this is only an example to help

quantify the possible costs, which will be different based on the actual cluster makeup when Sites is submitted.

The total Cluster 12 Reliability Costs were estimated at $88.26 Million. The total Local Deliverability Network Upgrades were estimated at $185.94 Million, and Area Deliverability Network Upgrades were estimated at $2,332.78 Million ($2.33 Billion).

Using Cluster 12, Q1543 at Cortina as a proxy to estimate cost allocations, it was found that three specific RNU's, totaling $58 Million, were assigned to Q1543 and other projects causing the mitigations. These include implementation of 2 RAS schemes and Substation work to address overstressed CB's. Using a simplified allocation methodology (pro-rata based on MW), the resulting $/MW for each upgrade was determined to be $67 K/Mw for first RAS, $24 K/ MW for second RAS, and $4.34 K / MW for substation work. Assuming a request of 50 MW of new generation for the Sites Project near Cortina and applying these costs, the estimated cost assignments would be $4.767 Million for RNU.

Again, using Q1543 as a proxy, there are two specific LDNU's totaling $72 Million. These include two line upgrades / reconductoring projects. The cost per MW was determined to be $115 K / MW and $199 K/MW. Assuming a 50 MW project the estimated costs for LDNU's is $15.7 Million.

From previous estimate we assume the cost for BAAH station (IF) for the Sites Project to be roughly $19 Million.

For these costs, the estimated 1st IFS would be $715 K for RNU, $2.35 M for LDNU and $2.85 M for IF. The total posting requirement at Phase 1 would be $5.915 Million.

As noted above, historically it has been observed that a significant number of projects and MW will drop out of the process prior to Phase 2 due to the IFS requirements putting 50% of the IFS for RNU and LDNU at risk. Cluster 12 is a perfect example of this as only 30 MW (Q1565) of the initial 2,558 MW from Phase 1 actually proceeded into Phase 2. With just 30 MW remaining, all of the RNU and LDNU's identified in Phase 1 were eliminated during the Phase 2 study. Consequently, for a 50 MW project in Cluster 12 there would have been no additional IFS for RNU or LDNU as these were all eliminated. However, there would still be an 2nd IFS associated with Interconnection Facilities. The 2nd IFS for IF needs to bring the total IFS posted to 30%. For Sites IF of $19 Million, the 2nd IFS for IF would be an incremental $2.85 Million to bring the total posting to $5.7 Million.

Cluster 11 Phase 1 and 2 PG&E North of Greater Bay Area Interconnection Area Study Reports

Cluster 11 also experienced a relatively high drop outrate, but not as extensive as Cluster 12. Cluster 11 Phase 1 (submissions April 1-15, 2018) included 3,858 MW from 35 projects across norther California. In Phase 2, the total Mw was reduced to 1,673 MW from 15 projects, which corresponds to roughly 60% reduction in MW's. The corresponding cots assignments to the entire cluster for Phase 1 RNU was $52.4 M and $407 M for LDNU's. Phase 2 RNU's were reduced to $8.5 M and LDNU's to $138 M. This represents a 69% reduction in total cost form Phase I to Phase 2 for Cluster 11.

Quantifying these costs to a $/MW value we find that Phase 1 costs are for RNU are $14 K / MW and for LDNU $105 K/Mw. In Phased 2 these costs dropped to $5 K / MW for RNU and $82 K/MW for LDNU. Although this is a rough approximation of cost allocations it provides an idea of what may occur for a 50 MW generation project.

Total Phase 1 total Cost Responsibility for RNU for 50 MW is $700 K and for LDNU is $5.3 M. The 1st IFS for RNU would be $500 K (this is set by the minimum IFS requirement rule) and for LDNU is $795 K.

Total Phase 2 total Cost Responsibility for RNU for 50 MW is reduced to $250 K and for LDNU is $4.1 M. The 2nd IFS for RNU would be $0 and a reduction in the posing of $250 K can be made. For LDNU, the 2nd IFS must bring the total posting to 30% of the Phase 2 costs. This equates to a total posing of $1.23 M, an increment of $435 K.

Summary

In Summary, Sites Authority should consider the following in developing the project budget related to the Interconnection Study process.

- Interconnection Study Deposit of $150,000 due at time of submission (April of 2023 or 2024). Study Deposit will be completely used up by the end of the CAISO study process.

- If formal site control cannot be demonstrated an additional $250,000 must be posted until site control is proven. At that time, it will be fully refunded. Evidence of site control is only needed for the property where the generator and pumping facilities will be located (TRR and Funks locations).

  Per the CAISO Business Practice Manual for "Generator Interconnection Procedures"

  For private land;

  - Ownership of, a leasehold interest in, or a right to develop property upon which the Generating Facility will be located consisting of a minimum of 50% of the acreage reasonably necessary to accommodate the Generating Facility; or

  - An option to purchase or acquire a leasehold interest in property upon which the Generating Facility will be located consisting of a minimum of 50% of the acreage reasonably necessary to accommodate the Generating Facility.

  For public land, including that controlled or managed by any federal, state or local agency, a final, non-appealable permit, license, or other right to use the property for the purpose of generating electric power and in acreage reasonably necessary to accommodate the Generating Facility, with exclusive right to use public land under the management of the federal Bureau of Land Management (BLM) shall be in a form specified by the BLM.

- Typical Consulting fees to create request and usher the project through the 2 ½ year study process. Estimated at $30,000. This does not include engineering fees to provide the technical data requested by CAISO.

- 1st IFS will be due approximately 12 months after Interconnection Request is submitted (March of 2024 or 2025).

  For budgetary purposes it is suggested to have $3 Million for Interconnection Facilities. This includes a buffer of $150 K above the estimated 15% to account for possible work not included in the BAAH estimate. These costs are not refunded and will all go towards the cost of the interconnection station.

  Additionally, there will be a posting requirement for RNU and LDNU. As discussed above, these can vary quite a bit based on the makeup and size of the cluster. In most cases, these costs will be refunded over a 5-year period from COD of the respective upgrade. RNU's are also refunded but are capped at $70,000 / requested MW, LDNU's are 100% refunded. For 50 MW of generation, this equates to a refund limit of $3.5 Million. Using Cluster 12 as a proxy and the total cost assignment for RNU/LDNU may be around $20 Million, which will require a budget of $3 Million for the 1st IFS. Looking at Cluster 11, these costs are lower at roughly $ 6 M which would require a posting of just $1 M.

- 2nd IFS will be due approximately 12 months after the 1st IFS (May of 2025 or 2026).

  The posting for IF will again be roughly $ 3 Million to bring the total posting to 30% of the total estimated costs.

  The 2nd IFS for RNU/LDNU, as shown in Cluster 11 and 12 examples above, is difficult to estimate due to project dropout uncertainty. However, it is most likely that some costs will remain, so it is advised that a budget be included of $500 K to $1 M. But recall that all these costs are refunded assuming the total costs for RNU remain below $3.5 Million and all LDNU cost will be refunded.

The table below provides a summary of the potential upfront costs that Sites would be responsible for highlighted in yellow. It would be the Study Deposit ($150,000) the Site Control ($250,000) and the IFS Budget Amount for a potential total of about $10 million.

Interconnection Cost Table. Assumes a 2023 Project Submission to CAISO							
Cost Element	Total Estimated Cost	IFS Budget Amount	Refunded	Refund Limit (50 MW)	At Risk once Posted	When Due	Comments
Study Deposit	$ 150,000	N/A	No	N/A	100%	4/15/2023	
Site Control In lieu of Deposit	$ 250,000	N/A	Yes	N/A	0%	4/15/2023	
1st IFS: (15%)							
Interconnection Facilities	$ 19,000,000	$ 3,000,000	No	N/A	0%	3/1/2024	based on estimate for BAAH station
Reliability Network Upgrades	$ 5,000,000	$ 750,000	Yes	$ 3,500,000	50%	3/1/2024	These costs can vary widely
Local Deliverability Network Upgrade	$ 16,000,000	$ 2,400,000	Yes	N/A	50%	3/1/2024	These costs can vary widely
2nd IFS: (30%, 15% incremental to Phase 1)							
Interconnection Facilities	$ 19,000,000	$ 3,000,000	No	N/A	0%	5/1/2025	based on estimate for BAAH station
Reliability Network Upgrades	$ 2,000,000	$ 250,000	Yes	$ 3,500,000	50%	5/1/2025	typically reduced from Phase 1. assumed some RNU will remain, but below refund limit. Assume minor budget for IFS
Local Deliverability Network Upgrade	$ 4,100,000	$ 250,000	Yes	N/A	50%	5/1/2025	typically reduced from Phase 1. assumed some LDNU will remain. Assume minor budget for IFS

TRR West/Funks Pipelines

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 Funks/TRR Pipelines Rev 3
Project Number: D3880600
Design Stage: Feasibility Study

Estimator: Cavalleri/Wells Jacobs
Revision/Date: 3 / May 4, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
05			Funks/TRR Pipelines										
	05.01		Funks TRR Connection Manifold										
		33.00.510	Funks TRR Connection Manifold	475.00 LF	1,227.64 /LF	741.07 /LF	6,828.64 /LF	426.12 /LF	/LF	9,223.46 /LF	4,381,142	14,748.68 /LF	7,005,622
			05.01 Funks TRR Connection Manifold	1.00 LS	583,127.16 /LS	352,005.74 /LS	3,243,604.00 /LS	202,405.00 /LS	/LS	4,381,141.90 /LS	4,381,142	7,005,622.40 /LS	7,005,622
	05.02		Funks Pipeline										
		33.00.502	Funks Pipeline, Open Cut, Dual Bore	11,194.00 LF	593.42 /LF	254.16 /LF	2,022.68 /LF	98.75 /LF	/LF	2,969.02 /LF	33,235,154	4,734.85 /LF	53,001,964
			05.02 Funks Pipeline	11,194.00 LF	593.42 /LF	254.16 /LF	2,022.68 /LF	98.75 /LF	/LF	2,969.02 /LF	33,235,154	4,734.85 /LF	53,001,964
	05.03		Terminal Regulating Reservoir Pipeline										
		32.00.000	TRR Access Roads	31,455.00 LF	7.28 /LF	8.03 /LF	38.38 /LF	/LF	/LF	53.69 /LF	1,688,782	85.75 /LF	2,697,298
		33.00.500	TRR Pipeline, Open Cut, Dual Bore	25,066.00 LF	637.54 /LF	276.32 /LF	2,029.29 /LF	98.75 /LF	/LF	3,041.90 /LF	76,248,233	4,847.97 /LF	121,519,109
		33.00.504	Funks Pipeline, Trenchless Pipe Installation, Dual Bore at TC Canal	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,250.90 /LF	7,196,132
		33.00.508	Funks Pipeline, Enviormental Water Pipeline	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,672.23 /LF	4,264,193
		33.00.530	Funks Pipeline, Enviormental Water Pipeline, Energy Dissipation Structure	1.00 EA	465,190.61 /EA	16,851.09 /EA	507,322.79 /EA	/EA	/EA	989,364.49 /EA	989,364	1,565,709.66 /EA	1,565,710
			05.03 Terminal Regulating Reservoir Pipeline	28,318.00 LF	660.67 /LF	271.42 /LF	1,989.83 /LF	120.87 /LF	/LF	3,042.78 /LF	86,165,568	4,846.47 /LF	137,242,441
			05 Funks/TRR Pipelines	59,853.00 LF	433.31 /LF	181.83 /LF	1,373.93 /LF	79.04 /LF	/LF	2,068.10 /LF	123,781,863	3,295.57 /LF	197,250,028

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	40,078,662		326,540.559 hrs	
Material	133,042,738			
Allowance	7,310,393			
Equipment	16,818,235		134,223.572 hrs	
Other				
Total Construction Cost	**197,250,028**	**197,250,028**		
Non-Contract Costs	29,587,504			15.000 %
Total Project Costs	**29,587,504**	**226,837,532**		

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
05						***Funks/TRR Pipelines***										
	05.01					**Funks TRR Connection Manifold**										
		33.00.510				*Funks TRR Connection Manifold*										
			33.2			*Pipeline Specialties*										
				33.01		*Pipeline Specialties*										
					33.10.99.01	*Buried Pipe Specials, Other*										
						Butterfly valve, iron body, Flgd, MTR OPER, 150#, 144"	5.00 ea	5,001.82 /ea	600.00 /ea	170,000.00 /ea	-	-	175,601.82 /ea	878,009	283,693.82 /ea	1,418,469
						Gasket and bolt set, for flanges, 150 lb., 144" pipe size	10.00 ea	1,491.57 /ea	-	5,250.00 /ea	-	-	6,741.57 /ea	67,416	10,798.81 /ea	107,988
						Reducer, steel, butt weld, 32" x 17"	1.00 ea	6,563.14 /ea	1,800.00 /ea	217,200.00 /ea	-	-	225,563.14 /ea	225,563	364,324.26 /ea	364,324
						Reducer, steel, butt weld, 17" x 12"	2.00 ea	4,375.43 /ea	1,200.00 /ea	42,600.00 /ea	-	-	48,175.43 /ea	96,351	77,537.10 /ea	155,074
						Flange, steel, forged steel, weld neck, 150 lb., 144" pipe size, includes 1 weld per joint and weld machine	10.00 ea	6,563.16 /ea	195.36 /ea	11,250.00 /ea	-	-	18,008.52 /ea	180,085	28,645.35 /ea	286,454
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	31,415.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	138,594	6.82 /cy	214,179
						Pipe bedding and zone, CLSM	7,920.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	595,841	121.34 /cy	960,985
						Backfill native material	20,420.00 cy	6.18 /cy	1.69 /cy		-	-	7.87 /cy	160,730	12.16 /cy	248,387
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	10,995.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	176,309	24.78 /cy	272,462
						Load excavated spoils	10,995.00 cy	0.77 /cy	0.84 /cy		-	-	1.62 /cy	17,779	2.50 /cy	27,475
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	20,420.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	41,468	3.14 /cy	64,083
						Compaction, water for, 6000 gallon wagon, 6 mile haul	20,420.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	37,852	2.95 /cy	60,272
						Piping, pipe, WSP, plain end, welded, 144" diameter, excludes excavation or backfill	340.00 lf	121.97 /lf	62.10 /lf	1,790.00 /lf	-	-	1,974.07 /lf	671,182	3,180.43 /lf	1,081,345
						Piping, pipe, WSP, plain end, welded, 384" diameter, excludes excavation or backfill	50.00 lf	243.94 /lf	124.19 /lf	4,770.00 /lf	-	-	5,138.13 /lf	256,907	8,286.11 /lf	414,306
						Piping, pipe, WSP, plain end, welded, 204" diameter, excludes excavation or backfill	160.00 lf	121.97 /lf	62.10 /lf	2,470.00 /lf	-	-	2,654.07 /lf	424,651	4,280.57 /lf	684,892
						Erosion Controls Allowance	625.00 lf				55.00 /lf		55.00 /lf	34,375	85.00 /lf	53,122
						Dewatering Allowance	18.67 msf				9,000.00 /msf		9,000.00 /msf	168,030	13,908.28 /msf	259,668
						Miscellaneous Items Allowance	1.00 ls	52,500.00 /ls	52,500.00 /ls	105,000.00 /ls			210,000.00 /ls	210,000	332,139.05 /ls	332,139
						33.10.99.01 Buried Pipe Specials, Other	***475.00*** *LF*	*1,227.64 /LF*	*741.07 /LF*	*6,828.64 /LF*	*/LF*	*9,223.46 /LF*	*4,381,142*	*4,381,142*	*14,748.68 /LF*	*7,005,622*
						33.01 Pipeline Specialties	***1.00*** *LS*	*583,127.16 /LS*	*352,005.74 /LS*	*3,243,604.00 /LS*	*202,405.00 /LS*	*/LS*	*4,381,141.90 /LS*	*4,381,142*	*7,005,622.40 /LS*	*7,005,622*
						33.2 Pipeline Specialties	***1.00*** *LS*	*583,127.16 /LS*	*352,005.74 /LS*	*3,243,604.00 /LS*	*202,405.00 /LS*	*/LS*	*4,381,141.90 /LS*	*4,381,142*	*7,005,622.40 /LS*	*7,005,622*
						33.00.510 Funks TRR Connection Manifold	***475.00*** *LF*	*1,227.64 /LF*	*741.07 /LF*	*6,828.64 /LF*	*/LF*	*9,223.46 /LF*	*4,381,142*	*4,381,142*	*14,748.68 /LF*	*7,005,622*
						05.01 Funks TRR Connection Manifold	***1.00*** **LS**	**583,127.16 /LS**	**352,005.74 /LS**	**3,243,604.00 /LS**	**202,405.00 /LS**	**/LS**	**4,381,141.90 /LS**	**4,381,142**	**7,005,622.40 /LS**	**7,005,622**
	05.02					**Funks Pipeline**										
		33.00.502				*Funks Pipeline, Open Cut, Dual Bore*										
			33.0			*Pipelines*										
				33.03		*Buried Process Pipe, Carbon Steel*										
					33.00.10.144	*Buried Pipe, WSP, 144"*										
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	214,920.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	948,168	6.82 /cy	1,465,265
						Trench Stabilization, Geotextile Wrapped	4,786.00 cy	5.50 /cy	2.25 /cy	40.00 /cy	-	-	47.75 /cy	228,517	76.69 /cy	367,021
						Pipe bedding and zone, CLSM	65,054.00 cy	4.52 /cy	0.71 /cy	35.00 /cy	-	-	40.23 /cy	2,617,280	64.71 /cy	4,209,726
						Backfill native material	113,597.00 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	894,148	12.16 /cy	1,381,784
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	101,323.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	1,624,753	24.78 /cy	2,510,835
						Load excavated spoils	101,323.00 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	163,838	2.50 /cy	253,189
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	113,597.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	230,685	3.14 /cy	356,493
						Compaction, water for, 6000 gallon wagon, 6 mile haul	113,597.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	210,574	2.95 /cy	335,297
						Piping, WSP 0.6875" Wt Polyurethane Lined and Coated, 144" diameter	11,194.00 LF	379.47 /LF	82.79 /LF	1,790.00 /LF	-	-	2,252.26 /LF	25,211,784	3,610.34 /LF	40,414,097
						Dewatering Allowance	223.88 msf	0.00 /msf	0.00 /msf	0.00 /msf	3,000.00 /msf	0.00 /msf	3,000.00 /msf	671,640	4,636.09 /msf	1,037,929
						Erosion Controls Allowance	5,597.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	0.00 /lf	55.00 /lf	307,835	85.00 /lf	475,717
						Surface Restorations Allowance	839.55 msf	0.00 /msf	0.00 /msf	0.00 /msf	150.00 /msf	0.00 /msf	150.00 /msf	125,933	231.80 /msf	194,612
						33.00.10.144 Buried Pipe, WSP, 144"	*11,194.00 LF*	*593.42 /LF*	*254.16 /LF*	*2,022.68 /LF*	*98.75 /LF*	*/LF*	*2,969.02 /LF*	*33,235,154*	*4,734.85 /LF*	*53,001,964*
						33.03 Buried Process Pipe, Carbon Steel	*11,194.00 LF*	*593.42 /LF*	*254.16 /LF*	*2,022.68 /LF*	*98.75 /LF*	*/LF*	*2,969.02 /LF*	*33,235,154*	*4,734.85 /LF*	*53,001,964*
						33.0 Pipelines	*11,194.00 LF*	*593.42 /LF*	*254.16 /LF*	*2,022.68 /LF*	*98.75 /LF*	*/LF*	*2,969.02 /LF*	*33,235,154*	*4,734.85 /LF*	*53,001,964*
						33.00.502 Funks Pipeline, Open Cut, Dual Bore	*11,194.00 LF*	*593.42 /LF*	*254.16 /LF*	*2,022.68 /LF*	*98.75 /LF*	*/LF*	*2,969.02 /LF*	*33,235,154*	*4,734.85 /LF*	*53,001,964*
						05.02 Funks Pipeline	**11,194.00 LF**	**593.42 /LF**	**254.16 /LF**	**2,022.68 /LF**	**98.75 /LF**	**/LF**	**2,969.02 /LF**	**33,235,154**	**4,734.85 /LF**	**53,001,964**
	05.03					**Terminal Regulating Reservoir Pipeline**										
		32.00.000				*TRR Access Roads*										
			32.0			*Exterior Improvements*										
				32.12		*Paving*										
					32.40.04.00	*Site Improvements, Access Roads, Gravel*										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	60,354.00 SY	0.62 /SY	0.35 /SY	-	-	-	0.98 /SY	58,822	1.51 /SY	90,901
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	13,520.00 cy	1.68 /cy	4.63 /cy	-	-	-	6.31 /cy	85,285	9.75 /cy	131,797
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	6,760.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	108,399	24.78 /cy	167,516
						Load excavated spoils	6,760.00 cy	0.77 /cy	0.84 /cy		-	-	1.62 /cy	10,931	2.50 /cy	16,892
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,18"deep	60,354.00 sy	1.34 /sy	1.31 /sy	20.00 /sy	-	-	22.64 /sy	1,366,499	36.44 /sy	2,199,252
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	60,354.00 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	58,847	1.51 /sy	90,940
						32.40.04.00 Site Improvements, Access Roads, Gravel	*60,354.00 SY*	*3.80 /SY*	*4.19 /SY*	*20.00 /SY*	*/SY*	*/SY*	*27.98 /SY*	*1,688,782*	*44.69 /SY*	*2,697,298*
						32.12 Paving	*60,354.00 SY*	*3.80 /SY*	*4.19 /SY*	*20.00 /SY*	*/SY*	*/SY*	*27.98 /SY*	*1,688,782*	*44.69 /SY*	*2,697,298*
						32.0 Exterior Improvements	***1.00*** *LS*	*229,025.50 /LS*	*252,676.83 /LS*	*1,207,080.00 /LS*	*/LS*	*/LS*	*1,688,782.33 /LS*	*1,688,782*	*2,697,297.54 /LS*	*2,697,298*
						32.00.000 TRR Access Roads	***31,455.00*** *LF*	*7.28 /LF*	*8.03 /LF*	*38.38 /LF*	*/LF*	*/LF*	*53.69 /LF*	*1,688,782*	*85.75 /LF*	*2,697,298*
		33.00.500				*TRR Pipeline, Open Cut, Dual Bore*										
			33.0			*Pipelines*										
				33.03		*Buried Process Pipe, Carbon Steel*										
					33.00.10.144	*Buried Pipe, WSP, 144"*										
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	600,819.49 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	2,650,650	6.82 /cy	4,096,221
						Trench Stabilization, Geotextile Wrapped	10,728.25 cy	5.50 /cy	2.25 /cy	40.00 /cy	-	-	47.75 /cy	512,241	76.69 /cy	822,711
						Pipe bedding and zone, CLSM	145,671.06 cy	4.52 /cy	0.71 /cy	35.00 /cy	-	-	40.23 /cy	5,860,699	64.71 /cy	9,426,556
						Backfill native material	392,019.71 cy	6.18 /cy	1.69 /cy	0.00 /cy	-	-	7.87 /cy	3,085,676	12.16 /cy	4,768,494
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	208,799.78 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	3,348,183	24.78 /cy	5,174,163
						Load excavated spoils	208,799.78 cy	0.77 /cy	0.84 /cy	0.00 /cy	-	-	1.62 /cy	337,627	2.50 /cy	521,756
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	392,019.71 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	796,087	3.14 /cy	1,230,245
						Compaction, water for, 6000 gallon wagon, 6 mile haul	392,019.71 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	726,685	2.95 /cy	1,157,099
						Piping, WSP 0.6875" Wt Polyurethane Lined and Coated, 144" diameter	25,066.00 LF	379.47 /LF	82.79 /LF	1,790.00 /LF	-	-	2,252.26 /LF	56,455,116	3,610.34 /LF	90,496,672
						Dewatering Allowance	501.32 msf	0.00 /msf	0.00 /msf	0.00 /msf	3,000.00 /msf	0.00 /msf	3,000.00 /msf	1,503,960	4,636.09 /msf	2,324,166
						Erosion Controls Allowance	12,533.00 lf	0.00 /lf	0.00 /lf	0.00 /lf	55.00 /lf	0.00 /lf	55.00 /lf	689,315	85.00 /lf	1,065,243
						Surface Restorations Allowance	1,879.95 msf	0.00 /msf	0.00 /msf	0.00 /msf	150.00 /msf	0.00 /msf	150.00 /msf	281,993	231.80 /msf	435,781
						33.00.10.144 Buried Pipe, WSP, 144"	*25,066.00 LF*	*637.54 /LF*	*276.32 /LF*	*2,029.29 /LF*	*98.75 /LF*	*/LF*	*3,041.90 /LF*	*76,248,233*	*4,847.97 /LF*	*121,519,109*
						33.03 Buried Process Pipe, Carbon Steel	*25,066.00 LF*	*637.54 /LF*	*276.32 /LF*	*2,029.29 /LF*	*98.75 /LF*	*/LF*	*3,041.90 /LF*	*76,248,233*	*4,847.97 /LF*	*121,519,109*
						33.0 Pipelines	*25,066.00 LF*	*637.54 /LF*	*276.32 /LF*	*2,029.29 /LF*	*98.75 /LF*	*/LF*	*3,041.90 /LF*	*76,248,233*	*4,847.97 /LF*	*121,519,109*
						33.00.500 TRR Pipeline, Open Cut, Dual Bore	*25,066.00 LF*	*637.54 /LF*	*276.32 /LF*	*2,029.29 /LF*	*98.75 /LF*	*/LF*	*3,041.90 /LF*	*76,248,233*	*4,847.97 /LF*	*121,519,109*
		33.00.504				*Funks Pipeline, Trenchless Pipe Installation, Dual Bore at TC Canal*										
			33.0			*Pipelines*										
				33.60		*Trenchless Technology, Tunneling*										
					33.60.01.08	*Pipeline Specials, Tunneling, 144" Piping in 186" Casing*										
						Grout Annular Space Between Carrier Pipe and Casing	53,072.00 cf	9.30 /cf	0.43 /cf	0.95 /cf	-	-	10.68 /cf	566,756	16.57 /cf	879,500
						Final Surface Restoration Allowance	222.22 sy	0.00 /sy	0.00 /sy	0.00 /sy	13.50 /sy	0.00 /sy	13.50 /sy	3,000	20.86 /sy	4,636
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	2,300.00 cy	2.65 /cy	2.21 /cy	-	-	-	4.85 /cy	11,163	7.50 /cy	17,251

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					33.60.01.08	Pipeline Specials, Tunneling, 144" Piping in 186" Casing										
						Jacking and Receiving Pits Shoring, SF of Pit Walls	5,400.00 sf	0.00 /sf	0.00 /sf	0.00 /sf	45.00 /sf	0.00 /sf	45.00 /sf	243,000	69.54 /sf	375,524
						Backfill Pits, Native material	1,590.00 cy	6.18 /cy	1.15 /cy	0.00 /cy	-	-	7.33 /cy	11,661	11.33 /cy	18,021
						Pipe bedding and zone in pits, CLSM	855.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	64,324	121.34 /cy	103,743
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	5,620.00 cy	7.24 /cy	6.00 /cy	-	-	-	13.24 /cy	74,387	20.45 /cy	114,955
						Load excavated spoils	5,620.00 cy	1.03 /cy	0.77 /cy	0.00 /cy	-	-	1.80 /cy	10,104	2.78 /cy	15,614
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	1,590.00 cy	0.82 /cy	0.82 /cy	-	-	-	1.65 /cy	2,619	2.55 /cy	4,047
						Compaction, water for, 6000 gallon wagon, 6 mile haul	1,590.00 cy	0.35 /cy	0.21 /cy	1.20 /cy	-	-	1.76 /cy	2,795	2.80 /cy	4,458
						Horizontal boring, roadwork, 186" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	702.00 lf	596.42 /lf	142.23 /lf	1,100.00 /lf	-	-	1,838.65 /lf	1,290,729	2,921.13 /lf	2,050,632
						Carrier Pipe Spacers	148.00 ea	14.91 /ea	4.74 /ea	500.00 /ea	0.00 /ea	0.00 /ea	519.65 /ea	76,908	839.30 /ea	124,217
						Piping, WSP 0.6875" Wt Polyurethane Lined and Coated, 144" diameter	702.00 LF	596.41 /LF	28.45 /LF	1,790.00 /LF	-	-	2,414.86 /LF	1,695,232	3,861.61 /LF	2,710,853
						Dewatering Allowance	1.00 ls	0.00 /ls	0.00 /ls	0.00 /ls	500,000.00 /ls	0.00 /ls	500,000.00 /ls	500,000	772,682.24 /ls	772,682
						33.60.01.08 Pipeline Specials, Tunneling, 144" Piping in 186" Casing	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,250.90 /LF	7,196,132
						33.60 Trenchless Technology, Tunneling	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,250.90 /LF	7,196,132
						33.0 Pipelines	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,250.90 /LF	7,196,132
						33.00.504 Funks Pipeline, Trenchless Pipe Installation, Dual Bore at TC Canal	702.00 LF	1,995.71 /LF	271.70 /LF	3,155.21 /LF	1,062.68 /LF	/LF	6,485.30 /LF	4,552,678	10,250.90 /LF	7,196,132
		33.00.508				Funks Pipeline, Enviornmental Water Pipeline										
			33.0			Pipelines										
				33.03		Buried Process Pipe, Carbon Steel										
					33.00.10.042	Buried Pipe, WSP, 42"										
						Excavating, trench or continuous footing, common earth, 1-1/2 C.Y. excavator, 6' to 10' deep, excludes sheeting or dewatering	7,481.00 cy	2.27 /cy	1.76 /cy	-	-	-	4.03 /cy	30,115	6.22 /cy	46,539
						Trench Stabilization, Geotextile Wrapped	378.00 cy	5.50 /cy	2.25 /cy	40.00 /cy	-	-	47.75 /cy	18,048	76.69 /cy	28,987
						Pipe bedding and zone, CLSM	3,157.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	237,509	121.34 /cy	383,059
						Backfill native material	3,657.00 cy	6.18 /cy	1.69 /cy	-	-	-	7.87 /cy	28,785	12.16 /cy	44,483
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	3,824.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	61,319	24.78 /cy	94,761
						Load excavated spoils	3,824.00 cy	0.77 /cy	0.84 /cy	-	-	-	1.62 /cy	6,183	2.50 /cy	9,556
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	3,657.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	7,426	3.14 /cy	11,476
						Compaction, water for, 6000 gallon wagon, 6 mile haul	3,657.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	6,779	2.95 /cy	10,794
						Piping, WSP 0.5" Wt Polyurethane Lined and Coated, 42" diameter	2,550.00 LF	210.04 /LF	91.65 /LF	500.00 /LF	-	-	801.69 /LF	2,044,308	1,275.15 /LF	3,251,638
						Butterfly Valve, 42" Dia	1.00 ea	1,681.37 /ea	343.64 /ea	22,000.00 /ea	-	-	24,025.01 /ea	24,025	38,722.41 /ea	38,722
						Dewatering Allowance	20.40 msf				3,000.00 /msf		3,000.00 /msf	61,200	4,636.09 /msf	94,576
						Erosion Controls Allowance	2,550.00 lf				55.00 /lf		55.00 /lf	140,250	85.00 /lf	216,737
						Connection to TRR Pipeline	1.00 ls	5,001.82 /ls	560.00 /ls	15,000.00 /ls			20,561.82 /ls	20,562	32,862.99 /ls	32,863
						33.00.10.042 Buried Pipe, WSP, 42"	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,672.23 /LF	4,264,193
						33.03 Buried Process Pipe, Carbon Steel	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,672.23 /LF	4,264,193
						33.0 Pipelines	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,672.23 /LF	4,264,193
						33.00.508 Funks Pipeline, Enviornmental Water Pipeline	2,550.00 LF	248.30 /LF	117.42 /LF	608.82 /LF	79.00 /LF	/LF	1,053.53 /LF	2,686,510	1,672.23 /LF	4,264,193
		33.00.530				Funks Pipeline, Enviornmental Water Pipeline, Energy Dissipation Structure										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.36	Cast-In-Place Concrete, Slabs on Grade, 36" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,848.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	16,328	13.72 /sfca	25,362
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	56.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	143,973	4,060.05 /ton	227,363
						Reinforcing in place, unloading & sorting, add to above - slabs	56.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	3,119	86.08 /ton	4,821
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	762.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	99,822	211.94 /cy	161,498
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	740.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	21,461	44.82 /CY	33,164
						Cfnsh,flrs,for spcf rndm accs firs aci clss 1 2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,656.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	6,234	1.45 /sf	9,634
						Curing, sprayed membrane curing compound	66.56 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,534	36.52 /csf	2,431
						Fine grading, fine grade for slab on grade, machine	739.56 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,386	2.90 /sy	2,142
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	630.29 /CY	466,416
						03.18 Cast-In-Place Concrete, Slabs on Grade	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	630.29 /CY	466,416
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	12,800.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	188,641	23.17 /sfca	296,576
						Form oil, coverage varies greatly, maximum, includes material only	34.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	805	38.02 /gal	1,302
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	53.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	137,546	4,060.05 /ton	217,212
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	53.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,980	86.08 /ton	4,606
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	53.50 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	3,239	93.57 /ton	5,006
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	734.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	96,154	211.94 /cy	155,564
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	712.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	31,833	69.09 /CY	49,194
						Finishing; break ties & patch voids (walls, cols or beams)	12,800.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	12,915	1.56 /sf	19,986
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	712.00 CY	331.46 /CY	9.57 /CY	324.86 /CY	/CY	/CY	665.89 /CY	474,113	1,052.59 /CY	749,446
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7" 6" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	840.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	12,380	23.17 /sfca	19,463
						Form oil, coverage varies greatly, maximum, includes material only	2.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	53	38.03 /gal	86
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	22,496	4,060.05 /ton	35,525
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	8.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	487	86.08 /ton	753
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	8.75 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	530	93.57 /ton	819
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	120.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	15,720	211.94 /cy	25,433
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	117.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	5,231	69.09 /CY	8,084
						Finishing; break ties & patch voids (walls, cols or beams)	840.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	848	1.56 /sf	1,312
						03.10.06.90 Cast-In-Place Concrete, Straight Walls, 7" 6" thick	117.00 CY	220.08 /CY	9.57 /CY	263.90 /CY	/CY	/CY	493.54 /CY	57,744	781.83 /CY	91,474
						03.20 Cast-In-Place Concrete, Straight Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,014.38 /CY	840,920
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.36	Cast-In-Place Concrete, Elevated Decks, 36" thick										
						Slab shoring	46,000.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	31,497	1.06 /cf	48,842
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	2,000.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	17,753	13.81 /sf	27,628
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	280.00 lf	5.41 /lf	-	0.22 /lf	-	-	5.63 /lf	1,577	8.72 /lf	2,441
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	43,063	4,060.04 /ton	68,006
						Reinforcing in place, unloading & sorting, add to above - decks	16.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	933	86.09 /ton	1,442
						Reinforcing steel, crane cost for handling, maximum, add	16.75 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	2,666	245.95 /ton	4,120
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	230.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	30,130	211.94 /cy	48,746
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	223.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	6,647	46.06 /CY	10,272
						Finishing elev slab, bull float, manual float & manual steel trowel	2,000.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	2,468	1.91 /sf	3,814
						Curing, sprayed membrane curing compound, elevated decks	20.00 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	461	36.52 /csf	730

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						03.10.10.36 Cast-In-Place Concrete, Elevated Decks, 36" thick	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	968.79 /CY	216,040
						03.24 Cast-In-Place Concrete, Elevated Slabs	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	968.79 /CY	216,040
						03.0 Concrete Work	1,792.00 CY	257.15 /CY	8.24 /CY	271.94 /CY	/CY	/CY	537.34 /CY	962,909	850.10 /CY	1,523,376
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.24	Process Pipe, Carbon Steel, 24"										
						Energy Dissipating Valves W/ Hood	1.00 ea	2,187.72 /ea	1,560.00 /ea	15,000.00 /ea	-	-	18,747.72 /ea	18,748	30,059.52 /ea	30,060
						42" x 24" Reducer	1.00 ea	2,187.71 /ea	520.00 /ea	5,000.00 /ea	-	-	7,707.71 /ea	7,708	12,273.74 /ea	12,274
						40.10.02.24 Process Pipe, Carbon Steel, 24"	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,455	/LF	42,333
						40.11 Process Pipe, Carbon Steel	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,455	/LF	42,333
						40.0 Process Pipe	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,455	/LF	42,333
						33.00.530 Funks Pipeline, Enviornmental Water Pipeline, Energy Dissipation Structure	1.00 EA	465,190.61 /EA	16,851.09 /EA	507,322.79 /EA	/EA	/EA	989,364.49 /EA	989,364	1,565,709.66 /EA	1,565,710
						05.03 Terminal Regulating Reservoir Pipeline	28,318.00 LF	660.67 /LF	271.42 /LF	1,989.83 /LF	120.87 /LF	/LF	3,042.78 /LF	86,165,568	4,846.47 /LF	137,242,441
						05 Funks/TRR Pipelines	**59,853.00 LF**	**433.31 /LF**	**181.83 /LF**	**1,373.93 /LF**	**79.04 /LF**	**/LF**	**2,068.10 /LF**	**123,781,863**	**3,295.57 /LF**	**197,250,028**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	25,934,763		326,540.559 hrs	
Material	82,233,549			
Allowance	4,730,530			
Equipment	10,883,022		134,223.572 hrs	
Other				
Subtotal Direct Costs	**123,781,864**	**123,781,864**		
Material Sales Tax, Dunnigan Ca	5,961,932			7.250 %
Subtotal W/ Sales Tax	**5,961,932**	**129,743,796**		
General Conditions	6,487,190			5.000 %
Subtotal W/ General Conditions	**6,487,190**	**136,230,986**		
Mobilization/Demobilization	4,086,930			3.000 %
Prime Contractor Overhead	14,031,791			10.000 %
Prime Contractor Profit	9,260,982			6.000 %
Bonds & Insurance	3,550,352			2.170 %
Subtotal W/ Prime Markups	**30,930,055**	**167,161,041**		
Contractor Contingency	5,014,831			3.000 %
Design Contingency	25,074,156			15.000 %
Subtotal W/ Contingency	**30,088,987**	**197,250,028**		
Total Construction Cost		**197,250,028**		
Non-Contract Costs	29,587,504			15.000 %
Total Project Costs	**29,587,504**	**226,837,532**		

TRR West Reservoir

Summary Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
07			TRR West										
	07.01		TRR West Reservoir										
		01.00.700	TRR West Reservoir, Dewatering/Erosion Controls/Dust Abatement	24.00 MO	15,000.00 /MO	15,000.00 /MO	/MO	30,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,753.58 /MO	2,226,086
		31.00.700	Construct Access Roads	109,133.34 SY	3.80 /SY	20.00 /SY	/SY	4.19 /SY	/SY	27.98 /SY	3,053,674	44.20 /SY	4,823,548
		31.00.701	Extension Connection Tunnel	1.00 LS	5,185,117.88 /LS	8,189,893.95 /LS	1,423,440.98 /LS	706,261.45 /LS	/LS	15,504,714.26 /LS	15,504,714	24,281,372.60 /LS	24,281,373
		31.00.703	Main Reservoir Stripping 6 Inches of Reservoir Area	78,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.15 /CY	713,721	13.98 /CY	1,090,399
		31.00.705	Main Reservoir Excavation and Haul to Construct Base Grades	5,077,800.00 CY	2.56 /CY	/CY	/CY	6.47 /CY	/CY	9.02 /CY	45,819,703	13.79 /CY	70,001,872
		31.00.707	Main Reservoir Prepare Subgrade and Reservoir Liner	73,800.00 CY	20.06 /CY	27.97 /CY	/CY	11.95 /CY	/CY	59.97 /CY	4,426,067	93.65 /CY	6,911,641
		31.00.709	Extension Reservoir Stripping 6 Inches of Reservoir Area	41,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.16 /CY	375,368	13.99 /CY	573,475
		31.00.711	Extension Reservoir Retaining Walls	52,203.00 SF	33.92 /SF	113.68 /SF	/SF	12.90 /SF	/SF	160.49 /SF	8,378,207	253.44 /SF	13,230,206
		31.00.713	Extension Reservoir Excavation and Haul to Construct Base Grades	3,316,000.00 CY	2.60 /CY	/CY	/CY	6.57 /CY	/CY	9.17 /CY	30,395,485	14.00 /CY	46,437,247
		31.00.715	Extension Reservoir Prepare Subgrade and Reservoir Liner	25,100.00 CY	24.07 /CY	33.57 /CY	/CY	14.34 /CY	/CY	71.99 /CY	1,806,966	112.42 /CY	2,821,720
		31.00.716	Extension Reservoir Approach Channel Concrete Apron	2,118.00 CY	200.87 /CY	263.90 /CY	/CY	13.40 /CY	/CY	478.18 /CY	1,012,779	749.68 /CY	1,587,814
		31.00.717	Construct Check Structure #1	1.00 EA	266,067.88 /EA	415,487.86 /EA	30,200.00 /EA	21,319.16 /EA	/EA	733,074.90 /EA	733,075	1,176,324.37 /EA	1,176,324
		31.00.718	Construct Check Structure #2	1.00 EA	266,067.88 /EA	415,487.86 /EA	30,200.00 /EA	21,319.16 /EA	/EA	733,074.90 /EA	733,075	1,176,324.39 /EA	1,176,324
		31.00.720	Construct Check Structure #3	1.00 EA	266,067.88 /EA	415,487.86 /EA	30,200.00 /EA	21,319.16 /EA	/EA	733,074.90 /EA	733,075	1,176,324.37 /EA	1,176,324
		31.00.721	Construct Check Structure #4	1.00 EA	266,067.88 /EA	415,487.86 /EA	30,200.00 /EA	21,319.16 /EA	/EA	733,074.90 /EA	733,075	1,176,324.39 /EA	1,176,324
		31.00.726	Construct GCID Canal Plug	42,100.00 CY	4.88 /CY	/CY	/CY	8.83 /CY	/CY	13.71 /CY	577,301	20.95 /CY	881,981
		31.00.728	Relocate Canal Lateral	14,600.00 CY	1.98 /CY	/CY	/CY	3.91 /CY	/CY	5.89 /CY	85,914	8.99 /CY	131,257
		31.00.730	Construct I/O Canal	184,200.00 CY	1.93 /CY	/CY	/CY	3.19 /CY	/CY	5.12 /CY	942,477	7.82 /CY	1,439,886
			07.01 TRR West Reservoir	147.60 AC	228,989.51 /AC	147,659.82 /AC	10,462.34 /AC	408,719.46 /AC	/AC	795,831.13 /AC	117,464,674	1,227,261.54 /AC	181,143,803
			07 TRR West	**1.00 LS**	**33,798,851.24 /LS**	**21,794,589.29 /LS**	**1,544,240.98 /LS**	**60,326,992.58 /LS**	**/LS**	**117,464,674.09 /LS**	**117,464,674**	**181,143,802.94 /LS**	**181,143,803**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	51,668,454		433,196.908 hrs	
Material	34,947,183			
Allowance	2,359,242			
Equipment	92,168,925		304,369.193 hrs	
Other				
Total Construction Cost	**181,143,804**	**181,143,804**		
Non-Contract Costs	30,794,447			17.000 %
Total Project Costs	**30,794,447**	**211,938,251**		

Detail Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
07						TRR West										
	07.01					TRR West Reservoir										
		01.00.700				TRR West Reservoir, Dewatering/Erosion Controls/Dust Abatement										
			01.0			General Requirements										
				01.01		Construction Operations										
					01.01.05.00	General Conditions, Other										
						Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement Allowance	24.00 MO	15,000.00 /MO	15,000.00 /MO	-	30,000.00 /MO	-	60,000.00 /MO	1,440,000	92,753.58 /MO	2,226,086
						01.01.05.00 General Conditions, Other	24.00 MO	15,000.00 /MO	15,000.00 /MO	/MO	30,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,753.58 /MO	2,226,086
						01.01 Construction Operations	24.00 MO	15,000.00 /MO	15,000.00 /MO	/MO	30,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,753.58 /MO	2,226,086
						01.0 General Requirements	24.00 MO	15,000.00 /MO	15,000.00 /MO	/MO	30,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,753.58 /MO	2,226,086
						01.00.700 TRR West Reservoir, Dewatering/Erosion Controls/Dust Abatement	24.00 MO	15,000.00 /MO	15,000.00 /MO	/MO	30,000.00 /MO	/MO	60,000.00 /MO	1,440,000	92,753.58 /MO	2,226,086
		31.00.700				Construct Access Roads										
			32.0			Exterior Improvements										
				32.12		Paving										
					32.40.04.00	Site Improvements, Access Roads, Gravel										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	109,133.34 SY	0.62 /SY	-	-	0.35 /SY	-	0.98 /SY	106,362	1.49 /SY	162,497
						Excavation, bulk, scrapers, bank measure, common earth, 3000' haul, 14 C.Y. bucket, self propelled scrapers, 1/4 push dozer	24,446.00 cy	1.68 /cy	-	-	4.63 /cy	-	6.31 /cy	154,207	9.64 /cy	235,593
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	12,223.00 cy	7.24 /cy	-	-	8.80 /cy	-	16.04 /cy	196,000	24.50 /cy	299,443
						Load excavated spoils	12,223.00 cy	0.77 /cy		-	0.84 /cy	-	1.62 /cy	19,764	2.47 /cy	30,195
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,18"deep	109,133.34 sy	1.34 /sy	20.00 /sy	-	1.31 /sy	-	22.64 /sy	2,470,932	36.04 /sy	3,933,254
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	109,133.34 sy	0.57 /sy	-	-	0.41 /sy	-	0.98 /sy	106,408	1.49 /sy	162,566
						32.40.04.00 Site Improvements, Access Roads, Gravel	109,133.34 SY	3.80 /SY	20.00 /SY	/SY	4.19 /SY	/SY	27.98 /SY	3,053,674	44.20 /SY	4,823,548
						32.12 Paving	109,133.34 SY	3.80 /SY	20.00 /SY	/SY	4.19 /SY	/SY	27.98 /SY	3,053,674	44.20 /SY	4,823,548
						32.0 Exterior Improvements	1.00 LS	414,122.10 /LS	2,182,666.80 /LS	/LS	456,884.63 /LS	/LS	3,053,673.53 /LS	3,053,674	4,823,547.82 /LS	4,823,548
						31.00.700 Construct Access Roads	109,133.34 SY	3.80 /SY	20.00 /SY	/SY	4.19 /SY	/SY	27.98 /SY	3,053,674	44.20 /SY	4,823,548
		31.00.701				Extension Connection Tunnel										
			33.0			Utilities										
				33.60		Trenchless Technology, Tunneling										
					33.60.01.08	Pipeline Specials, Tunneling, 144" Piping in 186" Casing										
						Grout Annular Space Between Carrier Pipe and Casing	186,885.67 cf	9.76 /cf	1.00 /cf	-	0.46 /cf	-	11.21 /cf	2,095,540	17.20 /cf	3,215,014
						Excavating jacking and Receiving Pits, excludes sheeting or dewatering	8,098.27 cy	2.78 /cy	-	-	2.32 /cy	-	5.10 /cy	41,269	7.79 /cy	63,050
						Jacking and Receiving Pits Shoring, SF of Pit Walls	19,014.62 sf			47.25 /sf			47.25 /sf	898,441	72.19 /sf	1,372,609
						Backfill Pits, Native material	5,599.08 cy	6.49 /cy		-	1.21 /cy	-	7.70 /cy	43,117	11.77 /cy	65,873
						Pipe bedding and zone in pits, CLSM	3,010.90 cy	4.75 /cy	73.50 /cy	-	0.75 /cy	-	78.99 /cy	237,843	126.01 /cy	379,413
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	19,790.83 cy	7.60 /cy	-	-	6.30 /cy	-	13.90 /cy	275,053	21.23 /cy	420,217
						Load excavated spoils	19,790.83 cy	1.08 /cy		-	0.81 /cy	-	1.89 /cy	37,361	2.88 /cy	57,078
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	5,599.08 cy	0.87 /cy	-	-	0.86 /cy	-	1.73 /cy	9,682	2.64 /cy	14,792
						Compaction, water for, 6000 gallon wagon, 6 mile haul	5,599.08 cy	0.37 /cy	1.26 /cy	-	0.22 /cy	-	1.85 /cy	10,335	2.91 /cy	16,301
						Horizontal boring, roadwork, 186" diameter casing, includes casing only, 100' minimum, excludes jacking pits or dewatering	2,472.00 lf	626.24 /lf	1,155.00 /lf	-	149.34 /lf	-	1,930.58 /lf	4,772,390	3,033.21 /lf	7,498,103
						Carrier Pipe Spacers	521.59 ea	15.66 /ea	525.00 /ea		4.98 /ea		545.63 /ea	284,598	871.66 /ea	454,653
						Piping, WSP 0.6875" Wt Polyurethane Lined and Coated, 144" diameter	2,472.00 LF	626.24 /LF	1,879.50 /LF	-	29.87 /LF	-	2,535.60 /LF	6,268,011	4,010.08 /LF	9,912,909
						Dewatering Allowance	1.00 ls			525,000.00 /ls			525,000.00 /ls	525,000	802,078.15 /ls	802,078
						Rip Rap Armoring at Pipe Penitrations, Uses Onsite Excavated Material	180.00 cy	28.02 /cy	0.00 /cy		5.73 /cy	0.00 /cy	33.75 /cy	6,075	51.56 /cy	9,281
						33.60.01.08 Pipeline Specials, Tunneling, 144" Piping in 186" Casing	2,472.00 LF	2,097.54 /LF	3,313.06 /LF	575.83 /LF	285.70 /LF	/LF	6,272.13 /LF	15,504,714	9,822.56 /LF	24,281,373
						33.60 Trenchless Technology, Tunneling	2,472.00 LF	2,097.54 /LF	3,313.06 /LF	575.83 /LF	285.70 /LF	/LF	6,272.13 /LF	15,504,714	9,822.56 /LF	24,281,373
						33.0 Utilities	2,472.00 LF	2,097.54 /LF	3,313.06 /LF	575.83 /LF	285.70 /LF	/LF	6,272.13 /LF	15,504,714	9,822.56 /LF	24,281,373
						31.00.701 Extension Connection Tunnel	1.00 LS	5,185,117.88 /LS	8,189,893.95 /LS	1,423,440.98 /LS	706,261.45 /LS	/LS	15,504,714.26 /LS	15,504,714	24,281,372.60 /LS	24,281,373
		31.00.703				Main Reservoir Stripping 6 Inches of Reservoir Area										
			31.0			Earthwork										
				31.22		Earthworks, Site										
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure										
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	78,000.00 CY	0.65 /CY	-	-	1.77 /CY	-	2.42 /CY	188,393	3.69 /CY	287,821
						Ripping area w/dozer	467,777.78 sy	0.07 /sy	-	-	0.16 /sy	-	0.23 /sy	108,411	0.35 /sy	165,627
						Load excavated spoils	78,000.00 cy	0.62 /cy		-	0.68 /cy	-	1.29 /cy	100,900	1.98 /cy	154,152
						Cycle hlng(,load,trav,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 10 mile,25 mph,exclds loadng eqpmnt	78,000.00 lcy	0.88 /lcy	-	-	3.17 /lcy	-	4.05 /lcy	316,016	6.19 /lcy	482,799
						31.20.07.10 Earthworks, Sitework, Excavating Bulk Measure	78,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.15 /CY	713,721	13.98 /CY	1,090,399
						31.22 Earthworks, Site	78,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.15 /CY	713,721	13.98 /CY	1,090,399
						31.0 Earthwork	78,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.15 /CY	713,721	13.98 /CY	1,090,399
						31.00.703 Main Reservoir Stripping 6 Inches of Reservoir Area	78,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.15 /CY	713,721	13.98 /CY	1,090,399
		31.00.705				Main Reservoir Excavation and Haul to Construct Base Grades										
			31.0			Earthwork										
				31.22		Earthworks, Site										
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure										
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	5,004,000.00 CY	0.65 /CY	-	-	1.77 /CY	-	2.42 /CY	12,086,154	3.69 /CY	18,464,839
						Ripping area w/dozer	246,777.78 sy	9.19 /sy	-	-	19.52 /sy	-	28.72 /sy	7,086,447	43.87 /sy	10,826,447
						Load excavated spoils	5,004,000.00 cy	0.62 /cy		-	0.68 /cy	-	1.29 /cy	6,473,124	1.98 /cy	9,889,432
						Cycle hlng(,load,trav,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 2 mile,25 mph,exclds loadng eqpmnt	73,800.00 CY	0.59 /CY	-	-	2.11 /CY	-	2.70 /CY	199,333	4.13 /CY	304,535
						Cycle hlng(,load,trav,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 10 mile,25 mph,exclds loadng eqpmnt	4,930,200.00 lcy	0.88 /lcy	-	-	3.17 /lcy	-	4.05 /lcy	19,974,644	6.19 /lcy	30,516,620
						31.20.07.10 Earthworks, Sitework, Excavating Bulk Measure	5,077,800.00 CY	2.56 /CY	/CY	/CY	6.47 /CY	/CY	9.02 /CY	45,819,703	13.79 /CY	70,001,872
						31.22 Earthworks, Site	5,077,800.00 CY	2.56 /CY	/CY	/CY	6.47 /CY	/CY	9.02 /CY	45,819,703	13.79 /CY	70,001,872
						31.0 Earthwork	5,077,800.00 CY	2.56 /CY	/CY	/CY	6.47 /CY	/CY	9.02 /CY	45,819,703	13.79 /CY	70,001,872
						31.00.705 Main Reservoir Excavation and Haul to Construct Base Grades	5,077,800.00 CY	2.56 /CY	/CY	/CY	6.47 /CY	/CY	9.02 /CY	45,819,703	13.79 /CY	70,001,872
		31.00.707				Main Reservoir Prepare Subgrade and Reservoir Liner										
			31.0			Earthwork										
				31.22		Earthworks, Site										
					31.20.09.10	Earthworks, Sitework, Backfill										
						Fine grading, lagoon bottoms, to be paved with grader	3,621.00 msf	77.56 /msf	-	-	88.53 /msf	-	166.09 /msf	601,412	253.75 /msf	918,818
						Fill, native fill, compacted, 6" deep, Foundation Layer	73,800.00 cy	4.08 /cy		-	2.27 /cy	-	6.35 /cy	468,672	9.70 /cy	716,023
						Load excavated spoils	73,800.00 cy	0.62 /cy		-	0.68 /cy	-	1.29 /cy	95,467	1.98 /cy	145,851
						Cycle hlng(,load,trav,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 2 mile,25 mph,exclds loadng eqpmnt	73,800.00 CY	0.59 /CY	-	-	2.11 /CY	-	2.70 /CY	199,333	4.13 /CY	304,535

Detail Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
					31.20.09.10	Earthworks, Sitework, Backfill										
						Compaction, water for, 3000 gallon truck, 3 mile haul	73,800.00 cy	0.65 /cy		-	0.44 /cy	-	1.09 /cy	80,643	1.67 /cy	123,204
						Pond and reservoir liners, membrane lining systems HDPE, 100,000 S.F. or more, 60 mil thick, per M.S.F.	3,621.00 msf	210.17 /msf	570.00 /msf	-	42.96 /msf	-	823.13 /msf	2,980,539	1,298.87 /msf	4,703,210
						31.20.09.10 Earthworks, Sitework, Backfill	73,800.00 CY	20.06 /CY	27.97 /CY	/CY	11.95 /CY	/CY	59.97 /CY	4,426,067	93.65 /CY	6,911,641
						31.22 Earthworks, Site	73,800.00 CY	20.06 /CY	27.97 /CY	/CY	11.95 /CY	/CY	59.97 /CY	4,426,067	93.65 /CY	6,911,641
						31.0 Earthwork	**73,800.00 CY**	**20.06 /CY**	**27.97 /CY**	**/CY**	**11.95 /CY**	**/CY**	**59.97 /CY**	**4,426,067**	**93.65 /CY**	**6,911,641**
						31.00.707 Main Reservoir Prepare Subgrade and Reservoir Liner	73,800.00 CY	20.06 /CY	27.97 /CY	/CY	11.95 /CY	/CY	59.97 /CY	4,426,067	93.65 /CY	6,911,641
		31.00.709				Extension Reservoir Stripping 6 Inches of Reservoir Area										
			31.0			**Earthwork**										
				31.22		Earthworks, Site										
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure										
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	41,000.00 CY	0.65 /CY	-	-	1.77 /CY	-	2.42 /CY	99,027	3.69 /CY	151,291
						Ripping area w/dozer	246,777.78 sy	0.07 /sy	-	-	0.16 /sy	-	0.23 /sy	57,193	0.35 /sy	87,377
						Load excavated spoils	41,000.00 cy	0.62 /cy		-	0.68 /cy	-	1.29 /cy	53,037	1.98 /cy	81,029
						Cycle hlng(,load,trav,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 10 mile,25 mph,exclds loading eqpmnt	41,000.00 lcy	0.88 /lcy	-	-	3.17 /lcy	-	4.05 /lcy	166,111	6.19 /lcy	253,779
						31.20.07.10 Earthworks, Sitework, Excavating Bulk Measure	41,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.16 /CY	375,368	13.99 /CY	573,475
						31.22 Earthworks, Site	41,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.16 /CY	375,368	13.99 /CY	573,475
						31.0 Earthwork	**41,000.00 CY**	**2.59 /CY**	**/CY**	**/CY**	**6.56 /CY**	**/CY**	**9.16 /CY**	**375,368**	**13.99 /CY**	**573,475**
						31.00.709 Extension Reservoir Stripping 6 Inches of Reservoir Area	41,000.00 CY	2.59 /CY	/CY	/CY	6.56 /CY	/CY	9.16 /CY	375,368	13.99 /CY	573,475
		31.00.711				Extension Reservoir Retaining Walls										
			03.0			**Concrete Work**										
				03.20		Cast-In-Place Concrete, Straight Walls										
					32.50.01.01	Concrete Retaining Walls										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	7,536.00 sfca	9.29 /sfca	5.45 /sfca	-	-	-	14.74 /sfca	111,062	22.91 /sfca	172,655
						Form oil, coverage varies greatly, maximum, includes material only	20.10 gal	-	23.50 /gal	-	-	-	23.50 /gal	472	37.60 /gal	756
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	18.40 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	47,305	4,014.81 /ton	73,872
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	18.40 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	1,025	85.11 /ton	1,566
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	18.40 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	1,114	92.50 /ton	1,702
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	222.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	29,082	209.64 /cy	46,539
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	210.00 CY	36.16 /CY	-	-	8.55 /CY	-	44.71 /CY	9,389	68.31 /CY	14,344
						Concrete finishing, walls, includes breaking ties and patching voids	7,536.00 sf	0.98 /sf	0.04 /sf	-	-	-	1.02 /sf	7,681	1.56 /sf	11,757
						32.50.01.01 Concrete Retaining Walls	210.00 CY	533.71 /CY	442.89 /CY	/CY	9.74 /CY	/CY	986.34 /CY	207,131	1,539.01 /CY	323,192
						03.20 Cast-In-Place Concrete, Straight Walls	210.00 CY	533.71 /CY	442.89 /CY	/CY	9.74 /CY	/CY	986.34 /CY	207,131	1,539.01 /CY	323,192
						03.0 Concrete Work	**210.00 CY**	**533.71 /CY**	**442.89 /CY**	**/CY**	**9.74 /CY**	**/CY**	**986.34 /CY**	**207,131**	**1,539.01 /CY**	**323,192**
			31.0			**Earthwork**										
				31.22		Earthworks, Site										
					31.00.090	Soil Nail Wall										
						Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	48,434.85 sf	1.18 /sf	0.04 /sf	-	-	-	1.22 /sf	58,856	1.86 /sf	90,058
						Shotcrete (pneumatically placed concrete) up to 18" thick, avg. cost	597.96 cy	86.18 /cy	95.00 /cy	-	3.55 /cy	-	184.73 /cy	110,463	289.12 /cy	172,881
						Grouted soil nailing, layout and vertical and horizontal control average holes per day	2,365.00 ea	24.50 /ea	-	-	0.92 /ea	-	25.43 /ea	60,132	38.84 /ea	91,867
						Gouted soil nailing,drill hole,install # 8 nail,grout,average,grade 75,15 min setup per hole&120'hr drilling,80'depth,excludes guniting&matl delivery	2,365.00 ea	260.95 /ea	1,020.00 /ea	-	234.99 /ea	-	1,515.94 /ea	3,585,192	2,389.95 /ea	5,652,234
						Concrete pressure grouting, cement and sand, 1:1 mix, per C.F., maximum	133,110.00 cf	6.34 /cf	25.00 /cf	-	0.82 /cf	-	32.16 /cf	4,281,069	50.95 /cf	6,781,742
						31.00.090 Soil Nail Wall	*48,435.00* SF	33.61 /SF	119.72 /SF	/SF	13.81 /SF	/SF	167.15 /SF	8,095,712	264.04 /SF	12,788,781
					32.50.01.00	Concrete Retaining Walls Footings										
						C.I.P. concrete forms, footing, keyway, tapered wood, 2" x 4", 4 use, includes erecting, bracing, stripping and cleaning	318.00 lf	1.39 /lf	0.25 /lf	-	-	-	1.64 /lf	520	2.52 /lf	800
						Reinforcing Steel, in place, footings, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	15.60 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	40,107	4,014.81 /ton	62,631
						Reinforcing steel, unload and sort, add to base	15.60 ton	49.21 /ton	-	-	6.50 /ton	-	55.70 /ton	869	85.10 /ton	1,328
						Struct concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	188.00 cy	-	127.00 /cy	-	-	-	127.00 /cy	23,876	203.23 /cy	38,208
						Structural concrete, placing, continuous footing, deep, pumped, includes strike off & consolidation, excludes material	178.00 CY	27.12 /CY	-	-	6.41 /CY	-	33.53 /CY	5,969	51.23 /CY	9,119
						Excavating, trench or continuous footing, common earth, 1/2 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	176.67 bcy	6.21 /bcy	-	-	2.12 /bcy	-	8.32 /bcy	1,470	12.72 /bcy	2,246
						Excavating, trench or continuous footing, common earth, trim sides and bottom for concrete pours, excludes sheeting or dewatering	1,590.00 sf	1.04 /sf	-	-	0.03 /sf	-	1.07 /sf	1,704	1.64 /sf	2,603
						Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 2 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	176.67 lcy	2.17 /lcy	-	-	2.64 /lcy	-	4.81 /lcy	850	7.35 /lcy	1,298
						32.50.01.00 Concrete Retaining Walls Footings	178.00 CY	171.67 /CY	239.75 /CY	/CY	11.97 /CY	/CY	423.39 /CY	75,364	664.23 /CY	118,233
						31.22 Earthworks, Site	178.00 CY	9,317.30 /CY	32,817.24 /CY	/CY	3,770.38 /CY	/CY	45,904.92 /CY	8,171,076	72,511.32 /CY	12,907,014
						31.0 Earthwork	**178.00 CY**	**9,317.30 /CY**	**32,817.24 /CY**	**/CY**	**3,770.38 /CY**	**/CY**	**45,904.92 /CY**	**8,171,076**	**72,511.32 /CY**	**12,907,014**
						31.00.711 Extension Reservoir Retaining Walls	*52,203.00* SF	33.92 /SF	113.68 /SF	/SF	12.90 /SF	/SF	160.49 /SF	8,378,207	253.44 /SF	13,230,206
		31.00.713				Extension Reservoir Excavation and Haul to Construct Base Grades										
			31.0			**Earthwork**										
				31.22		Earthworks, Site										
					31.20.07.10	Earthworks, Sitework, Excavating Bulk Measure										
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	3,316,000.00 CY	0.65 /CY	-	-	1.77 /CY	-	2.42 /CY	8,009,130	3.69 /CY	12,236,092
						Ripping area w/dozer	246,777.78 sy	6.09 /sy	-	-	12.94 /sy	-	19.03 /sy	4,695,975	29.07 /sy	7,174,360
						Load excavated spoils	3,316,000.00 cy	0.62 /cy		-	0.68 /cy	-	1.29 /cy	4,289,544	1.98 /cy	6,553,428
						Cycle hlng(,load,trav,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 2 mile,25 mph,exclds loading eqpmnt	25,100.00 cy	0.59 /cy	-	-	2.11 /cy	-	2.70 /cy	67,795	4.13 /cy	103,575
						Cycle hlng(,load,trav,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 10 mile,25 mph,exclds loading eqpmnt	3,290,900.00 lcy	0.88 /lcy	-	-	3.17 /lcy	-	4.05 /lcy	13,333,040	6.19 /lcy	20,369,791
						31.20.07.10 Earthworks, Sitework, Excavating Bulk Measure	3,316,000.00 CY	2.60 /CY	/CY	/CY	6.57 /CY	/CY	9.17 /CY	30,395,485	14.00 /CY	46,437,247
						31.22 Earthworks, Site	3,316,000.00 CY	2.60 /CY	/CY	/CY	6.57 /CY	/CY	9.17 /CY	30,395,485	14.00 /CY	46,437,247
						31.0 Earthwork	**3,316,000.00 CY**	**2.60 /CY**	**/CY**	**/CY**	**6.57 /CY**	**/CY**	**9.17 /CY**	**30,395,485**	**14.00 /CY**	**46,437,247**
						31.00.713 Extension Reservoir Excavation and Haul to Construct Base Grades	3,316,000.00 CY	2.60 /CY	/CY	/CY	6.57 /CY	/CY	9.17 /CY	30,395,485	14.00 /CY	46,437,247
		31.00.715				Extension Reservoir Prepare Subgrade and Reservoir Liner										
			31.0			**Earthwork**										
				31.22		Earthworks, Site										
					31.20.09.10	Earthworks, Sitework, Backfill										

Detail Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
					31.20.09.10	Earthworks, Sitework, Backfill										
						Fine grading, lagoon bottoms, to be paved with grader	1,232.00 msf	93.07 /msf	-	-	106.23 /msf	-	199.31 /msf	245,547	304.50 /msf	375,140
						Fill, native fill, compacted, 6" deep, Foundation Layer	25,100.00 cy	4.90 /cy	0.00 /cy	-	2.72 /cy	-	7.62 /cy	191,279	11.64 /cy	292,230
						Load excavated spoils	25,100.00 cy	0.74 /cy	0.00 /cy	-	0.81 /cy	-	1.55 /cy	38,963	2.37 /cy	59,526
						Cycle hlng(,load,traw,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 2 mile,25 mph,exclds loadng eqpmnt	25,100.00 CY	0.71 /CY	-	-	2.54 /CY	-	3.24 /CY	81,354	4.95 /CY	124,290
						Compaction, water for, 3000 gallon truck, 3 mile haul	25,100.00 cy	0.78 /cy	0.00 /cy	-	0.53 /cy	-	1.31 /cy	32,913	2.00 /cy	50,283
						Pond and reservoir liners, membrane lining systems HDPE, 100,000 S.F. or more, 60 mil thick, per M.S.F.	1,232.00 msf	252.21 /msf	684.00 /msf	-	51.55 /msf	-	987.75 /msf	1,216,909	1,558.64 /msf	1,920,250
						31.20.09.10 Earthworks, Sitework, Backfill	25,100.00 CY	24.07 /CY	33.57 /CY	/CY	14.34 /CY	/CY	71.99 /CY	1,806,966	112.42 /CY	2,821,720
						31.22 Earthworks, Site	25,100.00 CY	24.07 /CY	33.57 /CY	/CY	14.34 /CY	/CY	71.99 /CY	1,806,966	112.42 /CY	2,821,720
						31.0 Earthwork	**25,100.00 CY**	**24.07 /CY**	**33.57 /CY**	**/CY**	**14.34 /CY**	**/CY**	**71.99 /CY**	**1,806,966**	**112.42 /CY**	**2,821,720**
						31.00.715 Extension Reservoir Prepare Subgrade and Reservoir Liner	25,100.00 CY	24.07 /CY	33.57 /CY	/CY	14.34 /CY	/CY	71.99 /CY	1,806,966	112.42 /CY	2,821,720
		31.00.716				Extension Reservoir Approach Channel Concrete Apron										
			03.0			**Concrete Work**										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.12	Cast-In-Place Concrete, Slabs on Grade, 12" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,358.00 sfca	8.32 /sfca	0.97 /sfca	-	-	-	9.29 /sfca	12,611	14.26 /sfca	19,363
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	185.40 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	476,653	4,014.81 /ton	744,345
						Reinforcing in place, unloading & sorting, add to above - slabs	185.40 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	10,328	85.10 /ton	15,778
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	185.40 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	11,226	92.50 /ton	17,150
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	2,160.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	282,960	209.64 /cy	452,812
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	2,118.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	61,424	44.31 /CY	93,841
						Cfnsh,flrs,for spcf mdm accs flrs aci clss 1,2,3 and 4,achv a cmps owl flr flt\n&lvn val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	57,186.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	53,564	1.43 /sf	81,833
						Curing, sprayed membrane curing compound	571.86 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	13,181	36.12 /csf	20,653
						Fine grading, fine grade for slab on grade, machine	6,354.00 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	11,909	2.86 /sy	18,194
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 6" deep	1,218.00 cy	20.99 /cy	37.00 /cy	-	6.81 /cy	-	64.80 /cy	78,924	101.68 /cy	123,844
						03.10.05.12 Cast-In-Place Concrete, Slabs on Grade, 12" thick	2,118.00 CY	200.87 /CY	263.90 /CY	/CY	13.40 /CY	/CY	478.18 /CY	1,012,779	749.68 /CY	1,587,814
						03.18 Cast-In-Place Concrete, Slabs on Grade	2,118.00 CY	200.87 /CY	263.90 /CY	/CY	13.40 /CY	/CY	478.18 /CY	1,012,779	749.68 /CY	1,587,814
						03.0 Concrete Work	**2,118.00 CY**	**200.87 /CY**	**263.90 /CY**	**/CY**	**13.40 /CY**	**/CY**	**478.18 /CY**	**1,012,779**	**749.68 /CY**	**1,587,814**
						31.00.716 Extension Reservoir Approach Channel Concrete Apron	2,118.00 CY	200.87 /CY	263.90 /CY	/CY	13.40 /CY	/CY	478.18 /CY	1,012,779	749.68 /CY	1,587,814
		31.00.717				Construct Check Structure #1										
			03.0			**Concrete Work**										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.07	Cast-In-Place Concrete, Slabs on Grade, 7" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	400.00 lf	5.07 /lf	0.33 /lf	-	-	-	5.40 /lf	2,161	8.28 /lf	3,311
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.00 ton	1,370.95 /ton	1,200.00 /ton	-	-	-	2,570.95 /ton	10,284	4,014.80 /ton	16,059
						Reinforcing in place, unloading & sorting, add to above - slabs	4.00 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	223	85.11 /ton	340
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	56.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	7,336	209.64 /cy	11,740
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	54.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	1,566	44.31 /CY	2,393
						Cfnsh,flrs,for spcf mdm accs flrs aci clss 1,2,3 and 4,achv a cmps owl flr flt\n&lvn val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,496.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	2,338	1.43 /sf	3,572
						Curing, sprayed membrane curing compound	24.96 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	575	36.12 /csf	901
						Fine grading, fine grade for slab on grade, machine	277.33 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	520	2.86 /sy	794
						03.10.05.07 Cast-In-Place Concrete, Slabs on Grade, 7" thick	54.00 CY	219.33 /CY	232.94 /CY	/CY	10.75 /CY	/CY	463.02 /CY	25,003	724.27 /CY	39,111
					03.10.05.16	Cast-In-Place Concrete, Slabs on Grade, 16" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	440.00 sfca	8.32 /sfca	0.97 /sfca	-	-	-	9.29 /sfca	4,086	14.26 /sfca	6,274
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	27.20 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	69,930	4,014.81 /ton	109,203
						Reinforcing in place, unloading & sorting, add to above - slabs	27.20 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	1,515	85.10 /ton	2,315
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	27.20 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	1,647	92.50 /ton	2,516
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	373.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	48,863	209.64 /cy	78,194
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	362.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	10,498	44.31 /CY	16,039
						Cfnsh,flrs,for spcf mdm accs flrs aci clss 1,2,3 and 4,achv a cmps owl flr flt\n&lvn val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,433.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	6,026	1.43 /sf	9,206
						Curing, sprayed membrane curing compound	64.33 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	1,483	36.12 /csf	2,323
						Fine grading, fine grade for slab on grade, machine	714.78 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	1,340	2.86 /sy	2,047
						03.10.05.16 Cast-In-Place Concrete, Slabs on Grade, 16" thick	362.00 CY	164.71 /CY	228.54 /CY	/CY	8.38 /CY	/CY	401.62 /CY	145,387	630.15 /CY	228,116
						03.18 Cast-In-Place Concrete, Slabs on Grade	416.00 CY	171.80 /CY	229.11 /CY	/CY	8.69 /CY	/CY	409.59 /CY	170,390	642.37 /CY	267,226
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	6,760.00 sfca	9.29 /sfca	5.45 /sfca	-	-	-	14.74 /sfca	99,626	22.91 /sfca	154,876
						Form oil, coverage varies greatly, maximum, includes material only	18.00 gal	-	23.50 /gal	-	-	-	23.50 /gal	423	37.61 /gal	677
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.50 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	42,421	4,014.81 /ton	66,244
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	16.50 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	919	85.10 /ton	1,404
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	16.50 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	999	92.50 /ton	1,526
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	194.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	25,414	209.64 /cy	40,669
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	188.00 CY	36.16 /CY	-	-	8.55 /CY	-	44.71 /CY	8,405	68.31 /CY	12,841
						Concrete finishing, walls, includes breaking ties and patching voids	6,760.00 sf	0.98 /sf	0.04 /sf	-	-	-	1.02 /sf	6,890	1.56 /sf	10,547
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	188.00 CY	534.66 /CY	440.16 /CY	/CY	9.74 /CY	/CY	984.56 /CY	185,097	1,536.09 /CY	288,785
						03.20 Cast-In-Place Concrete, Straight Walls	188.00 CY	534.66 /CY	440.16 /CY	/CY	9.74 /CY	/CY	984.56 /CY	185,097	1,536.09 /CY	288,785
						03.0 Concrete Work	**604.00 CY**	**284.74 /CY**	**294.80 /CY**	**/CY**	**9.02 /CY**	**/CY**	**588.56 /CY**	**355,487**	**920.55 /CY**	**556,012**
			05.0			**Metals**										
				05.50		Metal Fabrications										

Detail Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
					05.50.02.50	Metals, Elevated Platforms, Complete										
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	88.00 lf	21.19 /lf	90.50 /lf	-	0.79 /lf	-	112.48 /lf	9,898	178.40 /lf	15,699
						Metal Grating Catwalk	315.00 SF			80.00 /SF			80.00 /SF	25,200	122.22 /SF	38,500
						Miscellaneous Consumables Allowance	1.00 ls	0.00 /ls	0.00 /ls	5,000.00 /ls	-	-	5,000.00 /ls	5,000	7,638.84 /ls	7,639
						05.50.02.50 Metals, Elevated Platforms, Complete	315.00 SF	5.92 /SF	25.28 /SF	95.87 /SF	0.22 /SF	/SF	127.30 /SF	40,098	196.31 /SF	61,838
						05.50 Metal Fabrications	315.00 SF	5.92 /SF	25.28 /SF	95.87 /SF	0.22 /SF	/SF	127.30 /SF	40,098	196.31 /SF	61,838
						05.0 Metals	**315.00 SF**	**5.92 /SF**	**25.28 /SF**	**95.87 /SF**	**0.22 /SF**	**/SF**	**127.30 /SF**	**40,098**	**196.31 /SF**	**61,838**
			26.0			**Electrical Work**										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Electrical Allowance	1.00 LS	26,377.28 /LS	50,000.00 /LS	-	2,800.00 /LS	-	79,177.28 /LS	79,177	144,383.84 /LS	144,384
						26.00.99.00 Electrical, Other	*6,433.00* SF	4.10 /SF	7.77 /SF	/SF	0.44 /SF	/SF	12.31 /SF	79,177	22.44 /SF	144,384
						26.00 Electrical	*6,433.00* SF	4.10 /SF	7.77 /SF	/SF	0.44 /SF	/SF	12.31 /SF	79,177	22.44 /SF	144,384
						26.0 Electrical Work	***6,433.00* SF**	**4.10 /SF**	**7.77 /SF**	**/SF**	**0.44 /SF**	**/SF**	**12.31 /SF**	**79,177**	**22.44 /SF**	**144,384**
			31.0			**Earthworks**										
				31.25		Earthworks, Structural										
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	275.00 CY	14.75 /CY	35.00 /CY	-	0.76 /CY	-	50.50 /CY	13,888	79.69 /CY	21,915
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	275.00 CY	14.75 /CY	35.00 /CY	/CY	0.76 /CY	/CY	50.50 /CY	13,888	79.69 /CY	21,915
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	700.00 CY	6.18 /CY		-	1.69 /CY	-	7.87 /CY	5,510	12.03 /CY	8,418
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	700.00 cy	1.29 /cy	-	-	0.15 /cy	-	1.44 /cy	1,006	2.20 /cy	1,537
						Compaction, water for, 6000 gallon wagon, 6 mile haul	700.00 cy	0.35 /cy	1.20 /cy	-	0.30 /cy	-	1.85 /cy	1,298	2.92 /cy	2,043
						31.25.03.00 Earthworks, Structural, Backfill	700.00 CY	7.83 /CY	1.20 /CY	/CY	2.14 /CY	/CY	11.16 /CY	7,814	17.14 /CY	11,998
						31.25 Earthworks, Structural	975.00 CY	9.78 /CY	10.73 /CY	/CY	1.75 /CY	/CY	22.26 /CY	21,701	34.78 /CY	33,913
						31.0 Earthwork	**975.00 CY**	**9.78 /CY**	**10.73 /CY**	**/CY**	**1.75 /CY**	**/CY**	**22.26 /CY**	**21,701**	**34.78 /CY**	**33,913**
			40.9			**Instrumentation & Controls**										
				40.90		Instrumentation & Controls										
					40.90.99.01	I&C, Other										
						I&C Allowance	1.00 LS	6,594.32 /LS	25,000.00 /LS	-	600.00 /LS	-	32,194.32 /LS	32,194	57,436.82 /LS	57,437
						40.90.99.01 I&C, Other	*6,433.00* SF	1.03 /SF	3.89 /SF	/SF	0.09 /SF	/SF	5.01 /SF	32,194	8.93 /SF	57,437
						40.90 Instrumentation & Controls	*6,433.00* SF	1.03 /SF	3.89 /SF	/SF	0.09 /SF	/SF	5.01 /SF	32,194	8.93 /SF	57,437
						40.9 Instrumentation & Controls	***6,433.00* SF**	**1.03 /SF**	**3.89 /SF**	**/SF**	**0.09 /SF**	**/SF**	**5.01 /SF**	**32,194**	**8.93 /SF**	**57,437**
			46.0			**Water and Wastewater Equipment**										
				40.55		Water Control Gates, Other Gates										
					40.30.06.01	Other Gates										
						Slide gates, hydraulic structures, steel, 72" x 72", incl. anchor bolts & grout	2.00 EA	8,217.34 /EA	15,000.00 /EA	-	2,042.34 /EA	-	25,259.67 /EA	50,519	39,678.42 /EA	79,357
						Langman gates, hydraulic structures, steel, 14'	3.00 EA	11,093.40 /EA	38,000.00 /EA	-	2,205.72 /EA	-	51,299.12 /EA	153,897	81,128.15 /EA	243,384
						40.30.06.01 Other Gates	5.00 EA	9,942.97 /EA	28,800.00 /EA	/EA	2,140.37 /EA	/EA	40,883.34 /EA	204,417	64,548.25 /EA	322,741
						40.55 Water Control Gates, Other Gates	5.00 EA	9,942.97 /EA	28,800.00 /EA	/EA	2,140.37 /EA	/EA	40,883.34 /EA	204,417	64,548.25 /EA	322,741
						46.0 Water and Wastewater Equipment	**5.00 EA**	**9,942.97 /EA**	**28,800.00 /EA**	**/EA**	**2,140.37 /EA**	**/EA**	**40,883.34 /EA**	**204,417**	**64,548.25 /EA**	**322,741**
						31.00.717 Construct Check Structure #1	*1.00* EA	266,067.88 /EA	415,487.86 /EA	30,200.00 /EA	21,319.16 /EA	/EA	733,074.90 /EA	733,075	1,176,324.37 /EA	1,176,324
		31.00.718				Construct Check Structure #2										
			03.0			**Concrete Work**										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.07	Cast-In-Place Concrete, Slabs on Grade, 7" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	400.00 lf	5.07 /lf	0.33 /lf	-	-	-	5.40 /lf	2,161	8.28 /lf	3,311
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.00 ton	1,370.95 /ton	1,200.00 /ton	-	-	-	2,570.95 /ton	10,284	4,014.82 /ton	16,059
						Reinforcing in place, unloading & sorting, add to above - slabs	4.00 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	223	85.10 /ton	340
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	56.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	7,336	209.64 /cy	11,740
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	54.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	1,566	44.31 /CY	2,393
						Cfnsh,flrs,for spcf mdm accs frs aci clss 1,2,3 and 4,achv a cmps owl flr flt\n&lvn val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,496.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	2,338	1.43 /sf	3,572
						Curing, sprayed membrane curing compound	24.96 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	575	36.12 /csf	901
						Fine grading, fine grade for slab on grade, machine	277.33 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	520	2.86 /sy	794
						03.10.05.07 Cast-In-Place Concrete, Slabs on Grade, 7" thick	54.00 CY	219.33 /CY	232.94 /CY	/CY	10.75 /CY	/CY	463.02 /CY	25,003	724.27 /CY	39,111
					03.10.05.16	Cast-In-Place Concrete, Slabs on Grade, 16" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	440.00 sfca	8.32 /sfca	0.97 /sfca	-	-	-	9.29 /sfca	4,086	14.26 /sfca	6,274
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	27.20 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	69,930	4,014.81 /ton	109,203
						Reinforcing in place, unloading & sorting, add to above - slabs	27.20 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	1,515	85.10 /ton	2,315
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	27.20 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	1,647	92.50 /ton	2,516
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	373.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	48,863	209.64 /cy	78,194
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	362.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	10,498	44.31 /CY	16,039
						Cfnsh,flrs,for spcf mdm accs frs aci clss 1,2,3 and 4,achv a cmps owl flr flt\n&lvn val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,433.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	6,026	1.43 /sf	9,206
						Curing, sprayed membrane curing compound	64.33 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	1,483	36.12 /csf	2,323
						Fine grading, fine grade for slab on grade, machine	714.78 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	1,340	2.86 /sy	2,047
						03.10.05.16 Cast-In-Place Concrete, Slabs on Grade, 16" thick	362.00 CY	164.71 /CY	228.54 /CY	/CY	8.38 /CY	/CY	401.62 /CY	145,387	630.15 /CY	228,116
						03.18 Cast-In-Place Concrete, Slabs on Grade	416.00 CY	171.80 /CY	229.11 /CY	/CY	8.69 /CY	/CY	409.59 /CY	170,390	642.37 /CY	267,226
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	6,760.00 sfca	9.29 /sfca	5.45 /sfca	-	-	-	14.74 /sfca	99,626	22.91 /sfca	154,876
						Form oil, coverage varies greatly, maximum, includes material only	18.00 gal	-	23.50 /gal	-	-	-	23.50 /gal	423	37.61 /gal	677
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.50 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	42,421	4,014.81 /ton	66,244
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	16.50 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	919	85.10 /ton	1,404
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	16.50 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	999	92.50 /ton	1,526
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	194.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	25,414	209.64 /cy	40,669
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	188.00 CY	36.16 /CY	-	-	8.55 /CY	-	44.71 /CY	8,405	68.31 /CY	12,841
						Concrete finishing, walls, includes breaking ties and patching voids	6,760.00 sf	0.98 /sf	0.04 /sf	-	-	-	1.02 /sf	6,890	1.56 /sf	10,547

Detail Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	188.00 CY	534.66 /CY	440.16 /CY	/CY	9.74 /CY	/CY	984.56 /CY	185,097	1,536.09 /CY	288,785
						03.20 Cast-In-Place Concrete, Straight Walls	188.00 CY	534.66 /CY	440.16 /CY	/CY	9.74 /CY	/CY	984.56 /CY	185,097	1,536.09 /CY	288,785
						03.0 Concrete Work	**604.00 CY**	**284.74 /CY**	**294.80 /CY**	**/CY**	**9.02 /CY**	**/CY**	**588.56 /CY**	**355,487**	**920.55 /CY**	**556,012**
			05.0			**Metals**										
				05.50		Metal Fabrications										
					05.50.02.50	Metals, Elevated Platforms, Complete										
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	88.00 lf	21.19 /lf	90.50 /lf	-	0.79 /lf	-	112.48 /lf	9,898	178.40 /lf	15,699
						Metal Grating Catwalk	315.00 SF			80.00 /SF		-	80.00 /SF	25,200	122.22 /SF	38,500
						Miscellaneous Consumables Allowance	1.00 ls			5,000.00 /ls	-	-	5,000.00 /ls	5,000	7,638.83 /ls	7,639
						05.50.02.50 Metals, Elevated Platforms, Complete	315.00 SF	5.92 /SF	25.28 /SF	95.87 /SF	0.22 /SF	/SF	127.30 /SF	40,098	196.31 /SF	61,838
						05.50 Metal Fabrications	315.00 SF	5.92 /SF	25.28 /SF	95.87 /SF	0.22 /SF	/SF	127.30 /SF	40,098	196.31 /SF	61,838
						05.0 Metals	**315.00 SF**	**5.92 /SF**	**25.28 /SF**	**95.87 /SF**	**0.22 /SF**	**/SF**	**127.30 /SF**	**40,098**	**196.31 /SF**	**61,838**
			26.0			**Electrical Work**										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Electrical Allowance	1.00 LS	26,377.28 /LS	50,000.00 /LS	-	2,800.00 /LS	-	79,177.28 /LS	79,177	144,383.83 /LS	144,384
						26.00.99.00 Electrical, Other	*6,433.00* SF	4.10 /SF	7.77 /SF	/SF	0.44 /SF	/SF	12.31 /SF	79,177	22.44 /SF	144,384
						26.00 Electrical	*6,433.00* SF	4.10 /SF	7.77 /SF	/SF	0.44 /SF	/SF	12.31 /SF	79,177	22.44 /SF	144,384
						26.0 Electrical Work	***6,433.00* SF**	**4.10 /SF**	**7.77 /SF**	**/SF**	**0.44 /SF**	**/SF**	**12.31 /SF**	**79,177**	**22.44 /SF**	**144,384**
			31.0			**Earthwork**										
				31.25		Earthworks, Structural										
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	275.00 CY	14.75 /CY	35.00 /CY	-	0.76 /CY	-	50.50 /CY	13,888	79.69 /CY	21,915
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	275.00 CY	14.75 /CY	35.00 /CY	/CY	0.76 /CY	/CY	50.50 /CY	13,888	79.69 /CY	21,915
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	700.00 CY	6.18 /CY		-	1.69 /CY	-	7.87 /CY	5,510	12.03 /CY	8,418
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	700.00 cy	1.29 /cy	-	-	0.15 /cy	-	1.44 /cy	1,006	2.20 /cy	1,537
						Compaction, water for, 6000 gallon wagon, 6 mile haul	700.00 cy	0.35 /cy	1.20 /cy	-	0.30 /cy	-	1.85 /cy	1,298	2.92 /cy	2,043
						31.25.03.00 Earthworks, Structural, Backfill	700.00 CY	7.83 /CY	1.20 /CY	/CY	2.14 /CY	/CY	11.16 /CY	7,814	17.14 /CY	11,998
						31.25 Earthworks, Structural	975.00 CY	9.78 /CY	10.73 /CY	/CY	1.75 /CY	/CY	22.26 /CY	21,701	34.78 /CY	33,913
						31.0 Earthwork	**975.00 CY**	**9.78 /CY**	**10.73 /CY**	**/CY**	**1.75 /CY**	**/CY**	**22.26 /CY**	**21,701**	**34.78 /CY**	**33,913**
			40.9			**Instrumentation & Controls**										
				40.90		Instrumentation & Controls										
					40.90.99.01	I&C, Other										
						I&C Allowance	1.00 LS	6,594.32 /LS	25,000.00 /LS	-	600.00 /LS	-	32,194.32 /LS	32,194	57,436.82 /LS	57,437
						40.90.99.01 I&C, Other	*6,433.00* SF	1.03 /SF	3.89 /SF	/SF	0.09 /SF	/SF	5.01 /SF	32,194	8.93 /SF	57,437
						40.90 Instrumentation & Controls	*6,433.00* SF	1.03 /SF	3.89 /SF	/SF	0.09 /SF	/SF	5.01 /SF	32,194	8.93 /SF	57,437
						40.9 Instrumentation & Controls	***6,433.00* SF**	**1.03 /SF**	**3.89 /SF**	**/SF**	**0.09 /SF**	**/SF**	**5.01 /SF**	**32,194**	**8.93 /SF**	**57,437**
			46.0			**Water and Wastewater Equipment**										
				40.55		Water Control Gates, Other Gates										
					40.30.06.01	Other Gates										
						Slide gates, hydraulic structures, steel, 72" x 72", incl. anchor bolts & grout	2.00 EA	8,217.34 /EA	15,000.00 /EA	-	2,042.34 /EA	-	25,259.67 /EA	50,519	39,678.42 /EA	79,357
						Langman gates, hydraulic structures, steel, 14'	3.00 EA	11,093.40 /EA	38,000.00 /EA	-	2,205.72 /EA	-	51,299.12 /EA	153,897	81,128.15 /EA	243,384
						40.30.06.01 Other Gates	5.00 EA	9,942.97 /EA	28,800.00 /EA	/EA	2,140.37 /EA	/EA	40,883.34 /EA	204,417	64,548.26 /EA	322,741
						40.55 Water Control Gates, Other Gates	5.00 EA	9,942.97 /EA	28,800.00 /EA	/EA	2,140.37 /EA	/EA	40,883.34 /EA	204,417	64,548.26 /EA	322,741
						46.0 Water and Wastewater Equipment	**5.00 EA**	**9,942.97 /EA**	**28,800.00 /EA**	**/EA**	**2,140.37 /EA**	**/EA**	**40,883.34 /EA**	**204,417**	**64,548.26 /EA**	**322,741**
						31.00.718 Construct Check Structure #2	*1.00* EA	266,067.88 /EA	415,487.86 /EA	30,200.00 /EA	21,319.16 /EA	/EA	733,074.90 /EA	733,075	1,176,324.39 /EA	1,176,324
		31.00.720				Construct Check Structure #3										
			03.0			**Concrete Work**										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.07	Cast-In-Place Concrete, Slabs on Grade, 7" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	400.00 lf	5.07 /lf	0.33 /lf	-	-	-	5.40 /lf	2,161	8.28 /lf	3,311
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.00 ton	1,370.95 /ton	1,200.00 /ton	-	-	-	2,570.95 /ton	10,284	4,014.81 /ton	16,059
						Reinforcing in place, unloading & sorting, add to above - slabs	4.00 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	223	85.11 /ton	340
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	56.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	7,336	209.64 /cy	11,740
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	54.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	1,566	44.31 /CY	2,393
						Cfnsh,flrs,for spcf mdm accs frs aci clss 1,2,3 and 4,achv a cmps owl flr flt\n&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,496.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	2,338	1.43 /sf	3,572
						Curing, sprayed membrane curing compound	24.96 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	575	36.11 /csf	901
						Fine grading, fine grade for slab on grade, machine	277.33 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	520	2.86 /sy	794
						03.10.05.07 Cast-In-Place Concrete, Slabs on Grade, 7" thick	54.00 CY	219.33 /CY	232.94 /CY	/CY	10.75 /CY	/CY	463.02 /CY	25,003	724.27 /CY	39,111
					03.10.05.16	Cast-In-Place Concrete, Slabs on Grade, 16" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	440.00 sfca	8.32 /sfca	0.97 /sfca	-	-	-	9.29 /sfca	4,086	14.26 /sfca	6,274
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	27.20 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	69,930	4,014.81 /ton	109,203
						Reinforcing in place, unloading & sorting, add to above - slabs	27.20 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	1,515	85.10 /ton	2,315
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	27.20 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	1,647	92.51 /ton	2,516
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	373.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	48,863	209.64 /cy	78,194
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	362.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	10,498	44.31 /CY	16,039
						Cfnsh,flrs,for spcf mdm accs frs aci clss 1,2,3 and 4,achv a cmps owl flr flt\n&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,433.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	6,026	1.43 /sf	9,206
						Curing, sprayed membrane curing compound	64.33 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	1,483	36.12 /csf	2,323
						Fine grading, fine grade for slab on grade, machine	714.78 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	1,340	2.86 /sy	2,047
						03.10.05.16 Cast-In-Place Concrete, Slabs on Grade, 16" thick	362.00 CY	164.71 /CY	228.54 /CY	/CY	8.38 /CY	/CY	401.62 /CY	145,387	630.15 /CY	228,116
						03.18 Cast-In-Place Concrete, Slabs on Grade	416.00 CY	171.80 /CY	229.11 /CY	/CY	8.69 /CY	/CY	409.59 /CY	170,390	642.37 /CY	267,226
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	6,760.00 sfca	9.29 /sfca	5.45 /sfca	-	-	-	14.74 /sfca	99,626	22.91 /sfca	154,876
						Form oil, coverage varies greatly, maximum, includes material only	18.00 gal	-	23.50 /gal	-	-	-	23.50 /gal	423	37.61 /gal	677
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.50 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	42,421	4,014.81 /ton	66,244
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	16.50 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	919	85.10 /ton	1,404
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	16.50 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	999	92.50 /ton	1,526

Detail Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick										
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	194.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	25,414	209.64 /cy	40,669
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	188.00 CY	36.16 /CY	-	-	8.55 /CY	-	44.71 /CY	8,405	68.31 /CY	12,842
						Concrete finishing, walls, includes breaking ties and patching voids	6,760.00 sf	0.98 /sf	0.04 /sf	-	-	-	1.02 /sf	6,890	1.56 /sf	10,547
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	188.00 CY	534.66 /CY	440.16 /CY	/CY	9.74 /CY	/CY	984.56 /CY	185,097	1,536.09 /CY	288,785
						03.20 Cast-In-Place Concrete, Straight Walls	188.00 CY	534.66 /CY	440.16 /CY	/CY	9.74 /CY	/CY	984.56 /CY	185,097	1,536.09 /CY	288,785
						03.0 Concrete Work	**604.00 CY**	**284.74 /CY**	**294.80 /CY**	**/CY**	**9.02 /CY**	**/CY**	**588.56 /CY**	**355,487**	**920.55 /CY**	**556,012**
			05.0			**Metals**										
				05.50		Metal Fabrications										
					05.50.02.50	Metals, Elevated Platforms, Complete										
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	88.00 lf	21.19 /lf	90.50 /lf	-	0.79 /lf	-	112.48 /lf	9,898	178.40 /lf	15,699
						Metal Grating Catwalk	315.00 SF			80.00 /SF		-	80.00 /SF	25,200	122.22 /SF	38,500
						Miscellaneous Consumables Allowance	1.00 ls			5,000.00 /ls	-	-	5,000.00 /ls	5,000	7,638.84 /ls	7,639
						05.50.02.50 Metals, Elevated Platforms, Complete	315.00 SF	5.92 /SF	25.28 /SF	95.87 /SF	0.22 /SF	/SF	127.30 /SF	40,098	196.31 /SF	61,838
						05.50 Metal Fabrications	315.00 SF	5.92 /SF	25.28 /SF	95.87 /SF	0.22 /SF	/SF	127.30 /SF	40,098	196.31 /SF	61,838
						05.0 Metals	**315.00 SF**	**5.92 /SF**	**25.28 /SF**	**95.87 /SF**	**0.22 /SF**	**/SF**	**127.30 /SF**	**40,098**	**196.31 /SF**	**61,838**
			26.0			**Electrical Work**										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Electrical Allowance	1.00 LS	26,377.28 /LS	50,000.00 /LS	-	2,800.00 /LS	-	79,177.28 /LS	79,177	144,383.84 /LS	144,384
						26.00.99.00 Electrical, Other	*6,433.00* SF	4.10 /SF	7.77 /SF	/SF	0.44 /SF	/SF	12.31 /SF	79,177	22.44 /SF	144,384
						26.00 Electrical	*6,433.00* SF	4.10 /SF	7.77 /SF	/SF	0.44 /SF	/SF	12.31 /SF	79,177	22.44 /SF	144,384
						26.0 Electrical Work	***6,433.00* SF**	**4.10 /SF**	**7.77 /SF**	**/SF**	**0.44 /SF**	**/SF**	**12.31 /SF**	**79,177**	**22.44 /SF**	**144,384**
			31.0			**Earthwork**										
				31.25		Earthworks, Structural										
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	275.00 CY	14.75 /CY	35.00 /CY	-	0.76 /CY	-	50.50 /CY	13,888	79.69 /CY	21,915
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	275.00 CY	14.75 /CY	35.00 /CY	/CY	0.76 /CY	/CY	50.50 /CY	13,888	79.69 /CY	21,915
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	700.00 CY	6.18 /CY		-	1.69 /CY	-	7.87 /CY	5,510	12.03 /CY	8,418
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	700.00 cy	1.29 /cy	-	-	0.15 /cy	-	1.44 /cy	1,006	2.20 /cy	1,537
						Compaction, water for, 6000 gallon wagon, 6 mile haul	700.00 cy	0.35 /cy	1.20 /cy	-	0.30 /cy	-	1.85 /cy	1,298	2.92 /cy	2,043
						31.25.03.00 Earthworks, Structural, Backfill	700.00 CY	7.83 /CY	1.20 /CY	/CY	2.14 /CY	/CY	11.16 /CY	7,814	17.14 /CY	11,998
						31.25 Earthworks, Structural	975.00 CY	9.78 /CY	10.73 /CY	/CY	1.75 /CY	/CY	22.26 /CY	21,701	34.78 /CY	33,913
						31.0 Earthwork	**975.00 CY**	**9.78 /CY**	**10.73 /CY**	**/CY**	**1.75 /CY**	**/CY**	**22.26 /CY**	**21,701**	**34.78 /CY**	**33,913**
			40.9			**Instrumentation & Controls**										
				40.90		Instrumentation & Controls										
					40.90.99.01	I&C, Other										
						I&C Allowance	1.00 LS	6,594.32 /LS	25,000.00 /LS	-	600.00 /LS	-	32,194.32 /LS	32,194	57,436.83 /LS	57,437
						40.90.99.01 I&C, Other	*6,433.00* SF	1.03 /SF	3.89 /SF	/SF	0.09 /SF	/SF	5.01 /SF	32,194	8.93 /SF	57,437
						40.90 Instrumentation & Controls	*6,433.00* SF	1.03 /SF	3.89 /SF	/SF	0.09 /SF	/SF	5.01 /SF	32,194	8.93 /SF	57,437
						40.9 Instrumentation & Controls	***6,433.00* SF**	**1.03 /SF**	**3.89 /SF**	**/SF**	**0.09 /SF**	**/SF**	**5.01 /SF**	**32,194**	**8.93 /SF**	**57,437**
			46.0			**Water and Wastewater Equipment**										
				40.55		Water Control Gates, Other Gates										
					40.30.06.01	Other Gates										
						Slide gates, hydraulic structures, steel, 72" x 72", incl. anchor bolts & grout	2.00 EA	8,217.34 /EA	15,000.00 /EA	-	2,042.34 /EA	-	25,259.67 /EA	50,519	39,678.41 /EA	79,357
						Langman gates, hydraulic structures, steel, 14'	3.00 EA	11,093.40 /EA	38,000.00 /EA	-	2,205.72 /EA	-	51,299.12 /EA	153,897	81,128.15 /EA	243,384
						40.30.06.01 Other Gates	5.00 EA	9,942.97 /EA	28,800.00 /EA	/EA	2,140.37 /EA	/EA	40,883.34 /EA	204,417	64,548.25 /EA	322,741
						40.55 Water Control Gates, Other Gates	5.00 EA	9,942.97 /EA	28,800.00 /EA	/EA	2,140.37 /EA	/EA	40,883.34 /EA	204,417	64,548.25 /EA	322,741
						46.0 Water and Wastewater Equipment	**5.00 EA**	**9,942.97 /EA**	**28,800.00 /EA**	**/EA**	**2,140.37 /EA**	**/EA**	**40,883.34 /EA**	**204,417**	**64,548.25 /EA**	**322,741**
						31.00.720 Construct Check Structure #3	*1.00* EA	266,067.88 /EA	415,487.86 /EA	30,200.00 /EA	21,319.16 /EA	/EA	733,074.90 /EA	733,075	1,176,324.37 /EA	1,176,324
		31.00.721				Construct Check Structure #4										
			03.0			**Concrete Work**										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.07	Cast-In-Place Concrete, Slabs on Grade, 7" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	400.00 lf	5.07 /lf	0.33 /lf	-	-	-	5.40 /lf	2,161	8.28 /lf	3,312
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.00 ton	1,370.95 /ton	1,200.00 /ton	-	-	-	2,570.95 /ton	10,284	4,014.81 /ton	16,059
						Reinforcing in place, unloading & sorting, add to above - slabs	4.00 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	223	85.10 /ton	340
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	56.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	7,336	209.64 /cy	11,740
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	54.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	1,566	44.31 /CY	2,393
						Cfnsh,flrs,for spcf mdm accs frs aci clss 1,2,3 and 4,achv a cmps owl flr flt&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	2,496.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	2,338	1.43 /sf	3,572
						Curing, sprayed membrane curing compound	24.96 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	575	36.12 /csf	901
						Fine grading, fine grade for slab on grade, machine	277.33 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	520	2.86 /sy	794
						03.10.05.07 Cast-In-Place Concrete, Slabs on Grade, 7" thick	54.00 CY	219.33 /CY	232.94 /CY	/CY	10.75 /CY	/CY	463.02 /CY	25,003	724.27 /CY	39,111
					03.10.05.16	Cast-In-Place Concrete, Slabs on Grade, 16" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	440.00 sfca	8.32 /sfca	0.97 /sfca	-	-	-	9.29 /sfca	4,086	14.26 /sfca	6,274
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	27.20 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	69,930	4,014.81 /ton	109,203
						Reinforcing in place, unloading & sorting, add to above - slabs	27.20 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	1,515	85.10 /ton	2,315
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	27.20 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	1,647	92.50 /ton	2,516
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	373.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	48,863	209.64 /cy	78,194
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	362.00 CY	23.45 /CY	-	-	5.55 /CY	-	29.00 /CY	10,498	44.31 /CY	16,039
						Cfnsh,flrs,for spcf mdm accs frs aci clss 1,2,3 and 4,achv a cmps owl flr flt&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,433.00 sf	0.91 /sf	-	-	0.03 /sf	-	0.94 /sf	6,026	1.43 /sf	9,206
						Curing, sprayed membrane curing compound	64.33 csf	10.60 /csf	12.45 /csf	-	-	-	23.05 /csf	1,483	36.12 /csf	2,323
						Fine grading, fine grade for slab on grade, machine	714.78 sy	1.19 /sy	-	-	0.68 /sy	-	1.87 /sy	1,340	2.86 /sy	2,047
						03.10.05.16 Cast-In-Place Concrete, Slabs on Grade, 16" thick	362.00 CY	164.71 /CY	228.54 /CY	/CY	8.38 /CY	/CY	401.62 /CY	145,387	630.15 /CY	228,116
						03.18 Cast-In-Place Concrete, Slabs on Grade	416.00 CY	171.80 /CY	229.11 /CY	/CY	8.69 /CY	/CY	409.59 /CY	170,390	642.37 /CY	267,226
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick										

Detail Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
					03.10.06.18	Cast-In-Place Concrete, Straight Walls, 18" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	6,760.00 sfca	9.29 /sfca	5.45 /sfca	-	-	-	14.74 /sfca	99,626	22.91 /sfca	154,876
						Form oil, coverage varies greatly, maximum, includes material only	18.00 gal		23.50 /gal	-	-	-	23.50 /gal	423	37.61 /gal	677
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.50 ton	1,370.94 /ton	1,200.00 /ton	-	-	-	2,570.94 /ton	42,421	4,014.81 /ton	66,244
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	16.50 ton	49.21 /ton	-	-	6.50 /ton	-	55.71 /ton	919	85.10 /ton	1,404
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	16.50 ton	53.49 /ton	-	-	7.06 /ton	-	60.55 /ton	999	92.50 /ton	1,526
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	194.00 cy	-	131.00 /cy	-	-	-	131.00 /cy	25,414	209.64 /cy	40,669
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	188.00 CY	36.16 /CY	-	-	8.55 /CY	-	44.71 /CY	8,405	68.31 /CY	12,841
						Concrete finishing, walls, includes breaking ties and patching voids	6,760.00 sf	0.98 /sf	0.04 /sf	-	-	-	1.02 /sf	6,890	1.56 /sf	10,547
						03.10.06.18 Cast-In-Place Concrete, Straight Walls, 18" thick	188.00 CY	534.66 /CY	440.16 /CY	/CY	9.74 /CY	/CY	984.56 /CY	185,097	1,536.09 /CY	288,785
						03.20 Cast-In-Place Concrete, Straight Walls	188.00 CY	534.66 /CY	440.16 /CY	/CY	9.74 /CY	/CY	984.56 /CY	185,097	1,536.09 /CY	288,785
						03.0 Concrete Work	**604.00 CY**	**284.74 /CY**	**294.80 /CY**	**/CY**	**9.02 /CY**	**/CY**	**588.56 /CY**	**355,487**	**920.55 /CY**	**556,012**
			05.0			**Metals**										
				05.50		Metal Fabrications										
					05.50.02.50	Metals, Elevated Platforms, Complete										
						Railing, pipe, aluminum, clear finish, 3 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	88.00 lf	21.19 /lf	90.50 /lf	-	0.79 /lf	-	112.48 /lf	9,898	178.40 /lf	15,699
						Metal Grating Catwalk	315.00 SF			80.00 /SF		-	80.00 /SF	25,200	122.22 /SF	38,500
						Miscellaneous Consumables Allowance	1.00 ls			5,000.00 /ls	-	-	5,000.00 /ls	5,000	7,638.85 /ls	7,639
						05.50.02.50 Metals, Elevated Platforms, Complete	315.00 SF	5.92 /SF	25.28 /SF	95.87 /SF	0.22 /SF	/SF	127.30 /SF	40,098	196.31 /SF	61,838
						05.50 Metal Fabrications	315.00 SF	5.92 /SF	25.28 /SF	95.87 /SF	0.22 /SF	/SF	127.30 /SF	40,098	196.31 /SF	61,838
						05.0 Metals	**315.00 SF**	**5.92 /SF**	**25.28 /SF**	**95.87 /SF**	**0.22 /SF**	**/SF**	**127.30 /SF**	**40,098**	**196.31 /SF**	**61,838**
			26.0			**Electrical Work**										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Electrical Allowance	1.00 LS	26,377.28 /LS	50,000.00 /LS	-	2,800.00 /LS	-	79,177.28 /LS	79,177	144,383.83 /LS	144,384
						26.00.99.00 Electrical, Other	*6,433.00* SF	4.10 /SF	7.77 /SF	/SF	0.44 /SF	/SF	12.31 /SF	79,177	22.44 /SF	144,384
						26.00 Electrical	*6,433.00* SF	4.10 /SF	7.77 /SF	/SF	0.44 /SF	/SF	12.31 /SF	79,177	22.44 /SF	144,384
						26.0 Electrical Work	***6,433.00* SF**	**4.10 /SF**	**7.77 /SF**	**/SF**	**0.44 /SF**	**/SF**	**12.31 /SF**	**79,177**	**22.44 /SF**	**144,384**
			31.0			**Earthwork**										
				31.25		Earthworks, Structural										
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	275.00 CY	14.75 /CY	35.00 /CY	-	0.76 /CY	-	50.50 /CY	13,888	79.69 /CY	21,915
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	275.00 CY	14.75 /CY	35.00 /CY	/CY	0.76 /CY	/CY	50.50 /CY	13,888	79.69 /CY	21,915
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	700.00 CY	6.18 /CY		-	1.69 /CY	-	7.87 /CY	5,510	12.03 /CY	8,418
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	700.00 cy	1.29 /cy	-	-	0.15 /cy	-	1.44 /cy	1,006	2.20 /cy	1,537
						Compaction, water for, 6000 gallon wagon, 6 mile haul	700.00 cy	0.35 /cy	1.20 /cy	-	0.30 /cy	-	1.85 /cy	1,298	2.92 /cy	2,043
						31.25.03.00 Earthworks, Structural, Backfill	700.00 CY	7.83 /CY	1.20 /CY	/CY	2.14 /CY	/CY	11.16 /CY	7,814	17.14 /CY	11,998
						31.25 Earthworks, Structural	975.00 CY	9.78 /CY	10.73 /CY	/CY	1.75 /CY	/CY	22.26 /CY	21,701	34.78 /CY	33,913
						31.0 Earthwork	**975.00 CY**	**9.78 /CY**	**10.73 /CY**	**/CY**	**1.75 /CY**	**/CY**	**22.26 /CY**	**21,701**	**34.78 /CY**	**33,913**
			40.9			**Instrumentation & Controls**										
				40.90		Instrumentation & Controls										
					40.90.99.01	I&C, Other										
						I&C Allowance	1.00 LS	6,594.32 /LS	25,000.00 /LS	-	600.00 /LS	-	32,194.32 /LS	32,194	57,436.80 /LS	57,437
						40.90.99.01 I&C, Other	*6,433.00* SF	1.03 /SF	3.89 /SF	/SF	0.09 /SF	/SF	5.01 /SF	32,194	8.93 /SF	57,437
						40.90 Instrumentation & Controls	*6,433.00* SF	1.03 /SF	3.89 /SF	/SF	0.09 /SF	/SF	5.01 /SF	32,194	8.93 /SF	57,437
						40.9 Instrumentation & Controls	***6,433.00* SF**	**1.03 /SF**	**3.89 /SF**	**/SF**	**0.09 /SF**	**/SF**	**5.01 /SF**	**32,194**	**8.93 /SF**	**57,437**
			46.0			**Water and Wastewater Equipment**										
				40.55		Water Control Gates, Other Gates										
					40.30.06.01	Other Gates										
						Slide gates, hydraulic structures, steel, 72" x 72", incl. anchor bolts & grout	2.00 EA	8,217.34 /EA	15,000.00 /EA	-	2,042.34 /EA	-	25,259.67 /EA	50,519	39,678.42 /EA	79,357
						Langman gates, hydraulic structures, steel, 14'	3.00 EA	11,093.40 /EA	38,000.00 /EA	-	2,205.72 /EA	-	51,299.12 /EA	153,897	81,128.15 /EA	243,384
						40.30.06.01 Other Gates	5.00 EA	9,942.97 /EA	28,800.00 /EA	/EA	2,140.37 /EA	/EA	40,883.34 /EA	204,417	64,548.26 /EA	322,741
						40.55 Water Control Gates, Other Gates	5.00 EA	9,942.97 /EA	28,800.00 /EA	/EA	2,140.37 /EA	/EA	40,883.34 /EA	204,417	64,548.26 /EA	322,741
						46.0 Water and Wastewater Equipment	**5.00 EA**	**9,942.97 /EA**	**28,800.00 /EA**	**/EA**	**2,140.37 /EA**	**/EA**	**40,883.34 /EA**	**204,417**	**64,548.26 /EA**	**322,741**
						31.00.721 Construct Check Structure #4	*1.00* EA	266,067.88 /EA	415,487.86 /EA	30,200.00 /EA	21,319.16 /EA	/EA	733,074.90 /EA	733,075	1,176,324.39 /EA	1,176,324
		31.00.726				Construct GCID Canal Plug										
			31.0			**Earthwork**										
				31.22		Earthworks, Site										
					31.20.09.40	Earthworks, Sitework, Embankments/Berms										
						Construct cofferdam embankment w/200 HP dozer	42,100.00 CY	1.35 /CY	-	-	1.90 /CY	-	3.25 /CY	136,855	4.97 /CY	209,083
						Load excavated spoils	42,100.00 cy	0.62 /cy		-	0.68 /cy	-	1.29 /cy	54,460	1.98 /cy	83,202
						Cycle hlng(,load,trav(,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 4 mile,25 mph,exclds loadng eqpmnt	42,100.00 cy	1.18 /cy	-	-	4.23 /cy	-	5.40 /cy	227,424	8.25 /cy	347,450
						Compaction, water for, 3000 gallon truck, 3 mile haul	42,100.00 cy	0.65 /cy		-	0.44 /cy	-	1.09 /cy	46,004	1.67 /cy	70,283
						Compaction, structural, common fill, 8" lifts, sheepsfoot	42,100.00 cy	0.74 /cy	-	-	1.09 /cy	-	1.83 /cy	76,944	2.79 /cy	117,553
						Cut & finish cofferdam top/sideslopes w/dozer	19,871.20 sy	0.74 /sy	-	-	1.05 /sy	-	1.79 /sy	35,614	2.74 /sy	54,409
						31.20.09.40 Earthworks, Sitework, Embankments/Berms	42,100.00 CY	4.88 /CY	/CY	/CY	8.83 /CY	/CY	13.71 /CY	577,301	20.95 /CY	881,981
						31.22 Earthworks, Site	42,100.00 CY	4.88 /CY	/CY	/CY	8.83 /CY	/CY	13.71 /CY	577,301	20.95 /CY	881,981
						31.0 Earthwork	**42,100.00 CY**	**4.88 /CY**	**/CY**	**/CY**	**8.83 /CY**	**/CY**	**13.71 /CY**	**577,301**	**20.95 /CY**	**881,981**
						31.00.726 Construct GCID Canal Plug	42,100.00 CY	4.88 /CY	/CY	/CY	8.83 /CY	/CY	13.71 /CY	577,301	20.95 /CY	881,981
		31.00.728				Relocate Canal Lateral										
			31.0			**Earthwork**										
				31.22		Earthworks, Site										
					31.20.07.00	Earthworks, Sitework, Cut/Fill										
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	10,100.00 CY	0.65 /CY	-	-	1.77 /CY	-	2.42 /CY	24,395	3.69 /CY	37,269
						Construct cofferdam embankment w/200 HP dozer	4,500.00 CY	1.35 /CY	-	-	1.90 /CY	-	3.25 /CY	14,628	4.97 /CY	22,349
						Load excavated spoils	5,600.00 cy	0.62 /cy		-	0.68 /cy	-	1.29 /cy	7,244	1.98 /cy	11,067
						Cycle hlng(,load,trav(,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 10 mile,25 mph,exclds loadng eqpmnt	5,600.00 lcy	0.88 /lcy	-	-	3.17 /lcy	-	4.05 /lcy	22,688	6.19 /lcy	34,663
						Compaction, water for, 3000 gallon truck, 3 mile haul	4,500.00 cy	0.65 /cy		-	0.44 /cy	-	1.09 /cy	4,917	1.67 /cy	7,512
						Compaction, structural, common fill, 8" lifts, sheepsfoot	4,500.00 cy	0.74 /cy	-	-	1.09 /cy	-	1.83 /cy	8,224	2.79 /cy	12,565
						Cut & finish cofferdam top/sideslopes w/dozer	2,130.00 sy	0.74 /sy	-	-	1.05 /sy	-	1.79 /sy	3,817	2.74 /sy	5,832
						31.20.07.00 Earthworks, Sitework, Cut/Fill	14,600.00 CY	1.98 /CY	/CY	/CY	3.91 /CY	/CY	5.89 /CY	85,914	8.99 /CY	131,257
						31.22 Earthworks, Site	14,600.00 CY	1.98 /CY	/CY	/CY	3.91 /CY	/CY	5.89 /CY	85,914	8.99 /CY	131,257
						31.0 Earthwork	**14,600.00 CY**	**1.98 /CY**	**/CY**	**/CY**	**3.91 /CY**	**/CY**	**5.89 /CY**	**85,914**	**8.99 /CY**	**131,257**
						31.00.728 Relocate Canal Lateral	*14,600.00* CY	1.98 /CY	/CY	/CY	3.91 /CY	/CY	5.89 /CY	85,914	8.99 /CY	131,257
		31.00.730				Construct I/O Canal										

Detail Report

Jacobs

Project Name: Sites Reservoir Project Task Order 1 TRR West Rev 2
Project Number: D3380602
Feasibility

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 2 / March 31, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Equip Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount	Grand Total Price	Grand Total Amount
			31.0			Earthwork										
				31.22		Earthworks, Site										
					31.20.07.00	Earthworks, Sitework, Cut/Fill										
						Excavate material at deadpool area for levee embankments, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	167,300.00 CY	0.65 /CY	-	-	1.77 /CY	-	2.42 /CY	404,079	3.69 /CY	617,340
						Construct cofferdam embankment w/200 HP dozer	16,900.00 CY	1.35 /CY	-	-	1.90 /CY	-	3.25 /CY	54,937	4.97 /CY	83,931
						Load excavated spoils	5,600.00 cy	0.62 /cy		-	0.68 /cy	-	1.29 /cy	7,244	1.98 /cy	11,067
						Cycle hing(,load,traw,unld dump&rtrn) time per cycle,excvt bornw,loose cubic yards,25 min ld/wt/,42 cy truck,cycle 10 mile,25 mph,exclds loading eqpmnt	5,600.00 lcy	0.88 /lcy	-	-	3.17 /lcy	-	4.05 /lcy	22,688	6.19 /lcy	34,662
						Compaction, water for, 3000 gallon truck, 3 mile haul	150,400.00 cy	0.65 /cy		-	0.44 /cy	-	1.09 /cy	164,346	1.67 /cy	251,083
						Compaction, structural, common fill, 8" lifts, sheepsfoot	150,400.00 cy	0.74 /cy	-	-	1.09 /cy	-	1.83 /cy	274,880	2.79 /cy	419,953
						Cut & finish cofferdam top/sideslopes w/dozer	7,980.00 sy	0.74 /sy	-	-	1.05 /sy	-	1.79 /sy	14,302	2.74 /sy	21,850
						31.20.07.00 Earthworks, Sitework, Cut/Fill	184,200.00 CY	1.93 /CY	/CY	/CY	3.19 /CY	/CY	5.12 /CY	942,477	7.82 /CY	1,439,886
						31.22 Earthworks, Site	184,200.00 CY	1.93 /CY	/CY	/CY	3.19 /CY	/CY	5.12 /CY	942,477	7.82 /CY	1,439,886
						31.0 Earthwork	184,200.00 CY	1.93 /CY	/CY	/CY	3.19 /CY	/CY	5.12 /CY	942,477	7.82 /CY	1,439,886
						31.00.730 Construct I/O Canal	184,200.00 CY	1.93 /CY	/CY	/CY	3.19 /CY	/CY	5.12 /CY	942,477	7.82 /CY	1,439,886
						07.01 TRR West Reservoir	147.60 AC	228,989.51 /AC	147,659.82 /AC	10,462.34 /AC	408,719.46 /AC	/AC	795,831.13 /AC	117,464,674	1,227,261.54 /AC	181,143,803
						07 TRR West	1.00 LS	33,798,851.24 /LS	21,794,589.29 /LS	1,544,240.98 /LS	60,326,992.58 /LS	/LS	117,464,674.09 /LS	117,464,674	181,143,802.94 /LS	181,143,803

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	33,798,851		433,196.908 hrs	
Material	21,794,589			
Allowance	1,544,241			
Equipment	60,326,993		304,369.193 hrs	
Other				
Subtotal Direct Costs	**117,464,674**	**117,464,674**		
Material Sales Tax, Dunnigan Ca	1,580,108			7.250 %
Subtotal W/ Sales Tax	**1,580,108**	**119,044,782**		
Electrical Work I,OH&P	79,177			25.000 %
Instruments & Controls I,OH&P	25,755			20.000 %
Subtotal W/ Subcontractor OH&P	**104,932**	**119,149,714**		
General Conditions	5,957,486			5.000 %
Subtotal W/ General Conditions	**5,957,486**	**125,107,200**		
Mobilization/Demobilization	3,753,216			3.000 %
Prime Contractor Overhead	12,886,042			10.000 %
Prime Contractor Profit	8,504,787			6.000 %
Bonds & Insurance	3,260,452			2.170 %
Subtotal W/ Prime Markups	**28,404,497**	**153,511,697**		
Contractor Contingency	4,605,351			3.000 %
Design Contingency	23,026,755			15.000 %
Subtotal W/ Contingency	**27,632,106**	**181,143,803**		
Total Construction Cost		**181,143,803**		
Non-Contract Costs	30,794,447			17.000 %
Total Project Costs	**30,794,447**	**211,938,250**		

TRR West PGP

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 TRR PGP Rev 3
Project Number: D3380602
Design Stage: Feasibilty

Estimator: Cavalleri/Wells - Jacobs
Revision/Date: 3 / Feb 26, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
04			***Terminal Regulating Reservoir (TRR) PGP***										
	04.01		**Terminal Regulating Reservoir (TRR) PGP**										
		03.00.300	Funk PGP Foundation Slab	5,332.00 CY	155.81 /CY	7.33 /CY	232.33 /CY	/CY	/CY	395.47 /CY	2,108,622	643.20 /CY	3,429,561
		03.00.402	TRR PGP Concrete Walls, Perimeter	2,094.00 CY	299.31 /CY	9.70 /CY	309.96 /CY	/CY	/CY	618.96 /CY	1,296,110	1,002.82 /CY	2,099,905
		03.00.404	TRR PGP Concrete Walls, Pier Walls	4,480.00 CY	349.91 /CY	9.74 /CY	338.58 /CY	/CY	/CY	698.22 /CY	3,128,034	1,130.43 /CY	5,064,322
		03.00.406	TRR PGP Elevated Slab	3,400.00 CY	243.35 /CY	7.71 /CY	243.54 /CY	/CY	/CY	494.60 /CY	1,681,625	801.02 /CY	2,723,482
		03.00.408	TRR PGP Slab on Grade @ El 130.00	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
		05.00.400	TRR PGP, Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	33,729.80 /LS	2,600.00 /LS	19,500.00 /LS	/LS	/LS	55,829.80 /LS	55,830	103,797.48 /LS	103,797
		40.00.400	TRR PGP, Process Piping	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
		44.40.400	TRR PGP, Furnish and Install Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	1,128,963.54 /EA	1,149,650.90 /EA	14,945,462	1,161,901.14 /EA	15,104,715
			04.01 Terminal Regulating Reservoir (TRR) PGP	35,990.00 SF	126.35 /SF	7.30 /SF	183.69 /SF	26.52 /SF	407.80 /SF	751.65 /SF	27,052,030	971.00 /SF	34,946,227
	04.02		**Terminal Regulating Reservoir Turbine Buildings**										
		03.00.416	TRR PGP Turbine Buildings Foundation Slab	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
		03.00.418	TRR PGP Turbine Buildings Concrete Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
		03.00.420	TRR PGP Turbine Buildings Elevated Slab	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
		04.00.400	TRR PGP Turbine Buildings Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
		05.00.402	TRR PGP Turbine Building, Metals	2.00 LS	14,950.80 /LS	4,072.24 /LS	43,590.00 /LS	30,000.00 /LS	/LS	92,613.04 /LS	185,226	168,368.48 /LS	336,737
		08.00.400	TRR PGP Turbine Building, Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
		23.00.400	TRR PGP Turbine Building, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
		26.00.000	Hydopower Generators	2.00 EA	108,531.52 /EA	10,912.00 /EA	150,000.00 /EA	/EA	3,600,000.00 /EA	3,869,443.52 /EA	7,738,887	4,104,995.23 /EA	8,209,990
		26.05.GRDG	Facility Grounding	3,250.00 SF	2.22 /SF	0.10 /SF	1.10 /SF	/SF	/SF	3.41 /SF	11,082	6.33 /SF	20,582
		26.12.SEC	Subfeed from Elec Building	600.00 LF	41.92 /LF	4.18 /LF	24.95 /LF	/LF	/LF	71.05 /LF	42,629	128.85 /LF	77,312
		26.20.DIST	Electrical Distribution Equipment	450.00 AMP	46.44 /AMP	0.79 /AMP	49.26 /AMP	/AMP	/AMP	96.49 /AMP	43,422	180.52 /AMP	81,236
		26.25.LTG	Interior Lighting and Control	1.00 LS	15,144.99 /LS	/LS	6,724.85 /LS	/LS	/LS	21,869.84 /LS	21,870	40,593.63 /LS	40,594
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	1,713.08 /LS	/LS	143.26 /LS	/LS	/LS	1,856.34 /LS	1,856	3,414.66 /LS	3,415
		26.30.DEV	Device Outlets	1.00 LS	10,060.56 /LS	/LS	6,095.20 /LS	/LS	/LS	16,155.76 /LS	16,156	30,069.22 /LS	30,069
		26.40.EQCON	Facility Equipment Connections and Controls	1.00 ALO	25,946.13 /ALO	3,000.00 /ALO	10,000.00 /ALO	/ALO	/ALO	38,946.13 /ALO	38,946	72,146.53 /ALO	72,147
		26.40.HYDTURB	13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A	600.00 LF	380.99 /LF	7.83 /LF	154.39 /LF	2.67 /LF	/LF	545.88 /LF	327,529	1,006.48 /LF	603,891
		26.41.HYDTURB	Hyd Turbine Controls Circuits	600.00 LF	164.55 /LF	7.83 /LF	29.81 /LF	/LF	/LF	202.19 /LF	121,314	367.17 /LF	220,303
		26.90.LPS	Facility Lightning Protection System	3,250.00 SF	1.44 /SF	/SF	0.78 /SF	0.46 /SF	/SF	2.68 /SF	8,702	4.97 /SF	16,142
		27.30.COMCDT	Comm Conduit to Admin	1,200.00 LF	28.15 /LF	8.36 /LF	11.74 /LF	/LF	/LF	48.25 /LF	57,904	84.06 /LF	100,871
		28.20.AC	Access Control System	2.00 DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	/DOOR	2,356.77 /DOOR	4,714	3,790.80 /DOOR	7,582
		28.20.CCTV	Closed Circuit TV and Cameras	2.00 CAM	1,701.66 /CAM	/CAM	1,730.00 /CAM	500.00 /CAM	/CAM	3,931.66 /CAM	7,863	6,732.32 /CAM	13,465
		28.20.ID	Intrusion Detection System	2.00 DOOR	2,918.94 /DOOR	/DOOR	2,000.00 /DOOR	250.00 /DOOR	/DOOR	5,168.94 /DOOR	10,338	8,331.85 /DOOR	16,664
		40.00.404	TRR PGP Turbine Building, Process Piping	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
			04.02 Terminal Regulating Reservoir Turbine Buildings	2.00 EA	949,646.57 /EA	56,945.15 /EA	1,071,136.83 /EA	64,800.00 /EA	3,600,000.00 /EA	5,742,528.56 /EA	11,485,057	7,249,460.14 /EA	14,498,920
	04.03		**TRR Reservoir Energy Dissipation Valve Structures**										
		03.00.410	TRR PGP Energy Dissipation Structures Foundation Slab	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
		03.00.412	TRR PGP Energy Dissipation Structures Concrete Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,039.07 /CY	861,391
		03.00.414	TRR PGP Energy Dissipation Structures Elevated Deck	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
		40.00.402	TRR PGP Energy Dissipation Structures Piping	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
			04.03 TRR Reservoir Energy Dissipation Valve Structures	2.00 EA	246,476.70 /EA	12,866.61 /EA	312,861.40 /EA	/EA	/EA	572,204.70 /EA	1,144,409	928,971.47 /EA	1,857,943
	04.04		**TRR Reservoir Electrical Building**										
		04.00.402	TRR PGP Electrical Building, Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
		05.00.404	TRR PGP Electrical Building, Metal Roof Framing	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
		07.00.400	TRR PGP Electrical Building, Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
		08.00.402	TRR PGP Electrical Building, Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,851.19 /EA	97,024
		21.00.400	TRR PGP Electrical Building, Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
		23.00.402	TRR PGP Electrical Building, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
		26.02.PRI	Primary Feeds fromSubstation	2,180.00 LF	376.38 /LF	26.06 /LF	295.94 /LF	2.20 /LF	/LF	700.58 /LF	1,527,268	1,286.35 /LF	2,804,250
		26.03.MVSWGR	MV SWGR	30,800.00 FA	3.58 /FA	0.69 /FA	50.13 /FA	/FA	/FA	54.40 /FA	1,675,521	103.40 /FA	3,184,602
		26.03.SWGREQ	Station Aux Xfmr, Btty	1.00 LS	54,187.72 /LS	5,931.53 /LS	160,200.00 /LS	/LS	/LS	220,319.25 /LS	220,319	415,647.95 /LS	415,648
		26.04.MVBUS	Medium Voltage Overhead Bus Duct 2000A	540.00 LF	429.87 /LF	1.85 /LF	1,642.50 /LF	4.82 /LF	/LF	2,079.03 /LF	1,122,677	3,931.72 /LF	2,123,131
		26.04.MVVSD	Medium Voltage Variable Speed Drives	13.00 EA	12,973.07 /EA	3,250.00 /EA	420,200.00 /EA	5,000.00 /EA	/EA	441,423.07 /EA	5,738,500	839,970.19 /EA	10,919,613
		26.05.GRDG	Facility Grounding	14,550.00 SF	3.48 /SF	/SF	1.30 /SF	/SF	/SF	4.79 /SF	69,618	8.87 /SF	129,042
		26.20.DIST	Electrical Distribution Equipment	550.00 AMP	36.16 /AMP	0.65 /AMP	38.29 /AMP	/AMP	/AMP	75.10 /AMP	41,306	140.50 /AMP	77,278
		26.25.LTG	Interior Lighting and Control	1.00 LS	86,265.47 /LS	/LS	38,029.50 /LS	/LS	/LS	124,294.97 /LS	124,295	230,696.06 /LS	230,696
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	6,300.47 /LS	/LS	588.58 /LS	/LS	/LS	6,889.05 /LS	6,889	12,676.17 /LS	12,676
		26.30.DEV	Device Outlets	1.00 LS	53,247.76 /LS	/LS	19,053.60 /LS	/LS	/LS	72,301.36 /LS	72,301	133,971.57 /LS	133,972
		26.40.EQCON	Facility Equipment Connections and Controls	1.00 ALO	8,282.95 /ALO	/ALO	4,925.85 /ALO	/ALO	/ALO	13,208.80 /ALO	13,209	24,580.13 /ALO	24,580
		26.40.PMP	13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A	780.00 LF	145.29 /LF	1.28 /LF	115.46 /LF	3.33 /LF	/LF	265.37 /LF	206,985	495.01 /LF	386,109
		26.41.PMP	8000HP Pump Process Control Circuits and Connections	780.00 LF	43.96 /LF	/LF	12.06 /LF	/LF	/LF	56.02 /LF	43,697	103.61 /LF	80,815
		26.90.LPS	Facility Lightning Protection System	14,550.00 SF	1.27 /SF	0.03 /SF	0.85 /SF	0.34 /SF	/SF	2.49 /SF	36,201	4.62 /SF	67,283
		27.10.COMEQ	Communications Room Equipment	1.00 LS	28,011.60 /LS	/LS	21,023.71 /LS	/LS	/LS	49,035.31 /LS	49,035	91,447.85 /LS	91,448
		27.31.COMCDT	Comm Conduit to MH/HH	200.00 LF	224.65 /LF	28.56 /LF	52.68 /LF	/LF	/LF	305.89 /LF	61,178	553.24 /LF	110,648
		28.10.FA	Fire Alarm System	14,550.00 SF	3.58 /SF	/SF	1.41 /SF	0.17 /SF	/SF	5.16 /SF	75,070	9.09 /SF	132,312
		28.20.AC	Access Control System	12.00 DOOR	908.12 /DOOR	/DOOR	466.67 /DOOR	/DOOR	/DOOR	1,374.78 /DOOR	16,497	2,211.29 /DOOR	26,535
		28.20.CCTV	Closed Circuit TV and Cameras	12.00 CAM	3,344.91 /CAM	/CAM	2,063.33 /CAM	833.33 /CAM	/CAM	6,241.57 /CAM	74,899	10,992.55 /CAM	131,911
		28.20.ID	Intrusion Detection System	16.00 DOOR	1,256.77 /DOOR	/DOOR	812.50 /DOOR	93.75 /DOOR	/DOOR	2,163.02 /DOOR	34,608	3,484.81 /DOOR	55,757
			04.04 TRR Reservoir Electrical Building	14,384.00 SF	158.01 /SF	10.15 /SF	645.11 /SF	56.54 /SF	/SF	869.81 /SF	12,511,294	1,632.31 /SF	23,479,107
	04.05		**TRR Reservoir Site Electrical**										
		26.20.DB	Site Ductbanks	1.00 LS	/LS	/LS	/LS	50,000.00 /LS	/LS	50,000.00 /LS	50,000	91,692.74 /LS	91,693
		26.26.EXTLTG	Exterior Lighting and Control	1.00 LS	/LS	/LS	/LS	125,000.00 /LS	/LS	125,000.00 /LS	125,000	229,231.81 /LS	229,232
		28.20.AC	Access Control System	2.00 DOOR	/DOOR	/DOOR	/DOOR	10,000.00 /DOOR	/DOOR	10,000.00 /DOOR	20,000	18,338.55 /DOOR	36,677
		28.20.CCTV	Closed Circuit TV and Cameras	10.00 CAM	/CAM	/CAM	/CAM	7,500.00 /CAM	/CAM	7,500.00 /CAM	75,000	13,753.91 /CAM	137,539
			04.05 TRR Reservoir Site Electrical	1.00 LS	/LS	/LS	/LS	270,000.00 /LS	/LS	270,000.00 /LS	270,000	495,140.74 /LS	495,141
	04.06		**Funks Reservoir PGP Sitework**										
		31.00.400	TRR PGP Earthworks	272,100.00 CY	7.87 /CY	8.96 /CY	2.76 /CY	4.54 /CY	/CY	24.13 /CY	6,565,938	38.42 /CY	10,453,960
		32.00.400	TRR PGP Site Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,841.80 /LS	2,266,842
		33.00.400	TRR PGP Yard Piping	1,850.00 LF	455.79 /LF	364.83 /LF	1,939.98 /LF	/LF	/LF	2,760.60 /LF	5,107,102	4,513.03 /LF	8,349,107
			04.06 Funks Reservoir PGP Sitework	1.00 LS	3,472,440.83 /LS	3,184,362.15 /LS	5,174,040.18 /LS	1,235,250.00 /LS	/LS	13,066,093.16 /LS	13,066,093	21,069,908.87 /LS	21,069,909
			04 Terminal Regulating Reservoir (TRR) PGP	**1.00 LS**	**12,684,841.40 /LS**	**3,732,724.47 /LS**	**23,832,141.19 /LS**	**3,402,650.00 /LS**	**21,876,526.00 /LS**	**65,528,883.06 /LS**	**65,528,883**	**96,347,247.71 /LS**	**96,347,248**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	20,820,875		137,176.944 hrs	
Material	41,938,428			
Allowance	5,766,168			
Equipment	5,945,251		36,470.123 hrs	
Subtotal W/ Contingency	**74,470,722**	**74,470,722**		
Non-Markup Items	21,876,526			
Total Construction Cost	**21,876,526**	**96,347,248**		
Non-Contract Costs	16,379,032			17.000 %
Total Project Costs	**16,379,032**	**112,726,280**		

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
04						***Terminal Regulating Reservoir (TRR) PGP***										
	04.01					Terminal Regulating Reservoir (TRR) PGP										
		03.00.300				*Funk PGP Foundation Slab*										
			03.0			*Concrete Work*										
				03.18		*Cast-In-Place Concrete, Slabs on Grade*										
					03.10.05.48	*Cast-In-Place Concrete, Slabs on Grade, 48" thick*										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	3,336.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	30,980	14.78 /sfca	49,303
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	432.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	1,110,648	4,159.00 /ton	1,796,689
						Reinforcing in place, unloading & sorting, add to above - slabs	432.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	24,064	88.23 /ton	38,115
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	432.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	26,157	95.90 /ton	41,429
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	5,440.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	712,640	216.98 /cy	1,180,385
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	5,332.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	154,632	45.93 /CY	244,915
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	35,990.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	33,711	1.48 /sf	53,393
						Curing, sprayed membrane curing compound	359.90 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	8,295	37.41 /csf	13,463
						Fine grading, fine grade for slab on grade, machine	3,998.89 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	7,495	2.97 /sy	11,871
						03.10.05.48 Cast-In-Place Concrete, Slabs on Grade, 48" thick	*5,332.00 CY*	*155.81 /CY*	*7.33 /CY*	*232.33 /CY*	*/CY*	*/CY*	*395.47 /CY*	*2,108,622*	*643.20 /CY*	*3,429,561*
						03.18 Cast-In-Place Concrete, Slabs on Grade	*5,332.00 CY*	*155.81 /CY*	*7.33 /CY*	*232.33 /CY*	*/CY*	*/CY*	*395.47 /CY*	*2,108,622*	*643.20 /CY*	*3,429,561*
						03.0 Concrete Work	*5,332.00 CY*	*155.81 /CY*	*7.33 /CY*	*232.33 /CY*	*/CY*	*/CY*	*395.47 /CY*	*2,108,622*	*643.20 /CY*	*3,429,561*
						03.00.300 Funk PGP Foundation Slab	*5,332.00 CY*	*155.81 /CY*	*7.33 /CY*	*232.33 /CY*	*/CY*	*/CY*	*395.47 /CY*	*2,108,622*	*643.20 /CY*	*3,429,561*
		03.00.402				*TRR PGP Concrete Walls, Perimeter*										
			03.0			*Concrete Work*										
				03.20		*Cast-In-Place Concrete, Straight Walls*										
					03.10.06.48	*Cast-In-Place Concrete, Straight Walls, 48" thick*										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	28,266.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	416,572	23.74 /sfca	670,957
						Form oil, coverage varies greatly, maximum, includes material only	76.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	1,786	38.92 /gal	2,958
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	177.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	455,057	4,159.00 /ton	736,143
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	177.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	9,860	88.23 /ton	15,616
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	177.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	10,717	95.90 /ton	16,974
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	2,135.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	279,685	216.98 /cy	463,258
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	2,094.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	93,622	70.81 /CY	148,283
						Concrete finishing, walls, includes breaking ties and patching voids	28,266.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	28,811	1.62 /sf	45,715
						03.10.06.48 Cast-In-Place Concrete, Straight Walls, 48" thick	*2,094.00 CY*	*299.31 /CY*	*9.70 /CY*	*309.96 /CY*	*/CY*	*/CY*	*618.96 /CY*	*1,296,110*	*1,002.82 /CY*	*2,099,905*
						03.20 Cast-In-Place Concrete, Straight Walls	*2,094.00 CY*	*299.31 /CY*	*9.70 /CY*	*309.96 /CY*	*/CY*	*/CY*	*618.96 /CY*	*1,296,110*	*1,002.82 /CY*	*2,099,905*
						03.0 Concrete Work	*2,094.00 CY*	*299.31 /CY*	*9.70 /CY*	*309.96 /CY*	*/CY*	*/CY*	*618.96 /CY*	*1,296,110*	*1,002.82 /CY*	*2,099,905*
						03.00.402 TRR PGP Concrete Walls, Perimeter	*2,094.00 CY*	*299.31 /CY*	*9.70 /CY*	*309.96 /CY*	*/CY*	*/CY*	*618.96 /CY*	*1,296,110*	*1,002.82 /CY*	*2,099,905*
		03.00.404				*TRR PGP Concrete Walls, Pier Walls*										
			03.0			*Concrete Work*										
				03.20		*Cast-In-Place Concrete, Straight Walls*										
					03.10.06.36	*Cast-In-Place Concrete, Straight Walls, 36" thick*										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	80,640.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	1,188,436	23.74 /sfca	1,914,173
						Form oil, coverage varies greatly, maximum, includes material only	215.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	5,053	38.92 /gal	8,369
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	392.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	1,007,810	4,159.00 /ton	1,630,329
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	392.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	21,836	88.23 /ton	34,586
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	392.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	23,735	95.90 /ton	37,593
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	4,570.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	598,670	216.98 /cy	991,610
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	4,480.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	200,299	70.81 /CY	317,244
						Concrete finishing, walls, includes breaking ties and patching voids	80,640.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	82,195	1.62 /sf	130,419
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	*4,480.00 CY*	*349.91 /CY*	*9.74 /CY*	*338.58 /CY*	*/CY*	*/CY*	*698.22 /CY*	*3,128,034*	*1,130.43 /CY*	*5,064,322*
						03.20 Cast-In-Place Concrete, Straight Walls	*4,480.00 CY*	*349.91 /CY*	*9.74 /CY*	*338.58 /CY*	*/CY*	*/CY*	*698.22 /CY*	*3,128,034*	*1,130.43 /CY*	*5,064,322*
						03.0 Concrete Work	*4,480.00 CY*	*349.91 /CY*	*9.74 /CY*	*338.58 /CY*	*/CY*	*/CY*	*698.22 /CY*	*3,128,034*	*1,130.43 /CY*	*5,064,322*
						03.00.404 TRR PGP Concrete Walls, Pier Walls	*4,480.00 CY*	*349.91 /CY*	*9.74 /CY*	*338.58 /CY*	*/CY*	*/CY*	*698.22 /CY*	*3,128,034*	*1,130.43 /CY*	*5,064,322*
		03.00.406				*TRR PGP Elevated Slab*										
			03.0			*Concrete Work*										
				03.24		*Cast-In-Place Concrete, Elevated Slabs*										
					03.10.10.36	*Cast-In-Place Concrete, Elevated Decks, 36" thick*										
						Slab shoring	3,250.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	2,225	1.09 /cf	3,536
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	31,212.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	277,052	14.16 /sf	441,820
						C.I.P. concrete forms, elevated slab, edge forms, 36" high, 3 use, includes shoring, erecting, bracing, stripping and cleaning	3,474.00 sfca	12.19 /sfca	-	0.53 /sfca	-	-	12.72 /sfca	44,182	20.18 /sfca	70,111
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	272.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	699,297	4,159.00 /ton	1,131,248
						Reinforcing in place, unloading & sorting, add to above - decks	272.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	15,152	88.23 /ton	23,998
						Reinforcing steel, crane cost for handling, maximum, add	272.00 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	43,291	252.08 /ton	68,566
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	3,468.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	454,308	216.98 /cy	752,495
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	3,400.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	101,342	47.21 /CY	160,510
						Finishing elev slab, bull float, manual float & manual steel trowel	30,575.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	37,731	1.95 /sf	59,760
						Curing, sprayed membrane curing compound, elevated decks	305.75 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	7,047	37.41 /csf	11,438
						03.10.10.36 Cast-In-Place Concrete, Elevated Decks, 36" thick	*3,400.00 CY*	*243.35 /CY*	*7.71 /CY*	*243.54 /CY*	*/CY*	*/CY*	*494.60 /CY*	*1,681,625*	*801.02 /CY*	*2,723,482*
						03.24 Cast-In-Place Concrete, Elevated Slabs	*3,400.00 CY*	*243.35 /CY*	*7.71 /CY*	*243.54 /CY*	*/CY*	*/CY*	*494.60 /CY*	*1,681,625*	*801.02 /CY*	*2,723,482*
						03.0 Concrete Work	*3,400.00 CY*	*243.35 /CY*	*7.71 /CY*	*243.54 /CY*	*/CY*	*/CY*	*494.60 /CY*	*1,681,625*	*801.02 /CY*	*2,723,482*
						03.00.406 TRR PGP Elevated Slab	*3,400.00 CY*	*243.35 /CY*	*7.71 /CY*	*243.54 /CY*	*/CY*	*/CY*	*494.60 /CY*	*1,681,625*	*801.02 /CY*	*2,723,482*
		03.00.408				*TRR PGP Slab on Grade @ El 130.00*										
			03.0			*Concrete Work*										
				03.18		*Cast-In-Place Concrete, Slabs on Grade*										
					03.10.05.24	*Cast-In-Place Concrete, Slabs on Grade, 24" thick*										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	667.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	6,194	14.78 /sfca	9,858
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	41.25 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	106,051	4,159.00 /ton	171,559
						Reinforcing in place, unloading & sorting, add to above - slabs	41.25 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,298	88.23 /ton	3,639
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	41.25 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	2,498	95.90 /ton	3,956
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	485.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	63,535	216.98 /cy	105,236
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	471.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	13,659	45.93 /CY	21,634
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,358.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	5,955	1.48 /sf	9,432
						Curing, sprayed membrane curing compound	63.58 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,465	37.41 /csf	2,378
						Fine grading, fine grade for slab on grade, machine	706.44 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,324	2.97 /sy	2,097

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						03.10.05.24 Cast-In-Place Concrete, Slabs on Grade, 24" thick	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
						03.18 Cast-In-Place Concrete, Slabs on Grade	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
						03.0 Concrete Work	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
						03.00.408 TRR PGP Slab on Grade @ El 130.00	471.00 CY	179.80 /CY	8.11 /CY	243.04 /CY	/CY	/CY	430.96 /CY	202,980	700.19 /CY	329,791
		05.00.400				TRR PGP, Metals										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Trash Rack Allowance	13.00 ea		-		50,000.00 /ea	-	50,000.00 /ea	650,000	89,192.73 /ea	1,159,505
						Miscellaneous Metals Allowance	1.00 ls	116,094.40 /ls	11,200.00 /ls	100,000.00 /ls	-	-	227,294.40 /ls	227,294	412,710.16 /ls	412,710
						05.00.99.00 Metals, Other	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
						05.50 Metal Fabrications	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
						05.0 Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
						05.00.400 TRR PGP, Metals	35,990.00 SF	3.23 /SF	0.31 /SF	2.78 /SF	18.06 /SF	/SF	24.38 /SF	877,294	43.68 /SF	1,572,216
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Allowance for lighting?	260.00 hrs	129.73 /hrs	10.00 /hrs	75.00 /hrs		-	214.73 /hrs	55,830	399.22 /hrs	103,797
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	55,830	/SF	103,797
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	55,830	/SF	103,797
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	55,830	/SF	103,797
						26.26.EXTLTG Exterior Lighting and Control	1.00 LS	33,729.80 /LS	2,600.00 /LS	19,500.00 /LS	/LS	/LS	55,829.80 /LS	55,830	103,797.48 /LS	103,797
		40.00.400				TRR PGP, Process Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Elbow, steel, butt weld, 60" Dia	21.00 ea	3,281.57 /ea	97.68 /ea	9,500.00 /ea	-	-	12,879.25 /ea	270,464	21,087.61 /ea	442,840
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	720.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	434,928	987.20 /LF	710,786
						Butterfly Valves	14.00 ea	2,187.72 /ea	1,560.00 /ea	45,000.00 /ea	-	-	48,747.72 /ea	682,468	80,471.80 /ea	1,126,605
						Check Valves	13.00 ea	2,187.72 /ea	1,560.00 /ea	35,000.00 /ea	-	-	38,747.72 /ea	503,720	63,908.25 /ea	830,807
						Dismantling Joints	13.00 ea	2,187.72 /ea	1,560.00 /ea	37,000.00 /ea	-	-	40,747.72 /ea	529,720	67,220.96 /ea	873,872
						ARV, Complete	13.00 ea	2,500.91 /ea	520.00 /ea	3,500.00 /ea			6,520.91 /ea	84,772	10,581.93 /ea	137,565
						Miscellaneous Items Allowance	1.00 ls				250,000.00 /ls		250,000.00 /ls	250,000	395,963.65 /ls	395,964
						40.10.02.60 Process Pipe, Carbon Steel, 60"	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
						40.11 Process Pipe, Carbon Steel	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
						40.0 Process Pipe	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
						40.00.400 TRR PGP, Process Piping	720.00 LF	384.38 /LF	161.00 /LF	2,935.28 /LF	347.22 /LF	/LF	3,827.88 /LF	2,756,072	6,275.61 /LF	4,518,439
		44.40.400				TRR PGP, Furnish and Install Pumps										
			46.0			Water and Wastewater Equipment										
				44.40		Process Equipment - Pumps										
					44.05.42.06	Vertical Turbine Pump: > 8000 hp										
						Functional Testing, Pumps, >1000 hp	13.00 ea	3,068.99 /ea	-	100.00 /ea		-	3,168.99 /ea	41,197	5,026.47 /ea	65,344
						Align Pump & Motor, >1000 hp	13.00 ea	3,836.24 /ea	-		2,800.00 /ea	-	6,636.24 /ea	86,271	10,510.84 /ea	136,641
						Vibration Testing, Pumps, >1000 hp	13.00 ea	1,534.50 /ea	-	-	1,400.00 /ea	-	2,934.50 /ea	38,148	4,647.81 /ea	60,422
						Sleeved anchor bolts - Large	156.00 ea	95.91 /ea	-	28.00 /ea	-	-	123.91 /ea	19,329	198.28 /ea	30,932
						Anchor bolts for leveling pump cans	52.00 ea	383.62 /ea	-	150.00 /ea	-	-	533.62 /ea	27,748	856.06 /ea	44,515
						Non-Shrink Machine Grout	208.00 cuft	91.11 /cuft	-	74.00 /cuft	-	-	165.11 /cuft	34,343	266.88 /cuft	55,510
						Grease, Oil, and Lube Pumps, >1000 hp	13.00 ea	1,534.50 /ea	-	150.00 /ea	-	-	1,684.50 /ea	21,898	2,678.87 /ea	34,825
						44.05.42.06 Vertical Turbine Pump: > 8000 hp	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,937.60 /EA	428,189
						44.40 Process Equipment - Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,937.60 /EA	428,189
						46.0 Water and Wastewater Equipment	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	/EA	20,687.37 /EA	268,936	32,937.60 /EA	428,189
			99.1			Nom-Markup Items										
				44.40		Process Equipment - Pumps										
					44.05.42.06	Vertical Turbine Pump: > 8000 hp										
						FURNISH Vertical Turbine Pump, SS, 8850 hp	13.00 EA	-	-		-	940,802.00 /EA	940,802.00 /EA	12,230,426	940,802.00 /EA	12,230,426
						Contractor Markups on Pump Purchase 20%, Includes OH&P and Contingencies	1.00 ls		-		-	2,446,100.00 /ls	2,446,100.00 /ls	2,446,100	2,446,100.00 /ls	2,446,100
						44.05.42.06 Vertical Turbine Pump: > 8000 hp	13.00 EA	/EA	/EA	/EA	/EA	1,128,963.54 /EA	1,128,963.54 /EA	14,676,526	1,128,963.54 /EA	14,676,526
						44.40 Process Equipment - Pumps	13.00 EA	/EA	/EA	/EA	/EA	1,128,963.54 /EA	1,128,963.54 /EA	14,676,526	1,128,963.54 /EA	14,676,526
						99.1 Nom-Markup Items	13.00 EA	/EA	/EA	/EA	/EA	1,128,963.54 /EA	1,128,963.54 /EA	14,676,526	1,128,963.54 /EA	14,676,526
						44.40.400 TRR PGP, Furnish and Install Pumps	13.00 EA	14,117.37 /EA	/EA	2,370.00 /EA	4,200.00 /EA	1,128,963.54 /EA	1,149,650.90 /EA	14,945,462	1,161,901.14 /EA	15,104,715
						04.01 Terminal Regulating Reservoir (TRR) PGP	**35,990.00 SF**	**126.35 /SF**	**7.30 /SF**	**183.69 /SF**	**26.52 /SF**	**407.80 /SF**	**751.65 /SF**	**27,052,030**	**971.00 /SF**	**34,946,227**
	04.02					**Terminal Regulating Reservoir Turbine Buildings**										
		03.00.416				TRR PGP Turbine Buildings Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.99	Cast-In-Place Concrete, Slabs on Grade, Other										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	4,000.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	37,147	14.78 /sfca	59,116
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	204.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	524,473	4,159.00 /ton	848,436
						Reinforcing in place, unloading & sorting, add to above - slabs	204.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	11,364	88.23 /ton	17,999
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	204.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	12,352	95.90 /ton	19,564
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	3,310.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	433,610	216.98 /cy	718,212
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	3,248.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	94,195	45.93 /CY	149,190
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,700.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	6,276	1.48 /sf	9,940
						Curing, sprayed membrane curing compound	67.00 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,544	37.41 /csf	2,506
						Fine grading, fine grade for slab on grade, machine	744.44 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,395	2.97 /sy	2,210
						03.10.05.99 Cast-In-Place Concrete, Slabs on Grade, Other	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
						03.18 Cast-In-Place Concrete, Slabs on Grade	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
						03.0 Concrete Work	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
						03.00.416 TRR PGP Turbine Buildings Foundation Slab	3,248.00 CY	128.62 /CY	6.61 /CY	210.32 /CY	/CY	/CY	345.55 /CY	1,122,355	562.55 /CY	1,827,173
		03.00.418				TRR PGP Turbine Buildings Concrete Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	23,976.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	353,348	23.74 /sfca	569,125
						Form oil, coverage varies greatly, maximum, includes material only	64.00 gal	-	-	23.50 /gal	-	-	23.50 /gal	1,504	38.92 /gal	2,491
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	100.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	257,094	4,159.00 /ton	415,900
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	100.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	5,570	88.23 /ton	8,823
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	100.00 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	6,055	95.90 /ton	9,590
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	1,360.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	178,160	216.98 /cy	295,096
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	1,332.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	59,553	70.81 /CY	94,323
						Concrete finishing, walls, includes breaking ties and patching voids	23,976.00 sf	0.98 /sf	-	0.04 /sf	-	-	1.02 /sf	24,438	1.62 /sf	38,777
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
						03.20 Cast-In-Place Concrete, Straight Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
						03.0 Concrete Work	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
						03.00.418 TRR PGP Turbine Buildings Concrete Walls	1,332.00 CY	331.60 /CY	9.57 /CY	323.79 /CY	/CY	/CY	664.96 /CY	885,723	1,076.67 /CY	1,434,125
		03.00.420				TRR PGP Turbine Buildings Elevated Slab										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
			03.0			Concrete Work										
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.24	Cast-In-Place Concrete, Elevated Decks, 24" thick										
						Slab shoring	143,640.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	98,354	1.09 /cf	156,299
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	5,320.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	47,223	14.16 /sf	75,307
						C.I.P. concrete forms, elevated slab, edge forms, 24" high, 3 use, includes shoring, erecting, bracing, stripping and cleaning	680.00 sfca	12.19 /sfca	-	0.53 /sfca	-	-	12.72 /sfca	8,648	20.18 /sfca	13,723
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	34.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	88,698	4,159.00 /ton	143,486
						Reinforcing in place, unloading & sorting, add to above - decks	34.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	1,922	88.23 /ton	3,044
						Reinforcing steel, crane cost for handling, maximum, add	34.50 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	5,491	252.08 /ton	8,697
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	405.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	53,055	216.98 /cy	87,878
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	394.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	11,744	47.21 /CY	18,600
						Finishing elev slab, bull float, manual float & manual steel trowel	5,320.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	6,565	1.95 /sf	10,398
						Curing, sprayed membrane curing compound, elevated decks	53.20 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,226	37.41 /csf	1,990
						03.10.10.24 Cast-In-Place Concrete, Elevated Decks, 24" thick	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
						03.24 Cast-In-Place Concrete, Elevated Slabs	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
						03.0 Concrete Work	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
						03.00.400 TRR PGP Turbine Buildings Elevated Slab	394.00 CY	533.20 /CY	7.90 /CY	278.52 /CY	/CY	/CY	819.61 /CY	322,925	1,318.33 /CY	519,422
		04.00.400				TRR PGP Turbine Buildings Masonry										
			04.0			Masonry										
				04.21		Concrete Unit Masonry - Exterior										
					04.00.02.12	Masonry Concrete Masonry Units, 12"										
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	2.00 opng	41.31 /opng	2.13 /opng	13.40 /opng	-	-	56.84 /opng	114	102.36 /opng	205
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	1,008.00 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	-	12.80 /cf	12,898	23.21 /cf	23,399
						Masonry reinforcing bars, #5 and #6 reinforcing steel bars, placed horizontally, ASTM A615	3,600.00 lb	0.79 /lb	-	0.56 /lb	-	-	1.35 /lb	4,845	2.44 /lb	8,789
						Masonry reinforcing bars, #5 and #6 reinforcing steel bars, placed vertically, ASTM A615	1,872.00 lb	0.97 /lb	-	0.56 /lb	-	-	1.53 /lb	2,859	2.76 /lb	5,176
						Masonry reinforcing bars, truss type steel joint reinforcing, mill standard galvanized, 12" wide	19.20 clf	31.43 /clf	-	29.50 /clf	-	-	60.93 /clf	1,170	110.83 /clf	2,128
						Concrt block,high strngt,hollow,3500 psi,12"8"16",inclds mortar and horzntl joint rnfrcng every other course,excluds scffldn,grout and vertcl rnfrcng	2,400.00 SF	14.60 /SF	-	5.20 /SF	-	-	19.80 /SF	47,511	35.69 /SF	85,657
						Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00 lf	62.16 /lf	3.01 /lf	9.90 /lf	-	-	75.07 /lf	1,501	134.63 /lf	2,693
						Silicone water repellants, sprayed on CMU, 2 coat	4,800.00 sf	0.21 /sf	-	0.79 /sf	-	-	1.00 /sf	4,777	1.83 /sf	8,796
						Reglet, zinc and copper alloy, 20 ounce	240.00 lf	3.26 /lf	-	2.87 /lf	-	-	6.13 /lf	1,472	11.15 /lf	2,676
						Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	240.00 lf	5.27 /lf	-	5.25 /lf	-	-	10.52 /lf	2,526	19.15 /lf	4,597
						04.00.02.12 Masonry Concrete Masonry Units, 12"	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
						04.21 Concrete Unit Masonry - Exterior	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
						04.0 Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
						04.00.400 TRR PGP Turbine Buildings Masonry	2,400.00 SF	21.57 /SF	0.18 /SF	11.45 /SF	/SF	/SF	33.20 /SF	79,672	60.05 /SF	144,115
		05.00.402				TRR PGP Turbine Building, Metals										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Removable Roof Allowance	1,380.00 SF	10.99 /SF	4.03 /SF	35.00 /SF	-	-	50.03 /SF	69,037	91.78 /SF	126,654
						Stair Well Roof Allowance	864.00 SF	5.85 /SF	2.15 /SF	25.00 /SF	-	-	33.00 /SF	28,513	60.68 /SF	52,428
						Stair, 4'-0" wide, w/ guardrail both sides	8.00 flt	1,209.32 /flt	90.20 /flt	2,160.00 /flt	-	-	3,459.52 /flt	27,676	6,327.88 /flt	50,623
						Tailbay Gate Allowance	2.00 ea				30,000.00 /ea	-	30,000.00 /ea	60,000	53,515.64 /ea	107,031
						05.00.99.00 Metals, Other	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.06 /SF	336,737
						05.50 Metal Fabrications	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.06 /SF	336,737
						05.0 Metals	2,244.00 SF	13.33 /SF	3.63 /SF	38.85 /SF	26.74 /SF	/SF	82.54 /SF	185,226	150.06 /SF	336,737
						05.00.402 TRR PGP Turbine Building, Metals	**2.00** LS	14,950.80 /LS	4,072.24 /LS	43,590.00 /LS	30,000.00 /LS	/LS	92,613.04 /LS	185,226	168,368.48 /LS	336,737
		08.00.400				TRR PGP Turbine Building, Openings										
			08.0			Openings										
				08.10		Doors and Frames										
					08.10.01.00	Openings, Doors, Frames and Hardware										
						Steel frms, knock down, 14 ga., to 8-3/4" throat, to 3'-0" x 7'-0", single	2.00 EA	137.64 /EA	-	430.00 /EA	-	-	567.64 /EA	1,135	1,043.76 /EA	2,088
						Doors, commercial, steel, insulated, full panel, 18 ga., 3'-0" x 7'-0" x 1-3/4" thick	2.00 ea	97.88 /ea	-	520.00 /ea	-	-	617.88 /ea	1,236	1,139.91 /ea	2,280
						Add for baked enamel finish, average cost per leaf	2.00 leaf	12.94 /leaf	-	50.40 /leaf	-	-	63.34 /leaf	127	116.64 /leaf	233
						Average Door Hardware	2.00 ea	91.76 /ea	15.00 /ea	500.00 /ea			606.76 /ea	1,214	1,118.63 /ea	2,237
						08.10.01.00 Openings, Doors, Frames and Hardware	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
						08.10 Doors and Frames	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
						08.0 Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
						08.00.400 TRR PGP Turbine Building, Openings	2.00 EA	340.22 /EA	15.00 /EA	1,500.40 /EA	/EA	/EA	1,855.62 /EA	3,711	3,418.94 /EA	6,838
		23.00.400				TRR PGP Turbine Building, HVAC										
			23.0			HVAC										
				23.00		HVAC										
					23.00.02.00	Mechanical, HVAC										
						HVAC Vent/Fan Allowance	5,320.00 SF	1.75 /SF		7.52 /SF			9.27 /SF	49,307	17.08 /SF	90,857
						23.00.02.00 Mechanical, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
						23.00 HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
						23.0 HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
						23.00.400 TRR PGP Turbine Building, HVAC	5,320.00 SF	1.75 /SF	/SF	7.52 /SF	/SF	/SF	9.27 /SF	49,307	17.08 /SF	90,857
		26.00.000				Hydopower Generators										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Installation of Francis Turbines	2.00 ea	108,531.52 /ea	10,912.00 /ea	150,000.00 /ea	-	-	269,443.52 /ea	538,887	504,995.23 /ea	1,009,990
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	538,887	/SF	1,009,990
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	538,887	/SF	1,009,990
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	538,887	/SF	1,009,990
			99.1			Non-Markup Items										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Furnish Francis Turbine 11.75 MW	2.00 EA		-		-	3,000,000.00 /EA	3,000,000.00 /EA	6,000,000	3,000,000.00 /EA	6,000,000
						Contractor Markups on Turbines Purchase 20%, Includes OH&P and Contingencies	1.00 ls		-		-	1,200,000.00 /ls	1,200,000.00 /ls	1,200,000	1,200,000.00 /ls	1,200,000
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	7,200,000	/SF	7,200,000
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	7,200,000	/SF	7,200,000
						99.1 Non-Markup Items	2.00 EA	/EA	/EA	/EA	/EA	3,600,000.00 /EA	3,600,000.00 /EA	7,200,000	3,600,000.00 /EA	7,200,000
						26.00.000 Hydopower Generators	2.00 EA	108,531.52 /EA	10,912.00 /EA	150,000.00 /EA	/EA	3,600,000.00 /EA	3,869,443.52 /EA	7,738,887	4,104,995.23 /EA	8,209,990
		26.05.GRDG				Facility Grounding										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	QC Equip, Tools, & Consumables										
						Rent trencher chain boom gas oper walking 12 HP	2.00 day	-	156.95 /day	-	-	-	156.95 /day	314	287.82 /day	576
						01.01.06.03 QC Equip, Tools, & Consumables	0.00	/LS	/LS	/LS	/LS	/LS	/LS	314	/LS	576
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	314	/SF	576
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Copper Bus Bar .25"x3.0"	2.00 lf	32.44 /lf	-	52.90 /lf	-	-	85.34 /lf	171	160.33 /lf	321
						Copper Bus Bar Supports	2.00 E	129.73 /E	-	48.30 /E	-	-	178.03 /E	356	329.99 /E	660

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.11.00	Process Electrical, Grounding										
						Grounding rod, copper clad, 15' long, 3/4" diameter	6.00 ea	259.46 /ea	-	55.00 /ea	-	-	314.46 /ea	1,887	580.66 /ea	3,484
						Ground wire, copper wire, bare stranded, 4/0	4.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	3,137	1,468.48 /clf	5,874
						Water pipe ground clamps, heavy duty, bronze, 2-1/2" to 3" diameter	1.00 ea	172.97 /ea	-	60.50 /ea	-	-	233.47 /ea	233	432.52 /ea	433
						Exothermic weld, 4/0 wire to 4/0 wire	24.00 ea	148.26 /ea	-	9.45 /ea	-	-	157.71 /ea	3,785	289.91 /ea	6,958
						Exothermic weld, mold reusable for above	6.00 ea	-	-	141.00 /ea	-	-	141.00 /ea	846	268.80 /ea	1,613
						Protective boxes at grade level, round, concrete, 12" long, incl breather slots	2.00 ea	64.87 /ea	-	112.00 /ea	-	-	176.87 /ea	354	332.46 /ea	665
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	10,768	/LF	20,007
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,768	/SF	20,007
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	11,082	/SF	20,582
						26.05.GRDG Facility Grounding	**3,250.00** SF	2.22 /SF	0.10 /SF	1.10 /SF	/SF	/SF	3.41 /SF	11,082	6.33 /SF	20,582
		26.12.SEC				Subfeed from Elec Building										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	1.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,587	4,825.13 /ton	4,825
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,587	/LF	4,825
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	600.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	10,016	30.88 /lf	18,529
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	10,016	/EA	18,529
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	12,603	/LS	23,355
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	20.00 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	17,135	1,599.06 /clf	31,981
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	17,135	/LF	31,981
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	6.50 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	5,097	1,468.48 /clf	9,545
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	5,097	/LF	9,545
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	22,232	/SF	41,526
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,834	/SF	64,881
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	15.00 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	4,108	439.42 /cy	6,591
						End bulkheads, plywood, concrete envelope/encasement	24.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	341	22.57 /sf	542
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	4,450	/CY	7,133
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	50.00 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	1,263	40.01 /ecy	2,001
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,263	/CY	2,001
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	50.00 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	1,010	31.98 /lcy	1,599
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,010	/CY	1,599
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	37.04 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	1,072	45.85 /bcy	1,698
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,072	/CY	1,698
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,794	/LS	12,431
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	7,794	/CY	12,431
						26.12.SEC Subfeed from Elec Building	**600.00** LF	41.92 /LF	4.18 /LF	24.95 /LF	/LF	/LF	71.05 /LF	42,629	128.85 /LF	77,312
		26.20.DIST				Electrical Distribution Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 1-1/2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	100.00 lf	23.06 /lf	-	19.05 /lf	-	-	42.11 /lf	4,211	78.61 /lf	7,861
						Flexible metallic conduit, steel, 1-1/2" diameter	3.00 lf	20.76 /lf	-	2.55 /lf	-	-	23.31 /lf	70	42.93 /lf	129
						Flexible metallic conduit, steel, 2" diameter	3.00 lf	25.95 /lf	-	3.23 /lf	-	-	29.18 /lf	88	53.74 /lf	161
						Flexible metallic conduit, steel, connectors, insulated, 1-1/2" diameter	1.00 ea	32.43 /ea	-	24.50 /ea	-	-	56.93 /ea	57	106.17 /ea	106
						Flexible metallic conduit, steel, connectors, insulated, 2" diameter	1.00 ea	45.12 /ea	-	26.00 /ea	-	-	71.12 /ea	71	132.32 /ea	132
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 1-1/2" diameter	1.00 ea	45.12 /ea	-	46.00 /ea	-	-	91.12 /ea	91	170.44 /ea	170
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 2" diameter	1.00 ea	57.66 /ea	-	67.00 /ea	-	-	124.66 /ea	125	233.46 /ea	233
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 225 amp, 42 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	4,125.00 /ea	-	-	7,831.59 /ea	7,832	14,661.07 /ea	14,661
						Panelboards, 3 phase 4 wire, main circuit breaker, 277/480 V, 225 amp, 42 circuits, NEHB, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	5,175.00 /ea	-	-	8,881.59 /ea	8,882	16,662.73 /ea	16,663
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	21,426	/SF	40,117
					26.10.03.00	UG Conduit										
						Uninterruptible power supply, charger, inverter, and alarm 1 phase, 120 V, 5 kVA, incl 10 minutes battery	1.00 ea	6,182.64 /ea	356.18 /ea	7,100.00 /ea	-	-	13,638.82 /ea	13,639	25,526.36 /ea	25,526
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	13,639	/LF	25,526
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #6, type XHHW, in raceway	0.70 clf	159.67 /clf	-	54.50 /clf	-	-	214.17 /clf	150	396.71 /clf	278
						Wire, copper, stranded, 600 volt, #4, type XHHW, in raceway	0.70 clf	195.81 /clf	-	77.50 /clf	-	-	273.31 /clf	191	506.86 /clf	355
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	2.00 clf	259.46 /clf	-	159.00 /clf	-	-	418.46 /clf	837	778.91 /clf	1,558
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	2.00 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	1,714	1,599.07 /clf	3,198
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,892	/LF	5,388
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	37,956	/SF	71,032
				26.25		Facility Electrical										
					26.25.06.00	Transformers, Dry Type										
						Transformer, dry-type, ventilated, 3 phase 480 V primary 120/208 V secondary, 75 kVA	1.00 ea	2,965.27 /ea	-	2,500.00 /ea	-	-	5,465.27 /ea	5,465	10,203.79 /ea	10,204
						26.25.06.00 Transformers, Dry Type	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,465	/EA	10,204
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	5,465	/LS	10,204
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,422	/SF	81,236
						26.20.DIST Electrical Distribution Equipment	**450.00** AMP	46.44 /AMP	0.79 /AMP	49.26 /AMP	/AMP	/AMP	96.49 /AMP	43,422	180.52 /AMP	81,236
		26.25.LTG				Interior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	9,062	33.61 /lf	16,804
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	25.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	1,382	101.59 /ea	2,540
						Outlet boxes, pressed steel, covers, blank, 4" square	24.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	408	31.21 /ea	749
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	1.00 ea	16.22 /ea	-	1.66 /ea	-	-	17.88 /ea	18	32.90 /ea	33
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,869	/SF	20,126
					26.10.03.00	UG Conduit										
						Toggle switch, quiet type, single pole, 20 amp	1.00 ea	38.44 /ea	-	3.46 /ea	-	-	41.90 /ea	42	77.11 /ea	77
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	42	/LF	77
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	16.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,729	199.14 /clf	3,186
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,729	/LF	3,186
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	12,639	/SF	23,389
				26.20		Facility Electrical										
					26.20.03.00	Facility Electrical, Lighting										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.20.03.00	Facility Electrical, Lighting										
						LED Strip Light, hdwe	24.00 ea	182.08 /ea	-	110.00 /ea	-	-	292.08 /ea	7,010	543.60 /ea	13,046
						Emergency ballast, material only, interior, factory installed in fixture	6.00 ea	-	-	152.00 /ea	-	-	152.00 /ea	912	289.77 /ea	1,739
						Exit lighting, L.E.D. standard, single face, ceiling or wall mount	2.00 ea	129.73 /ea	-	70.00 /ea	-	-	199.73 /ea	399	371.36 /ea	743
						Fixture whips, 3/8" greenfield, 2 connectors, THHN wire, three #14, 6' long	24.00 ea	32.43 /ea	-	5.45 /ea	-	-	37.88 /ea	909	69.87 /ea	1,677
						26.20.03.00 Facility Electrical, Lighting	0.00	/SF	/SF	/SF	/SF	/SF	/SF	9,231	/SF	17,205
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	9,231	/SF	17,205
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	21,870	/SF	40,594
						26.25.LTG Interior Lighting and Control	**1.00** LS	15,144.99 /LS	/LS	6,724.85 /LS	/LS	/LS	21,869.84 /LS	21,870	40,593.63 /LS	40,594
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	80.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	724	16.68 /lf	1,334
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	4.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	221	101.59 /ea	406
						Outlet boxes, pressed steel, covers, blank, 4" square	4.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	68	31.21 /ea	125
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,013	/SF	1,866
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	3.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	324	199.14 /clf	597
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	324	/LF	597
					26.15.07.00	Lighting										
						LED Area Light	4.00 E	97.30 /E	-		-	-	97.30 /E	389	178.43 /E	714
						Wallpack Photocell	4.00 E	32.43 /E	-		-	-	32.43 /E	130	59.48 /E	238
						26.15.07.00 Lighting	0.00	/LS	/LS	/LS	/LS	/LS	/LS	519	/LS	952
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,856	/SF	3,415
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,856	/SF	3,415
						26.26.EXTLTG Exterior Lighting and Control	**1.00** LS	1,713.08 /LS	/LS	143.26 /LS	/LS	/LS	1,856.34 /LS	1,856	3,414.66 /LS	3,415
		26.30.DEV				Device Outlets										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00 lf	14.83 /lf	-	10.00 /lf	-	-	24.83 /lf	12,413	46.25 /lf	23,126
						Outlet boxes, cast, 1 gang, FD, 3/4" hub, 2-11/16" deep	8.00 ea	86.49 /ea	-	22.00 /ea	-	-	108.49 /ea	868	200.55 /ea	1,604
						Duplex receptacle, ground fault interrupting, 20 amp	8.00 ea	38.44 /ea	-	45.00 /ea	-	-	83.44 /ea	668	156.28 /ea	1,250
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	13,949	/SF	25,981
					26.10.03.00	UG Conduit										
						WP cover	8.00 ea	17.30 /ea	-	42.50 /ea	-	-	59.80 /ea	478	112.74 /ea	902
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	478	/LF	902
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	16.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,729	199.14 /clf	3,186
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,729	/LF	3,186
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,156	/SF	30,069
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,156	/SF	30,069
						26.30.DEV Device Outlets	**1.00** LS	10,060.56 /LS	/LS	6,095.20 /LS	/LS	/LS	16,155.76 /LS	16,156	30,069.22 /LS	30,069
		26.40.EQCON				Facility Equipment Connections and Controls										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.20.05.00	Facility Electrical, HVAC										
						Allowance for HVAC circuit, connection, controls	200.00 HR	129.73 /HR	15.00 /HR	50.00 /HR	-	-	194.73 /HR	38,946	360.73 /HR	72,147
						26.20.05.00 Facility Electrical, HVAC	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,147
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,147
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	38,946	/SF	72,147
						26.40.EQCON Facility Equipment Connections and Controls	**1.00** ALO	25,946.13 /ALO	3,000.00 /ALO	10,000.00 /ALO	/ALO	/ALO	38,946.13 /ALO	38,946	72,146.53 /ALO	72,147
		26.40.HYDTURB				13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	3.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	7,760	4,825.14 /ton	14,475
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,760	/LF	14,475
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,760	/LS	14,475
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	80.00 lf	64.87 /lf	-	62.50 /lf	-	-	127.37 /lf	10,189	238.10 /lf	19,048
						Rigid galvanized steel plastic coated conduit elbows, 4" diameter, to 15' high	16.00 ea	389.19 /ea	-	196.00 /ea	-	-	585.19 /ea	9,363	1,087.37 /ea	17,398
						Rigid galvanized steel plastic coated conduit couplings, 4" diameter, to 15' high	16.00 ea	28.83 /ea	-	57.50 /ea	-	-	86.33 /ea	1,381	162.48 /ea	2,600
						Flexible metallic conduit, sealtite, 4" diameter	24.00 lf	86.40 /lf	-	20.00 /lf	-	-	106.40 /lf	2,554	196.57 /lf	4,718
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 4" diameter	8.00 ea	129.73 /ea	-	163.00 /ea	-	-	292.73 /ea	2,342	548.64 /ea	4,389
						Flexible metallic conduit, coupling sealtite to rigid, 4" diameter	8.00 ea	129.73 /ea	-	198.00 /ea	-	-	327.73 /ea	2,622	615.37 /ea	4,923
						Electrical Contractor startup assistance per hour	40.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	56,892	2,615.55 /hr	104,622
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	85,343	/SF	157,698
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 4" diameter, to 15' H, incl terminations, fittings, & support	2,320.00 lf	32.43 /lf	-	5.75 /lf	-	-	38.18 /lf	88,584	70.44 /lf	163,417
						PVC conduit elbows, 4" diameter, to 15' H	16.00 ea	116.76 /ea	-	23.00 /ea	-	-	139.76 /ea	2,236	257.96 /ea	4,127
						PVC conduit, field bends, 45 Deg. to 90 Deg., 4" diameter	16.00 ea	129.73 /ea	-	-	-	-	129.73 /ea	2,076	237.91 /ea	3,807
						PVC adapters, 4" diameter, to 15' H	16.00 ea	64.87 /ea	-	4.80 /ea	-	-	69.67 /ea	1,115	128.10 /ea	2,050
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	94,010	/LF	173,401
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .525" to 1.025", pad mount	48.00 ea	324.33 /ea	-	109.00 /ea	-	-	433.33 /ea	20,800	802.56 /ea	38,523
						Medium-cable single cable, copper, XLP shielding, ungrounded neutral, 15 kV, 4/0, in conduit, excl splicing & terminations	78.00 clf	648.65 /clf	-	660.00 /clf	-	-	1,308.65 /clf	102,075	2,447.73 /clf	190,923
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	122,875	/LF	229,446
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	8.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	3,676	842.59 /E	6,741
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	3,676	/EA	6,741
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	305,904	/SF	567,285
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	313,664	/SF	581,760
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	29.63 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	8,115	439.41 /cy	13,020
						End bulkheads, plywood, concrete envelope/encasement	60.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	853	22.57 /sf	1,354
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	8,968	/CY	14,374
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	70.00 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	1,768	40.01 /ecy	2,801
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,768	/CY	2,801
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	70.00 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	1,414	31.98 /lcy	2,239

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,414	/CY	2,239
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	59.26 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	1,715	45.84 /bcy	2,717
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,715	/CY	2,717
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	13,866	/LS	22,131
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	13,866	/CY	22,131
						26.40.HYDTURB 13.8kV 15MW Hyd Turbine Pwr Feeders 4-[4" 3#4/0 #4/0G] 800A	**600.00** LF	380.99 /LF	7.83 /LF	154.39 /LF	2.67 /LF	/LF	545.88 /LF	327,529	1,006.48 /LF	603,891
		26.41.HYDTURB				Hyd Turbine Controls Circuits										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	3.00 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	7,760	4,825.14 /ton	14,475
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	7,760	/LF	14,475
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	7,760	/LS	14,475
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	40.00 lf	29.65 /lf	-	22.50 /lf	-	-	52.15 /lf	2,086	97.27 /lf	3,891
						Rigid galvanized steel plastic coated conduit elbows, 2" diameter, to 15' high	8.00 ea	129.73 /ea	-	42.00 /ea	-	-	171.73 /ea	1,374	317.97 /ea	2,544
						Rigid galvanized steel plastic coated conduit couplings, 2" diameter, to 15' high	8.00 ea	19.58 /ea	-	14.35 /ea	-	-	33.93 /ea	271	63.27 /ea	506
						Flexible metallic conduit, sealtite, 2" diameter	12.00 lf	34.60 /lf	-	4.30 /lf	-	-	38.90 /lf	467	71.64 /lf	860
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 2" diameter	4.00 ea	51.89 /ea	-	25.50 /ea	-	-	77.39 /ea	310	143.78 /ea	575
						Flexible metallic conduit, coupling sealtite to rigid, 2" diameter	4.00 ea	103.79 /ea	-	31.50 /ea	-	-	135.29 /ea	541	250.38 /ea	1,002
						Electrical Contractor startup assistance per hour	40.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	56,892	2,615.55 /hr	104,622
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	61,941	/SF	113,999
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 2" diameter, to 15' H, incl terminations, fittings, & support	1,160.00 lf	11.53 /lf	-	3.36 /lf	-	-	14.89 /lf	17,274	27.55 /lf	31,961
						PVC conduit elbows, 2" diameter, to 15' H	8.00 ea	51.32 /ea	-	3.54 /ea	-	-	54.86 /ea	439	100.87 /ea	807
						PVC conduit, field bends, 45 Deg. to 90 Deg., 2" diameter	8.00 ea	51.89 /ea	-	-	-	-	51.89 /ea	415	95.16 /ea	761
						PVC adapters, 2" diameter, to 15' H	8.00 ea	38.44 /ea	-	1.39 /ea	-	-	39.83 /ea	319	73.14 /ea	585
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	18,447	/LF	34,114
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	120.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	10,744	164.90 /clf	19,788
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	48.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	8,557	329.08 /clf	15,796
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	19,301	/LF	35,584
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	99,689	/SF	183,697
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	107,449	/SF	198,173
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	29.63 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	8,115	439.41 /cy	13,020
						End bulkheads, plywood, concrete envelope/encasement	60.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	853	22.57 /sf	1,354
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	8,968	/CY	14,374
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	70.00 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	1,768	40.01 /ecy	2,801
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,768	/CY	2,801
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	70.00 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	1,414	31.98 /lcy	2,239
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,414	/CY	2,239
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	59.26 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	1,715	45.84 /bcy	2,717
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	1,715	/CY	2,717
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	13,866	/LS	22,131
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	13,866	/CY	22,131
						26.41.HYDTURB Hyd Turbine Controls Circuits	**600.00** LF	164.55 /LF	7.83 /LF	29.81 /LF	/LF	/LF	202.19 /LF	121,314	367.17 /LF	220,303
		26.90.LPS				Facility Lightning Protection System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						Air terminal and base, copper, 3/8" dia x 10", to 75' h	10.00 ea	129.73 /ea	-	26.00 /ea	-	-	155.73 /ea	1,557	287.47 /ea	2,875
						Lightning protection cable, copper, 220 lb per thousand feet, to 75' h	400.00 lf	3.24 /lf	-	3.18 /lf	-	-	6.42 /lf	2,569	12.01 /lf	4,804
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,127	/SF	7,679
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,127	/SF	7,679
				26.20		Facility Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						LPS design and certification, misc mat and labor	1.00 LS	2,075.69 /LS	-	1,000.00 /LS	1,500.00 /LS	-	4,575.69 /LS	4,576	8,463.66 /LS	8,464
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,576	/SF	8,464
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,576	/SF	8,464
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,702	/SF	16,142
						26.90.LPS Facility Lightning Protection System	**3,250.00** SF	1.44 /SF	/SF	0.78 /SF	0.46 /SF	/SF	2.68 /SF	8,702	4.97 /SF	16,142
		27.30.COMCDT				Comm Conduit to Admin										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,328	4,825.11 /ton	4,343
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,328	/LF	4,343
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	1,200.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	20,032	30.88 /lf	37,059
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	20,032	/EA	37,059
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	22,360	/LS	41,401
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	13.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	10,194	1,468.48 /clf	19,090
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	10,194	/LF	19,090
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,194	/SF	19,090
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	32,554	/SF	60,492
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	40.00 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	10,955	439.41 /cy	17,577
						End bulkheads, plywood, concrete envelope/encasement	75.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	1,066	22.57 /sf	1,693
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	12,022	/CY	19,270
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	180.00 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	4,547	40.01 /ecy	7,202
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	4,547	/CY	7,202
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	180.00 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	3,635	31.98 /lcy	5,757
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	3,635	/CY	5,757
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	177.78 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	5,146	45.84 /bcy	8,150
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	5,146	/CY	8,150
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	25,350	/LS	40,379
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	25,350	/CY	40,379
						27.30.COMCDT Comm Conduit to Admin	**1,200.00** LF	28.15 /LF	8.36 /LF	11.74 /LF	/LF	/LF	48.25 /LF	57,904	84.06 /LF	100,871
		28.20.AC				Access Control System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Card reader - all in allowance per each (incl circuit, cards, CX)	2.00 ea	1,556.77 /ea	-	800.00 /ea	-	-	2,356.77 /ea	4,714	3,790.80 /ea	7,582
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,582
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,582
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,714	/SF	7,582
						28.20.AC Access Control System	**2.00** DOOR	1,556.77 /DOOR	/DOOR	800.00 /DOOR	/DOOR	/DOOR	2,356.77 /DOOR	4,714	3,790.80 /DOOR	7,582
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Camera allowance (licenses, circuit, startup, CX)	1.00 LS	1,037.85 /LS	-	1,000.00 /LS	1,000.00 /LS	-	3,037.85 /LS	3,038	5,643.46 /LS	5,643
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,038	/SF	5,643
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Closed circuit television system (CCTV), industrial quality, for additional camera stations, add	2.00 ea	384.39 /ea	-	690.00 /ea	-	-	1,074.39 /ea	2,149	1,751.70 /ea	3,503
						Closed circuit television system (CCTV), industrial quality, for weatherproof camera station, add	2.00 ea	798.35 /ea	-	540.00 /ea	-	-	1,338.35 /ea	2,677	2,158.90 /ea	4,318
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,821
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,821
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,825	/SF	7,821
						28.20.CCTV Closed Circuit TV and Cameras	**2.00** CAM	1,701.66 /CAM	/CAM	1,730.00 /CAM	500.00 /CAM	/CAM	3,931.66 /CAM	7,863	6,732.32 /CAM	13,465
		28.20.ID				Intrusion Detection System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Securitized door, all-in allowance per each (incl circuit, devices, CX)	2.00 ea	2,594.62 /ea	-	1,000.00 /ea	-	-	3,594.62 /ea	7,189	5,765.85 /ea	11,532
						Door controller (all-in cost including vendor program and startup)	1.00 ea	648.65 /ea	-	2,000.00 /ea	500.00 /ea	-	3,148.65 /ea	3,149	5,132.00 /ea	5,132
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,664
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,664
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	10,338	/SF	16,664
						28.20.ID Intrusion Detection System	**2.00** DOOR	2,918.94 /DOOR	/DOOR	2,000.00 /DOOR	250.00 /DOOR	/DOOR	5,168.94 /DOOR	10,338	8,331.85 /DOOR	16,664
		40.00.404				TRR PGP Turbine Building, Process Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	230.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	138,935	987.20 /LF	227,057
						Dismantling Joints	2.00 ea	2,187.72 /ea	1,560.00 /ea	37,000.00 /ea	-	-	40,747.72 /ea	81,495	67,220.96 /ea	134,442
						Turbine Shutoff Valves	2.00 ea	2,187.72 /ea	1,560.00 /ea	45,000.00 /ea	-	-	48,747.72 /ea	97,495	80,471.79 /ea	160,944
						Miscellaneous Items Allowance	1.00 ls				65,000.00 /ls		65,000.00 /ls	65,000	102,950.55 /ls	102,951
						40.10.02.60 Process Pipe, Carbon Steel, 60"	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
						40.11 Process Pipe, Carbon Steel	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
						40.0 Process Pipe	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
						40.00.404 TRR PGP Turbine Building, Process Piping	230.00 LF	160.02 /LF	89.23 /LF	1,133.04 /LF	282.61 /LF	/LF	1,664.90 /LF	382,926	2,719.10 /LF	625,393
						04.02 Terminal Regulating Reservoir Turbine Buildings	**2.00** EA	949,646.57 /EA	56,945.15 /EA	1,071,136.83 /EA	64,800.00 /EA	3,600,000.00 /EA	5,742,528.56 /EA	11,485,057	7,249,460.14 /EA	14,498,920
	04.03					**TRR Reservoir Energy Dissipation Valve Structures**										
		03.00.410				TRR PGP Energy Dissipation Structures Foundation Slab										
			03.0			Concrete Work										
				03.18		Cast-In-Place Concrete, Slabs on Grade										
					03.10.05.36	Cast-In-Place Concrete, Slabs on Grade, 36" thick										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,848.00 sfca	7.87 /sfca	-	0.97 /sfca	-	-	8.84 /sfca	16,328	14.06 /sfca	25,991
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	56.00 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	143,973	4,159.00 /ton	232,904
						Reinforcing in place, unloading & sorting, add to above - slabs	56.00 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	3,119	88.23 /ton	4,941
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	762.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	99,822	216.98 /cy	165,341
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	740.00 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	21,461	45.93 /CY	33,990
						Cfnsh,flrs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltnt&lvln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	6,656.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	6,234	1.48 /sf	9,874
						Curing, sprayed membrane curing compound	66.56 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	1,534	37.41 /csf	2,490
						Fine grading, fine grade for slab on grade, machine	739.56 sy	1.19 /sy	0.68 /sy	-	-	-	1.87 /sy	1,386	2.97 /sy	2,195
						03.10.05.36 Cast-In-Place Concrete, Slabs on Grade, 36" thick	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
						03.18 Cast-In-Place Concrete, Slabs on Grade	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
						03.0 Concrete Work	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
						03.00.410 TRR PGP Energy Dissipation Structures Foundation Slab	740.00 CY	160.90 /CY	6.96 /CY	229.25 /CY	/CY	/CY	397.11 /CY	293,857	645.58 /CY	477,726
		03.00.412				TRR PGP Energy Dissipation Structures Concrete Walls										
			03.0			Concrete Work										
				03.20		Cast-In-Place Concrete, Straight Walls										
					03.10.06.36	Cast-In-Place Concrete, Straight Walls, 36" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	12,800.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	188,641	23.74 /sfca	303,837
						Form oil, coverage varies greatly, maximum, includes material only	34.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	805	38.92 /gal	1,333
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	53.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	137,546	4,159.00 /ton	222,507
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	53.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	2,980	88.23 /ton	4,720
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	53.50 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	3,239	95.90 /ton	5,131
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	734.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	96,154	216.98 /cy	159,265
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	712.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	31,833	70.81 /CY	50,419
						Finishing: break ties & patch voids (walls, cols or beams)	12,800.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	12,915	1.60 /sf	20,483
						03.10.06.36 Cast-In-Place Concrete, Straight Walls, 36" thick	712.00 CY	331.46 /CY	9.57 /CY	324.86 /CY	/CY	/CY	665.89 /CY	474,113	1,078.22 /CY	767,695
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7' 6" thick										
						Forms in place, wall, steel framed plywood, >16' high, 3 use/month	840.00 sfca	9.29 /sfca	-	5.45 /sfca	-	-	14.74 /sfca	12,380	23.74 /sfca	19,939
						Form oil, coverage varies greatly, maximum, includes material only	2.25 gal	-	-	23.50 /gal	-	-	23.50 /gal	53	38.93 /gal	88
						Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	22,496	4,159.00 /ton	36,391
						Reinforcing in place, unloading & sorting, add - walls, cols, beams	8.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	487	88.23 /ton	772
						Reinforcing, crane cost for handling, add to above, walls, cols, beams	8.75 ton	53.49 /ton	7.06 /ton	-	-	-	60.55 /ton	530	95.90 /ton	839

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					03.10.06.90	Cast-In-Place Concrete, Straight Walls, 7' 6" thick										
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	120.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	15,720	216.98 /cy	26,038
						Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	117.00 CY	36.16 /CY	8.55 /CY	-	-	-	44.71 /CY	5,231	70.81 /CY	8,285
						Finishing; break ties & patch voids (walls, cols or beams)	840.00 sf	0.98 /sf	-	0.03 /sf	-	-	1.01 /sf	848	1.60 /sf	1,344
						03.10.06.90 Cast-In-Place Concrete, Straight Walls, 7' 6" thick	117.00 CY	220.08 /CY	9.57 /CY	263.90 /CY	/CY	/CY	493.54 /CY	57,744	800.82 /CY	93,697
						03.20 Cast-In-Place Concrete, Straight Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,039.07 /CY	861,391
						03.0 Concrete Work	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,039.07 /CY	861,391
						03.00.412 TRR PGP Energy Dissipation Structures Concrete Walls	829.00 CY	315.74 /CY	9.57 /CY	316.26 /CY	/CY	/CY	641.56 /CY	531,857	1,039.07 /CY	861,391
		03.00.414				TRR PGP Energy Dissipation Structures Elevated Deck										
			03.0			Concrete Work										
				03.24		Cast-In-Place Concrete, Elevated Slabs										
					03.10.10.36	Cast-In-Place Concrete, Elevated Decks, 36" thick										
						Slab shoring	46,000.00 cf	0.64 /cf	-	0.05 /cf	-	-	0.69 /cf	31,497	1.09 /cf	50,054
						C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	2,000.00 sf	7.55 /sf	-	1.33 /sf	-	-	8.88 /sf	17,753	14.16 /sf	28,311
						C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	280.00 lf	5.41 /lf	-	0.22 /lf	-	-	5.63 /lf	1,577	8.94 /lf	2,502
						Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	16.75 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	43,063	4,159.00 /ton	69,663
						Reinforcing in place, unloading & sorting, add to above - decks	16.75 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	933	88.23 /ton	1,478
						Reinforcing steel, crane cost for handling, maximum, add	16.75 ton	140.59 /ton	18.56 /ton	-	-	-	159.16 /ton	2,666	252.08 /ton	4,222
						Struct concrete,ready mix,normal wt,4500 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	230.00 cy	-	-	131.00 /cy	-	-	131.00 /cy	30,130	216.98 /cy	49,906
						Structural concrete, placing, elevated slab, pumped, over 10" thick, includes strike off & consolidation, excludes material	223.00 CY	24.11 /CY	5.70 /CY	-	-	-	29.81 /CY	6,647	47.21 /CY	10,528
						Finishing elev slab, bull float, manual float & manual steel trowel	2,000.00 sf	1.23 /sf	-	-	-	-	1.23 /sf	2,468	1.95 /sf	3,909
						Curing, sprayed membrane curing compound, elevated decks	20.00 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	461	37.41 /csf	748
						03.10.10.36 Cast-In-Place Concrete, Elevated Decks, 36" thick	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
						03.24 Cast-In-Place Concrete, Elevated Slabs	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
						03.0 Concrete Work	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
						03.00.414 TRR PGP Energy Dissipation Structures Elevated Deck	223.00 CY	358.76 /CY	7.58 /CY	248.88 /CY	/CY	/CY	615.23 /CY	137,195	992.47 /CY	221,321
		40.00.402				TRR PGP Energy Dissipation Structures Piping										
			40.0			Process Pipe										
				40.11		Process Pipe, Carbon Steel										
					40.10.02.60	Process Pipe, Carbon Steel, 60"										
						Fittings, steel, butt weld, 60" Dia	4.00 ea	3,281.57 /ea	97.68 /ea	9,500.00 /ea	-	-	12,879.25 /ea	51,517	21,087.61 /ea	84,350
						Piping, pipe, WSP, plain end, welded, 60" diameter, excludes excavation or backfill	120.00 LF	121.97 /LF	62.10 /LF	420.00 /LF	-	-	604.07 /LF	72,488	987.20 /LF	118,464
						Energy Dissipating Valves W/ Hood	2.00 ea	2,187.72 /ea	1,560.00 /ea	25,000.00 /ea	-	-	28,747.72 /ea	57,495	47,344.71 /ea	94,689
						40.10.02.60 Process Pipe, Carbon Steel, 60"	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
						40.11 Process Pipe, Carbon Steel	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
						40.0 Process Pipe	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
						40.00.402 TRR PGP Energy Dissipation Structures Piping	120.00 LF	267.82 /LF	91.35 /LF	1,153.33 /LF	/LF	/LF	1,512.50 /LF	181,500	2,479.20 /LF	297,504
						04.03 TRR Reservoir Energy Dissipation Valve Structures	**2.00 EA**	**246,476.70 /EA**	**12,866.61 /EA**	**312,861.40 /EA**	**/EA**	**/EA**	**572,204.70 /EA**	**1,144,409**	**928,971.47 /EA**	**1,857,943**
	04.04					**TRR Reservoir Electrical Building**										
		04.00.402				TRR PGP Electrical Building, Masonry										
			04.0			Masonry										
				04.21		Concrete Unit Masonry - Exterior										
					04.00.02.08	Masonry Concrete Masonry Units, 8"										
						Grout, door frames, 3' x 7' opening, 2.5 C.F. per opening	12.00 opng	41.31 /opng	2.12 /opng	13.40 /opng	-	-	56.83 /opng	682	102.35 /opng	1,228
						Grout, door frames, 6' x 7' opening, 3.5 C.F. per opening	4.00 opng	55.08 /opng	2.83 /opng	18.75 /opng	-	-	76.66 /opng	307	138.11 /opng	552
						Grout, for bond beams, lintels and concrete masonry unit (CMU) cores, C476, includes material only	3,649.99 cf	7.08 /cf	0.36 /cf	5.35 /cf	-	-	12.80 /cf	46,704	23.21 /cf	84,729
						Reinforcing, steel bars A615, placed horizontal, average #4 bar	4,963.98 lb	1.40 /lb	-	0.40 /lb	-	-	1.80 /lb	8,921	3.23 /lb	16,057
						Masonry reinforcing bars, #3 and #4 reinforcing steel bars, placed vertically, ASTM A615	3,649.99 lb	1.80 /lb	-	0.56 /lb	-	-	2.36 /lb	8,600	4.24 /lb	15,488
						Masonry reinforcing bars, truss type steel joint reinforcing, mill standard galvanized, 12" wide	109.48 clf	31.43 /clf	-	29.50 /clf	-	-	60.93 /clf	6,671	110.83 /clf	12,134
						Concrt block,high strngt,hollow,3500 psi,8"8"16",includs mortar and horzntl joint rnfrcng every other course,excluds scffldn,grout and vertcl rnfrcng	14,600.00 SF	8.50 /SF	-	4.07 /SF	-	-	12.57 /SF	183,576	22.72 /SF	331,780
						Channel framing, structural steel, field fabricated, C6x8.2, incl cutting & welding	180.00 lf	40.69 /lf	1.97 /lf	6.85 /lf	-	-	49.51 /lf	8,911	88.81 /lf	15,986
						Silicone water repellants, sprayed on CMU, 2 coat	29,199.88 sf	0.21 /sf	-	0.79 /sf	-	-	1.00 /sf	29,060	1.83 /sf	53,512
						Reglet, zinc and copper alloy, 20 ounce	682.00 lf	3.26 /lf	-	2.87 /lf	-	-	6.13 /lf	4,183	11.15 /lf	7,603
						Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	682.00 lf	5.27 /lf	-	5.25 /lf	-	-	10.52 /lf	7,177	19.15 /lf	13,062
						04.00.02.08 Masonry Concrete Masonry Units, 8"	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
						04.21 Concrete Unit Masonry - Exterior	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
						04.0 Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
						04.00.402 TRR PGP Electrical Building, Masonry	14,600.00 SF	12.79 /SF	0.12 /SF	7.97 /SF	/SF	/SF	20.88 /SF	304,790	37.82 /SF	552,132
		05.00.404				TRR PGP Electrical Building, Metal Roof Framing										
			05.0			Metals										
				05.50		Metal Fabrications										
					05.00.99.00	Metals, Other										
						Open web bar joist, K Series, 40-ton job lots, 28K8, 12.7 plf, 30' to 50' spans, shop fabricated, incl shop primer, horizontal bridging	2,450.00 lf	7.55 /lf	1.41 /lf	12.45 /lf	-	-	21.41 /lf	52,445	39.09 /lf	95,766
						Metal roof decking, steel, open type B wide rib, galvanized, over 500 Sq, 1-1/2" D, 20 gauge	14,384.00 SF	1.26 /SF	0.04 /SF	2.15 /SF	-	-	3.45 /SF	49,607	6.31 /SF	90,733
						05.00.99.00 Metals, Other	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
						05.50 Metal Fabrications	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
						05.0 Metals	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
						05.00.404 TRR PGP Electrical Building, Metal Roof Framing	14,384.00 SF	2.55 /SF	0.28 /SF	4.27 /SF	/SF	/SF	7.10 /SF	102,052	12.97 /SF	186,499
		07.00.400				TRR PGP Electrical Building, Roofing										
			07.0			Thermal and Moisture Protection										
				07.00		Thermal & Moisture Protection										
					07.50.02.00	Thermal & Moisture Protection, Membrane Roofing										
						Roof Deck Insulation, foamglass, tapered for drainage	14,384.00 sf	1.03 /sf	-	1.16 /sf	-	-	2.19 /sf	31,441	3.98 /sf	57,296
						Elastomeric Roofing, vinyl and neoprene membrane traffic deck	14,384.00 SF	2.74 /SF	0.37 /SF	1.77 /SF	-	-	4.88 /SF	70,161	8.83 /SF	127,003
						Flashing, galvanized steel, .018", 26 ga.	676.00 sf	5.46 /sf	-	0.65 /sf	-	-	6.11 /sf	4,127	10.94 /sf	7,394
						Reglet, stainless steel, .020" thick	676.00 lf	3.26 /lf	-	4.21 /lf	-	-	7.47 /lf	5,051	13.64 /lf	9,217
						Reglet, counter flashing for stainless steel, .020" thick, 12 wide	676.00 lf	5.27 /lf	-	6.80 /lf	-	-	12.07 /lf	8,162	22.03 /lf	14,893
						Roof Hatches, with curb, 1" fiberglass insulation, aluminum curb & cover, 2'-6" x 3'-0"	3.00 ea	258.90 /ea	-	900.00 /ea	-	-	1,158.90 /ea	3,477	2,132.55 /ea	6,398
						07.50.02.00 Thermal & Moisture Protection, Membrane Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
						07.00 Thermal & Moisture Protection	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
						07.0 Thermal and Moisture Protection	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
						07.00.400 TRR PGP Electrical Building, Roofing	14,384.00 SF	4.48 /SF	0.37 /SF	3.67 /SF	/SF	/SF	8.51 /SF	122,419	15.45 /SF	222,201
		08.00.402				TRR PGP Electrical Building, Openings										
			08.0			Openings										
				08.10		Doors and Frames										
					08.10.01.00	Openings, Doors, Frames and Hardware										
						Steel frms, knock down, 14 ga., to 8-3/4" throat, to 3'-0" x 7'-0", single	12.00 EA	137.64 /EA	-	430.00 /EA	-	-	567.64 /EA	6,812	1,043.76 /EA	12,525
						Steel frames, knock down, 14 ga., to 8-3/4" throat, to 6070, pair	4.00 EA	183.52 /EA	-	455.00 /EA	-	-	638.52 /EA	2,554	1,172.02 /EA	4,688
						Doors, commercial, steel, insulated, full panel, 18 ga., 3'-0" x 7'-0" x 1-3/4" thick	20.00 ea	97.88 /ea	-	520.00 /ea	-	-	617.88 /ea	12,358	1,139.91 /ea	22,798
						Add for baked enamel finish, average cost per leaf	20.00 leaf	12.94 /leaf	-	50.40 /leaf	-	-	63.34 /leaf	1,267	116.64 /leaf	2,333
						Average Door Hardware	20.00 ea	91.76 /ea	15.00 /ea	500.00 /ea			606.76 /ea	12,135	1,118.62 /ea	22,372

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						08.10.01.00 Openings, Doors, Frames and Hardware	16.00 EA	402.33 /EA	18.75 /EA	1,774.25 /EA	/EA	/EA	2,195.33 /EA	35,125	4,044.79 /EA	64,717
						08.10 Doors and Frames	16.00 EA	402.33 /EA	18.75 /EA	1,774.25 /EA	/EA	/EA	2,195.33 /EA	35,125	4,044.79 /EA	64,717
				08.30		Specialty Doors and Frames - Overhead Door										
					08.30.01.20	Specialty Doors and Frames, Coiling Doors										
						Doors, rolling service, steel, manual, 20 gauge, 12' x 10' high, incl. hardware	4.00 EA	1,186.73 /EA	-	1,250.00 /EA	-	-	2,436.73 /EA	9,747	4,437.40 /EA	17,750
						Doors, rolling service, steel, manual, for weatherstripping, extruded rubber, jambs, add	80.00 lf	-	-	19.15 /lf	-	-	19.15 /lf	1,532	35.55 /lf	2,844
						Doors, rolling service, steel, manual, for weatherstripping, hood, extruded rubber, add	48.00 lf	-	-	8.65 /lf	-	-	8.65 /lf	415	16.06 /lf	771
						Doors, rolling service, steel, manual, motor operators for, to 14' x 14' opening	4.00 ea	284.82 /ea	-	1,200.00 /ea	-	-	1,484.82 /ea	5,939	2,735.69 /ea	10,943
						08.30.01.20 Specialty Doors and Frames, Coiling Doors	4.00 EA	1,471.55 /EA	/EA	2,936.80 /EA	/EA	/EA	4,408.35 /EA	17,633	8,076.77 /EA	32,307
						08.30 Specialty Doors and Frames - Overhead Door	4.00 EA	1,471.55 /EA	/EA	2,936.80 /EA	/EA	/EA	4,408.35 /EA	17,633	8,076.77 /EA	32,307
						08.0 Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,851.19 /EA	97,024
						08.00.402 TRR PGP Electrical Building, Openings	20.00 EA	616.18 /EA	15.00 /EA	2,006.76 /EA	/EA	/EA	2,637.94 /EA	52,759	4,851.19 /EA	97,024
		21.00.400				TRR PGP Electrical Building, Fire Suppression										
			21.0			Fire Suppression										
				21.00		Fire Suppression										
					21.00.10.10	Fire Suppression Systems										
						Fire Suppression System Allowance	14,384.00 SF				15.00 /SF		15.00 /SF	215,760	26.76 /SF	384,884
						21.00.10.10 Fire-Suppression Systems	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
						21.00 Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
						21.0 Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
						21.00.400 TRR PGP Electrical Building, Fire Suppression	14,384.00 SF	/SF	/SF	/SF	15.00 /SF	/SF	15.00 /SF	215,760	26.76 /SF	384,884
		23.00.402				TRR PGP Electrical Building, HVAC										
			23.0			HVAC										
				23.00		HVAC										
					23.00.02.00	Mechanical, HVAC										
						HVAC Allowance	14,384.00 SF				35.00 /SF		35.00 /SF	503,440	62.43 /SF	898,064
						23.00.02.00 Mechanical, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
						23.00 HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
						23.0 HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
						23.00.402 TRR PGP Electrical Building, HVAC	14,384.00 SF	/SF	/SF	/SF	35.00 /SF	/SF	35.00 /SF	503,440	62.43 /SF	898,064
		26.02.PRI				Primary Feeds fromSubstation										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Roadway steel plates, 8' x 20' x 1"thick, avg cost per sf, monthly	1,600.00 sf	-	1.00 /sf	-	-	-	1.00 /sf	1,600	1.83 /sf	2,934
						01.01.06.03 GC Equip, Tools, & Consumables	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,600	/LS	2,934
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,600	/SF	2,934
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	45.42 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	117,487	4,825.14 /ton	219,158
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	117,487	/LF	219,158
					26.10.03.00	UG Conduit										
						Electrical Underground Ducts and Manholes, PVC, conduit with coupling, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	17,440.00 lf	6.49 /lf	-	3.16 /lf	-	-	9.65 /lf	168,236	17.92 /lf	312,515
						Electrical Underground Ducts and Manholes, PVC, elbows, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	128.00 ea	115.32 /ea	-	23.00 /ea	-	-	138.32 /ea	17,704	255.32 /ea	32,681
						Electrical Underground Ducts and Manholes, PVC, bell end and cap, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	256.00 ea	74.13 /ea	-	9.90 /ea	-	-	84.03 /ea	21,512	154.82 /ea	39,634
						Electrical Underground Ducts and Manholes, PVC, base spacer, 4" diameter, schedule 40, installed by direct burial in slab or duct bank	3,488.00 ea	25.31 /ea	-	1.78 /ea	-	-	27.09 /ea	94,501	49.81 /ea	173,752
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	301,954	/LF	558,582
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Elctrc undrgr ducts and manhls,man holes,precast w/iron racks&pulling irons,cl frame and cover,6'10"7",excluds excavtn,backfll and cast place concrete	12.00 ea	3,167.96 /ea	324.85 /ea	3,775.00 /ea	-	-	7,267.81 /ea	87,214	13,601.79 /ea	163,221
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	87,214	/EA	163,221
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	506,654	/LS	940,961
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .975" to 1.570", pad mount	144.00 ea	172.97 /ea	-	163.00 /ea	-	-	335.97 /ea	48,380	627.95 /ea	90,424
						Medium-cable single cable, copper, XLP shielding, ungrounded neutral, 15 kV, 500 kcmil, in conduit, excl splicing & terminations	400.00 clf	864.87 /clf	-	1,050.00 /clf	-	-	1,914.87 /clf	765,948	3,587.72 /clf	1,435,088
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	814,329	/LF	1,525,512
					26.15.11.00	Process Electrical, Grounding										
						Grounding rod, copper clad, 8' long, 3/4" diameter	12.00 ea	195.82 /ea	-	36.00 /ea	-	-	231.82 /ea	2,782	427.73 /ea	5,133
						Ground wire, copper wire, bare stranded, 4/0	23.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	18,036	1,468.48 /clf	33,775
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	20,817	/LF	38,908
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	24.00 E	242.87 /E	-	-	200.00 /E	-	442.87 /E	10,629	812.16 /E	19,492
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	10,629	/EA	19,492
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	845,775	/SF	1,583,912
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,354,029	/SF	2,527,807
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red), envelope/encasement, poured neat	363.33 cy	194.63 /cy	0.35 /cy	77.50 /cy	-	-	272.48 /cy	98,999	437.18 /cy	158,842
						End bulkheads, plywood, concrete envelope/encasement	320.00 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	4,550	22.57 /sf	7,224
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	103,550	/CY	166,066
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	1,253.50 ecy	1.94 /ecy	11.66 /ecy	-	-	-	13.60 /ecy	17,051	21.54 /ecy	27,006
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	17,051	/CY	27,006
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 1/4 mile round trip, 5.0 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	1,670.95 lcy	4.46 /lcy	1.86 /lcy	-	-	-	6.33 /lcy	10,572	10.02 /lcy	16,744
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	10,572	/CY	16,744
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	1,453.33 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	42,067	45.84 /bcy	66,628
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	42,067	/CY	66,628
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	173,239	/LS	276,443
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	173,239	/CY	276,443
						26.02.PRI Primary Feeds fromSubstation	2,180.00 LF	376.38 /LF	26.06 /LF	295.94 /LF	2.20 /LF	/LF	700.58 /LF	1,527,268	1,286.35 /LF	2,804,290
		26.03.MVSWGR				MV SWGR										
			26.0			Electrical Work										
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	80.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	16,378	379.07 /hr	30,326
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,378	/SF	30,326
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,378	/SF	30,326
				26.25		Facility Electrical										
					26.25.03.00	Electrical Equipment, Switchgear - General										
						MV SWGR-A	16,000.00 ea	3.24 /ea	0.63 /ea	50.00 /ea	-	-	53.87 /ea	861,892	102.41 /ea	1,638,585
						MV SWGR-B	14,800.00 ea	3.24 /ea	0.63 /ea	50.00 /ea	-	-	53.87 /ea	797,250	102.41 /ea	1,515,691

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	1,659,143	/EA	3,154,276
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,659,143	/LS	3,154,276
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,675,521	/SF	3,184,602
						26.03.MVSWGR MV SWGR	30,800.00 FA	3.58 /FA	0.69 /FA	50.13 /FA	/FA	/FA	54.40 /FA	1,675,521	103.40 /FA	3,184,602
		26.03.SWGREQ				Station Aux Xfmr, Bttry										
			26.0			Electrical Work										
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	24.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	4,914	379.07 /hr	9,098
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,914	/SF	9,098
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,914	/SF	9,098
				26.25		Facility Electrical										
					26.25.01.00	Station Equipment										
						Control batteries	100.00 kah	498.29 /kah	52.02 /kah	540.00 /kah	-	-	1,090.30 /kah	109,030	2,038.60 /kah	203,860
						Conversion equipment, station service transformers	1.00 ea	1,245.71 /ea	130.04 /ea	105,000.00 /ea	-	-	106,375.75 /ea	106,376	202,690.14 /ea	202,690
						26.25.01.00 Station Equipment	0.00	/LS	/LS	/LS	/LS	/LS	/LS	215,406	/LS	406,550
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	215,406	/LS	406,550
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	220,319	/SF	415,648
						26.03.SWGREQ Station Aux Xfmr, Bttry	1.00 LS	54,187.72 /LS	5,931.53 /LS	160,200.00 /LS	/LS	/LS	220,319.25 /LS	220,319	415,647.95 /LS	415,648
		26.04.MVBUS				Medium Voltage Overhead Bus Duct 2000A										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Threaded rod, steel, painted, 1/2" diameter	768.00 lf	7.41 /lf	-	6.75 /lf	-	-	14.16 /lf	10,877	26.46 /lf	20,323
						Nuts, galvanized steel, 1/2" diameter	16.00 c	-	-	46.50 /c	-	-	46.50 /c	744	88.65 /c	1,418
						Channels, steel, 1-1/2" x 1-1/2"	896.00 lf	14.83 /lf	-	3.68 /lf	-	-	18.51 /lf	16,582	34.20 /lf	30,647
						Spring nuts, steel channel, long, 1/2"	1,024.00 ea	12.97 /ea	-	0.83 /ea	-	-	13.80 /ea	14,134	25.37 /ea	25,982
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	42,337	/SF	78,371
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 5 kV, .525" to 1.025", pad mount	26.00 ea	129.73 /ea	-	87.50 /ea	-	-	217.23 /ea	5,648	404.71 /ea	10,523
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	5,648	/LF	10,523
					26.15.04.00	Process Electrical, Bus Duct										
						Bus duct, copper, 3 pole 3 wire, 2000 amp	540.00 lf	172.97 /lf	-	1,000.00 /lf	-	-	1,172.97 /lf	633,406	2,223.56 /lf	1,200,725
						Bus duct, copper, 3 pole 3 wire, elbow, 2000 amp V	11.00 ea	1,037.85 /ea	-	5,000.00 /ea	-	-	6,037.85 /ea	66,416	11,435.03 /ea	125,785
						Bus duct, copper, 3 pole 3 wire, elbow, 2000 amp H	4.00 ea	1,037.85 /ea	-	5,000.00 /ea	-	-	6,037.85 /ea	24,151	11,435.03 /ea	45,740
						Bus duct, copper, 3 pole 3 wire, tee fittings, 2000 amp V	5.00 ea	2,075.69 /ea	-	7,500.00 /ea	-	-	9,575.69 /ea	47,878	18,104.17 /ea	90,521
						Bus duct, copper, 3 pole 3 wire, tee fittings, 2000 amp H	4.00 ea	2,075.69 /ea	-	7,500.00 /ea	-	-	9,575.69 /ea	38,303	18,104.17 /ea	72,417
						Bus duct, copper, 3 pole 3 wire, expansion fitting, 2000 amp	4.00 ea	798.34 /ea	-	7,500.00 /ea	-	-	8,298.34 /ea	33,193	15,761.70 /ea	63,047
						Bus duct fittings, flange, wall, with vapor barrier, 2000 amp	4.00 ea	518.92 /ea	-	850.00 /ea	-	-	1,368.92 /ea	5,476	2,572.03 /ea	10,288
						Bus duct fittings, switchboard stub, 3 pole, 3 wire, 2000 amp	17.00 ea	864.87 /ea	-	5,000.00 /ea	-	-	5,864.87 /ea	99,703	11,117.82 /ea	189,003
						Bus duct fittings, bellows, 3 pole, 3 wire, 2000 amp	21.00 ea	864.87 /ea	-	2,500.00 /ea	-	-	3,364.87 /ea	70,662	6,351.93 /ea	133,391
						Bus duct fittings, hanger, spring type, 2000 amp	128.00 ea	172.97 /ea	-	150.00 /ea	-	-	322.97 /ea	41,341	633.16 /ea	77,205
						26.15.04.00 Process Electrical, Bus Duct	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,060,530	/LF	2,008,121
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	13.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	5,973	842.59 /E	10,954
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,973	/EA	10,954
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,114,488	/SF	2,107,968
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	40.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	8,189	379.07 /hr	15,163
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,163
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,163
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,122,677	/SF	2,123,131
						26.04.MVBUS Medium Voltage Overhead Bus Duct 2000A	540.00 LF	429.87 /LF	1.85 /LF	1,642.50 /LF	4.82 /LF	/LF	2,079.03 /LF	1,122,677	3,931.72 /LF	2,123,131
		26.04.MVVSD				Medium Voltage Variable Speed Drives										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electrical Contractor startup assistance per hour	26.00 hr	1,297.31 /hr	25.00 /hr	100.00 /hr	-	-	1,422.31 /hr	36,980	2,615.55 /hr	68,004
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	36,980	/SF	68,004
					26.25.03.00	Electrical Equipment, Switchgear - General										
						MV VSP 8000A 13.8kV, includes allowance for Vendor startup, CX train, doc	13.00 ea	10,378.45 /ea	3,200.00 /ea	420,000.00 /ea	5,000.00 /ea	-	438,578.45 /ea	5,701,520	834,739.09 /ea	10,851,608
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,701,520	/EA	10,851,608
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	5,738,500	/SF	10,919,613
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	5,738,500	/SF	10,919,613
						26.04.MVVSD Medium Voltage Variable Speed Drives	13.00 EA	12,973.07 /EA	3,250.00 /EA	420,200.00 /EA	5,000.00 /EA	/EA	441,423.07 /EA	5,738,500	839,970.19 /EA	10,919,613
		26.05.GRDG				Facility Grounding										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.11.00	Process Electrical, Grounding										
						Copper Bus Bar ,25"x 3.0"	20.00 lf	32.43 /lf	-	52.90 /lf	-	-	85.33 /lf	1,707	160.32 /lf	3,206
						Copper Bus Bar Supports	20.00 E	129.73 /E	-	48.30 /E	-	-	178.03 /E	3,561	329.98 /E	6,600
						Ground wire, copper wire, bare stranded, 4/0	35.00 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	27,445	1,468.48 /clf	51,397
						Exothermic weld, 4/0 wire to 4/0 wire	234.00 ea	148.26 /ea	-	9.45 /ea	-	-	157.71 /ea	36,905	289.91 /ea	67,839
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	69,618	/LF	129,042
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	69,618	/SF	129,042
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	69,618	/SF	129,042
						26.05.GRDG Facility Grounding	14,550.00 SF	3.48 /SF	/SF	1.30 /SF	/SF	/SF	4.79 /SF	69,618	8.87 /SF	129,042
		26.20.DIST				Electrical Distribution Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 1-1/2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	40.00 lf	11.53 /lf	-	3.46 /lf	-	-	14.99 /lf	600	27.74 /lf	1,110
						Flexible metallic conduit, steel, 1-1/2" diameter	3.00 lf	20.76 /lf	-	2.55 /lf	-	-	23.31 /lf	70	42.93 /lf	129
						Flexible metallic conduit, steel, 2" diameter	3.00 lf	25.95 /lf	-	3.23 /lf	-	-	29.18 /lf	88	53.74 /lf	161
						Flexible metallic conduit, steel, connectors, insulated, 1-1/2" diameter	1.00 ea	32.43 /ea	-	24.50 /ea	-	-	56.93 /ea	57	106.17 /ea	106
						Flexible metallic conduit, steel, connectors, insulated, 2" diameter	1.00 ea	45.12 /ea	-	26.00 /ea	-	-	71.12 /ea	71	132.30 /ea	132
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 1-1/2" diameter	1.00 ea	45.12 /ea	-	46.00 /ea	-	-	91.12 /ea	91	170.44 /ea	170
						Flexible metallic conduit, steel, connectors, insulated, 90 Deg., 2" diameter	1.00 ea	57.66 /ea	-	67.00 /ea	-	-	124.66 /ea	125	233.48 /ea	233
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 100 amp, 30 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	2,594.61 /ea	-	2,125.00 /ea	-	-	4,719.61 /ea	4,720	8,809.13 /ea	8,809
						Panelboards, 3 phase 4 wire, main circuit breaker, 120/208 V, 225 amp, 42 circuits, NQOD, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	4,125.00 /ea	-	-	7,831.59 /ea	7,832	14,661.06 /ea	14,661
						Panelboards, 3 phase 4 wire, main circuit breaker, 277/480 V, 225 amp, 42 circuits, NEHB, incl 20 A 1 pole plug-in breakers	1.00 ea	3,706.59 /ea	-	5,175.00 /ea	-	-	8,881.59 /ea	8,882	16,662.73 /ea	16,663
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	22,534	/SF	42,175
					26.10.03.00	UG Conduit										
						Uninterruptible power supply, charger, inverter, and alarm 1 phase, 120 V, 5 kVA, incl 10 minutes battery	1.00 ea	6,182.64 /ea	356.18 /ea	7,100.00 /ea	-	-	13,638.82 /ea	13,639	25,526.37 /ea	25,526
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	13,639	/LF	25,526
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #6, type XHHW, in raceway	0.25 clf	159.68 /clf	-	54.50 /clf	-	-	214.20 /clf	54	396.76 /clf	99

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #4, type XHHW, in raceway	0.15 clf	195.80 /clf	-	77.50 /clf	-	-	273.30 /clf	41	506.87 /clf	76
						Wire, copper, stranded, 600 volt, #1, type XHHW, in raceway	1.00 clf	259.46 /clf	-	159.00 /clf	-	-	418.46 /clf	418	778.92 /clf	779
						Wire, copper, stranded, 600 volt, 4/0, type XHHW, in raceway	0.60 clf	471.75 /clf	-	385.00 /clf	-	-	856.75 /clf	514	1,599.05 /clf	959
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,027	/LF	1,914
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	37,200	/SF	69,615
				26.25		Facility Electrical										
					26.25.06.00	Transformers, Dry Type										
						Transformer, dry-type, ventilated, 3 phase 480 V primary 120/208 V secondary, 30 kVA	1.00 ea	2,306.32 /ea	-	1,800.00 /ea	-	-	4,106.32 /ea	4,106	7,660.90 /ea	7,661
						26.25.06.00 Transformers, Dry Type	0.00	/EA	/EA	/EA	/EA	/EA	/EA	4,106	/EA	7,661
						26.25 Facility Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	4,106	/LS	7,661
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	41,306	/SF	77,276
						26.20.DIST Electrical Distribution Equipment	**550.00** AMP	36.16 /AMP	0.65 /AMP	38.29 /AMP	/AMP	/AMP	75.10 /AMP	41,306	140.50 /AMP	77,276
		26.25.LTG				Interior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	2,600.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	47,120	33.61 /lf	87,382
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	150.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	8,289	101.59 /ea	15,238
						Outlet boxes, pressed steel, covers, blank, 4" square	150.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	2,548	31.21 /ea	4,681
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	57,957	/SF	107,301
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	80.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	8,644	199.14 /clf	15,931
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	10.00 clf	103.79 /clf	-	20.50 /clf	-	-	124.29 /clf	1,243	229.41 /clf	2,294
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	9,887	/LF	18,225
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	67,844	/SF	125,526
				26.20		Facility Electrical										
					26.20.03.00	Facility Electrical, Lighting										
						LED Strip Light, hdwe	150.00 ea	182.08 /ea	-	110.00 /ea	-	-	292.08 /ea	43,812	543.60 /ea	81,541
						Emergency ballast, material only, interior, factory installed in fixture	30.00 ea	-	-	152.00 /ea	-	-	152.00 /ea	4,560	289.77 /ea	8,693
						Exit lighting, L.E.D. standard, single face, ceiling or wall mount	12.00 ea	129.73 /ea	-	70.00 /ea	-	-	199.73 /ea	2,397	371.35 /ea	4,456
						Fixture whips, 3/8" greenfield, 2 connectors, THHN wire, three #14, 6' long	150.00 ea	32.43 /ea	-	5.45 /ea	-	-	37.88 /ea	5,682	69.87 /ea	10,480
						26.20.03.00 Facility Electrical, Lighting	0.00	/SF	/SF	/SF	/SF	/SF	/SF	56,451	/SF	105,170
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	56,451	/SF	105,170
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	124,295	/SF	230,696
						26.25.LTG Interior Lighting and Control	**1.00** LS	86,265.47 /LS	/LS	38,029.50 /LS	/LS	/LS	124,294.97 /LS	124,295	230,696.06 /LS	230,696
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	350.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	3,169	16.68 /lf	5,838
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	12.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	663	101.59 /ea	1,219
						Outlet boxes, pressed steel, covers, blank, 4" square	12.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	204	31.21 /ea	374
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,036	/SF	7,432
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	12.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	1,297	199.14 /clf	2,390
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,297	/LF	2,390
					26.15.07.00	Lighting										
						LED Area Light	12.00 E	97.30 /E	-		-	-	97.30 /E	1,168	178.43 /E	2,141
						Wallpack Photocell	12.00 E	32.43 /E	-		-	-	32.43 /E	389	59.48 /E	714
						26.15.07.00 Lighting	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,557	/LS	2,855
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	6,889	/SF	12,676
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	6,889	/SF	12,676
						26.26.EXTLTG Exterior Lighting and Control	**1.00** LS	6,300.47 /LS	/LS	588.58 /LS	/LS	/LS	6,889.05 /LS	6,889	12,676.17 /LS	12,676
		26.30.DEV				Device Outlets										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel conduit, 3/4" diameter, to 15' H, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	3,000.00 lf	12.97 /lf	-	5.15 /lf	-	-	18.12 /lf	54,369	33.61 /lf	100,825
						Outlet boxes, cast, 1 gang, FD, 3/4" hub, 2-11/16" deep	36.00 ea	86.49 /ea	-	22.00 /ea	-	-	108.49 /ea	3,906	200.54 /ea	7,220
						Duplex receptacle, grounded, 120 volt, 20 amp	24.00 ea	38.44 /ea	-	10.65 /ea	-	-	49.09 /ea	1,178	90.79 /ea	2,179
						Duplex receptacle, ground fault interrupting, 20 amp	12.00 ea	38.44 /ea	-	45.00 /ea	-	-	83.44 /ea	1,001	156.28 /ea	1,875
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	60,454	/SF	112,099
					26.10.03.00	UG Conduit										
						WP cover	12.00 ea	17.30 /ea	-	42.50 /ea	-	-	59.80 /ea	718	112.74 /ea	1,353
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	718	/LF	1,353
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	80.00 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	8,644	199.14 /clf	15,931
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	20.00 clf	103.79 /clf	-	20.50 /clf	-	-	124.29 /clf	2,486	229.41 /clf	4,588
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	11,130	/LF	20,519
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	72,301	/SF	133,972
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	72,301	/SF	133,972
						26.30.DEV Device Outlets	**1.00** LS	53,247.76 /LS	/LS	19,053.60 /LS	/LS	/LS	72,301.36 /LS	72,301	133,971.57 /LS	133,972
		26.40.EQCON				Facility Equipment Connections and Controls										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.00.99.00	Electrical, Other										
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 5 HP motor	4.00 ea	129.73 /ea	-	6.35 /ea	-	-	136.08 /ea	544	250.01 /ea	1,000
						Motor connections, flexible conduit and fittings, 3 phase, 460 volt, 10 HP motor	2.00 ea	129.73 /ea	-	6.35 /ea	-	-	136.08 /ea	272	250.01 /ea	500
						Motor connections, flexible conduit and fittings, 3 phase, sealtite, 460 volt, 10 HP motor	2.00 ea	129.73 /ea	-	9.30 /ea	-	-	139.03 /ea	278	255.64 /ea	511
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,095	/SF	2,011
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	1,095	/LS	2,011
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	300.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	2,716	16.68 /lf	5,004
						Electric metallic tubing (EMT), 1" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	9.03 /lf	-	1.80 /lf	-	-	10.83 /lf	2,165	19.98 /lf	3,996
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	4,881	/SF	9,000
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	4.50 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	486	199.14 /clf	896
						Wire, copper, stranded, 600 volt, #10, type XHHW, in raceway	9.00 clf	103.78 /clf	-	20.50 /clf	-	-	124.28 /clf	1,119	229.41 /clf	2,065
						Wire, copper, stranded, 600 volt, #8, type XHHW, in raceway	13.00 clf	129.73 /clf	-	34.00 /clf	-	-	163.73 /clf	2,129	302.72 /clf	3,935
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	3,733	/LF	6,896
					26.20.05.00	Facility Electrical, HVAC										
						HVAC controls - electrical contractor scope	1.00 LS		-	3,500.00 /LS	-	-	3,500.00 /LS	3,500	6,672.24 /LS	6,672
						26.20.05.00 Facility Electrical, HVAC	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,500	/SF	6,672
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	12,114	/SF	22,589
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	13,209	/SF	24,580
						26.40.EQCON Facility Equipment Connections and Controls	**1.00** ALO	8,282.95 /ALO	/ALO	4,925.85 /ALO	/ALO	/ALO	13,208.80 /ALO	13,209	24,580.13 /ALO	24,580
		26.40.PMP				13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A										
			26.0			Electrical Work										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	130.00 lf	64.87 /lf	-	62.50 /lf	-	-	127.37 /lf	16,557	238.10 /lf	30,953
						Rigid galvanized steel plastic coated conduit elbows, 4" diameter, to 15' high	13.00 ea	389.19 /ea	-	196.00 /ea	-	-	585.19 /ea	7,608	1,087.37 /ea	14,136
						Rigid galvanized steel plastic coated conduit couplings, 4" diameter, to 15' high	13.00 ea	28.83 /ea	-	57.50 /ea	-	-	86.33 /ea	1,122	162.49 /ea	2,112
						Flexible metallic conduit, sealtite, 4" diameter	39.00 lf	86.40 /lf	-	20.00 /lf	-	-	106.40 /lf	4,150	196.57 /lf	7,666
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 4" diameter	13.00 ea	129.73 /ea	-	163.00 /ea	-	-	292.73 /ea	3,806	548.64 /ea	7,132
						Flexible metallic conduit, coupling sealtite to rigid, 4" diameter	13.00 ea	129.73 /ea	-	198.00 /ea	-	-	327.73 /ea	4,261	615.37 /ea	8,000
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	37,503	/SF	70,000
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 4" diameter, to 15' H, incl terminations, fittings, & support	650.00 lf	32.43 /lf	-	5.75 /lf	-	-	38.18 /lf	24,819	70.44 /lf	45,785
						PVC conduit elbows, 4" diameter, to 15' H	13.00 ea	116.76 /ea	-	23.00 /ea	-	-	139.76 /ea	1,817	257.96 /ea	3,354
						PVC conduit, field bends, 45 Deg. to 90 Deg., 4" diameter	13.00 ea	129.73 /ea	-	-	-	-	129.73 /ea	1,687	237.91 /ea	3,093
						PVC adapters, 4" diameter, to 15' H	26.00 ea	64.87 /ea	-	4.80 /ea	-	-	69.67 /ea	1,811	128.10 /ea	3,331
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	30,133	/LF	55,562
					26.15.01.00	Process Electrical, Wire/Cable										
						Cable terminations, indoor, insulation diameter range, 15 kV, .525" to 1.025", pad mount	78.00 ea	324.33 /ea	-	109.00 /ea	-	-	433.33 /ea	33,799	802.56 /ea	62,600
						MV VFD Cable 3/C	9.75 clf	3,373.00 /clf	-	6,000.00 /clf	-	-	9,373.00 /clf	91,387	17,623.71 /clf	171,831
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	125,186	/LF	234,431
					26.25.03.00	Electrical Equipment, Switchgear - General										
						Hi-Pot Test 15 KV	13.00 E	259.46 /E	-	-	200.00 /E	-	459.46 /E	5,973	842.59 /E	10,954
						26.25.03.00 Electrical Equipment, Switchgear - General	0.00	/EA	/EA	/EA	/EA	/EA	/EA	5,973	/EA	10,954
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	198,795	/SF	370,946
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	40.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	8,189	379.07 /hr	15,163
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,163
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	8,189	/SF	15,163
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	206,985	/SF	386,109
						26.40.PMP 13.8kV 8000HP Pump Power Feeders 4", 3/C VFD Cable 300A	**780.00** LF	145.29 /LF	1.28 /LF	115.46 /LF	3.33 /LF	/LF	265.37 /LF	206,985	495.01 /LF	386,109
		26.41.PMP				8000HP Pump Process Control Circuits and Connections										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Rigid galvanized steel plastic coated conduit, 40 mil. thick, 2" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	130.00 lf	29.65 /lf	-	22.50 /lf	-	-	52.15 /lf	6,780	97.27 /lf	12,645
						Rigid galvanized steel plastic coated conduit elbows, 2" diameter, to 15' high	13.00 ea	129.73 /ea	-	42.00 /ea	-	-	171.73 /ea	2,233	317.97 /ea	4,134
						Rigid galvanized steel plastic coated conduit couplings, 2" diameter, to 15' high	13.00 ea	19.58 /ea	-	14.35 /ea	-	-	33.93 /ea	441	63.27 /ea	822
						Flexible metallic conduit, sealtite, 2" diameter	39.00 lf	34.60 /lf	-	4.30 /lf	-	-	38.90 /lf	1,517	71.64 /lf	2,794
						Flexible metallic conduit, sealtite, connectors, insulated, 90 Deg., 2" diameter	13.00 ea	51.89 /ea	-	25.50 /ea	-	-	77.39 /ea	1,006	143.77 /ea	1,869
						Flexible metallic conduit, coupling sealtite to rigid, 2" diameter	13.00 ea	103.79 /ea	-	31.50 /ea	-	-	135.29 /ea	1,759	250.38 /ea	3,255
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	13,735	/SF	25,519
					26.10.03.00	UG Conduit										
						PVC conduit, schedule 40, 2" diameter, to 15' H, incl terminations, fittings, & support	650.00 lf	11.53 /lf	-	3.36 /lf	-	-	14.89 /lf	9,680	27.55 /lf	17,909
						PVC conduit elbows, 2" diameter, to 15' H	13.00 ea	51.32 /ea	-	3.54 /ea	-	-	54.86 /ea	713	100.87 /ea	1,311
						PVC conduit, field bends, 45 Deg. to 90 Deg., 2" diameter	13.00 ea	51.89 /ea	-	-	-	-	51.89 /ea	675	95.16 /ea	1,237
						PVC adapters, 2" diameter, to 15' H	26.00 ea	38.44 /ea	-	1.39 /ea	-	-	39.83 /ea	1,036	73.14 /ea	1,902
						26.10.03.00 UG Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	12,103	/LF	22,359
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	80.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	7,163	164.90 /clf	13,192
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	60.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	10,696	329.08 /clf	19,745
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	17,859	/LF	32,937
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,697	/SF	80,815
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	43,697	/SF	80,815
						26.41.PMP 8000HP Pump Process Control Circuits and Connections	**780.00** LF	43.96 /LF	/LF	12.06 /LF	/LF	/LF	56.02 /LF	43,697	103.61 /LF	80,815
		26.90.LPS				Facility Lightning Protection System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.15.10.00	Process Electrical, Lightning Protection										
						Air terminal and base, copper, 3/8" dia x 10", to 75' h	50.00 ea	129.73 /ea	-	26.00 /ea	-	-	155.73 /ea	7,787	287.47 /ea	14,374
						Lightning protection cable, copper, 220 lb per thousand feet, to 75' h	1,650.00 lf	3.24 /lf	-	3.18 /lf	-	-	6.42 /lf	10,598	12.01 /lf	19,816
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	18,385	/SF	34,190
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	18,385	/SF	34,190
				26.20		Facility Electrical										
					26.00.99.00	Electrical, Other										
						Electrical startup, FAT, demonstration, documentation, testing, commissioning	16.00 hr	129.73 /hr	25.00 /hr	50.00 /hr	-	-	204.73 /hr	3,276	379.07 /hr	6,065
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,276	/SF	6,065
					26.15.10.00	Process Electrical, Lightning Protection										
						LPS design and certification, misc mat and labor	1.00 LS	4,540.57 /LS	-	5,000.00 /LS	5,000.00 /LS	-	14,540.57 /LS	14,541	27,027.79 /LS	27,028
						26.15.10.00 Process Electrical, Lightning Protection	0.00	/SF	/SF	/SF	/SF	/SF	/SF	14,541	/SF	27,028
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	17,816	/SF	33,093
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	36,201	/SF	67,283
						26.90.LPS Facility Lightning Protection System	**14,550.00** SF	1.27 /SF	0.03 /SF	0.85 /SF	0.34 /SF	/SF	2.49 /SF	36,201	4.62 /SF	67,283
		27.10.COMEQ				Communications Room Equipment										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	1,811	16.68 /lf	3,336
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	4.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	221	101.59 /ea	406
						Outlet boxes, pressed steel, covers, blank, 4" square	4.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	68	31.21 /ea	125
						Duplex receptacle, grounded, 120 volt, 20 amp	4.00 ea	38.44 /ea	-	10.65 /ea	-	-	49.09 /ea	196	90.79 /ea	363
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	2,296	/SF	4,230
					26.15.01.00	Process Electrical, Wire/Cable										
						Closet Distribution Frame (CDF), 7 feet tall, 19 inches wide	1.00 E	364.31 /E	-	123.00 /E	-	-	487.31 /E	487	902.58 /E	903
						Network Equipment Allowance	1.00 LS	24,287.06 /LS	-	20,000.00 /LS	-	-	44,287.06 /LS	44,287	82,666.03 /LS	82,666
						Wire, copper, stranded, 600 volt, #12, type XHHW, in raceway	6.50 clf	94.35 /clf	-	13.70 /clf	-	-	108.05 /clf	702	199.14 /clf	1,294
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	45,477	/LF	84,863
					26.15.03.00	Process Electrical, Cable Tray										
						Cable tray, ladder type, galvanized steel, 4" deep, 4" rung spacing, 12" wide, to 15' elevation, incl fittings & supports	30.00 lf	24.14 /lf	-	17.95 /lf	-	-	42.09 /lf	1,263	78.48 /lf	2,354
						26.15.03.00 Process Electrical, Cable Tray	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,263	/LF	2,354
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	49,035	/SF	91,448
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	49,035	/SF	91,448
						27.10.COMEQ Communications Room Equipment	**1.00** LS	28,011.60 /LS	/LS	21,023.71 /LS	/LS	/LS	49,035.31 /LS	49,035	91,447.85 /LS	91,448
		27.31.COMCDT				Comm Conduit to MH/HH										
			26.0			Electrical Work										
				26.10		Site Electrical										
					26.10.02.00	Site Electrical, Buried Conduit										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					26.10.02.00	Site Electrical, Buried Conduit										
						Reinforcing Steel, in place, beams and girders, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	0.90 ton	1,461.67 /ton	-	1,125.00 /ton	-	-	2,586.67 /ton	2,328	4,825.14 /ton	4,343
						26.10.02.00 Site Electrical, Buried Conduit	0.00	/LF	/LF	/LF	/LF	/LF	/LF	2,328	/LF	4,343
					26.10.04.00	Site Electrical, Manholes/Handholes										
						Electrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 4"dm,excludes excavation,backfill and cast place concrete	800.00 lf	12.97 /lf	-	3.72 /lf	-	-	16.69 /lf	13,354	30.88 /lf	24,706
						26.10.04.00 Site Electrical, Manholes/Handholes	0.00	/EA	/EA	/EA	/EA	/EA	/EA	13,354	/EA	24,706
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	15,682	/LS	29,049
				26.15		Process Electrical										
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	130.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	11,639	164.90 /clf	21,436
						Cable, copper braided shield, PVC jacket, 300 V, #18 stranded, 2 conductor	130.00 clf	148.26 /clf	-	30.00 /clf	-	-	178.26 /clf	23,174	329.08 /clf	42,781
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	34,814	/LF	64,217
					26.15.11.00	Process Electrical, Grounding										
						Ground wire, copper wire, bare stranded, 4/0	1.55 clf	364.16 /clf	-	420.00 /clf	-	-	784.16 /clf	1,212	1,468.48 /clf	2,269
						Water pipe ground clamps, heavy duty, bronze, 1-1/4" to 2" diameter	1.50 ea	129.73 /ea	-	31.00 /ea	-	-	160.73 /ea	241	297.01 /ea	446
						26.15.11.00 Process Electrical, Grounding	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,453	/LF	2,714
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	36,266	/SF	66,932
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	51,949	/SF	95,980
			31.0			Earthwork										
				26.10		Site Electrical										
					31.20.07.15	Earthworks, Sitework, Borrow										
						Concrete (red) envelope/encasement, poured neat	8.90 cy	194.63 /cy	1.76 /cy	77.50 /cy	-	-	273.89 /cy	2,438	439.41 /cy	3,912
						End bulkheads, plywood, concrete envelope/encasement	1.07 sf	13.49 /sf	-	0.73 /sf	-	-	14.22 /sf	15	22.59 /sf	24
						31.20.07.15 Earthworks, Sitework, Borrow	0.00	/CY	/CY	/CY	/CY	/CY	/CY	2,454	/CY	3,936
					31.20.09.10	Earthworks, Sitework, Backfill										
						Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	116.05 ecy	1.94 /ecy	23.32 /ecy	-	-	-	25.26 /ecy	2,932	40.01 /ecy	4,643
						31.20.09.10 Earthworks, Sitework, Backfill	0.00	/CY	/CY	/CY	/CY	/CY	/CY	2,932	/CY	4,643
					31.20.15.00	Earthworks, Sitework, Hauling and Dump Fees										
						Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	9.87 lcy	10.88 /lcy	9.31 /lcy	-	-	-	20.19 /lcy	199	31.98 /lcy	316
						31.20.15.00 Earthworks, Sitework, Hauling and Dump Fees	0.00	/CY	/CY	/CY	/CY	/CY	/CY	199	/CY	316
					31.25.01.00	Earthworks, Structural, Excavation										
						Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	125.92 bcy	5.93 /bcy	23.02 /bcy	-	-	-	28.95 /bcy	3,645	45.84 /bcy	5,773
						31.25.01.00 Earthworks, Structural, Excavation	0.00	/CY	/CY	/CY	/CY	/CY	/CY	3,645	/CY	5,773
						26.10 Site Electrical	0.00	/LS	/LS	/LS	/LS	/LS	/LS	9,229	/LS	14,668
						31.0 Earthwork	0.00	/CY	/CY	/CY	/CY	/CY	/CY	9,229	/CY	14,668
						27.31.COMCDT Comm Conduit to MH/HH	**200.00** LF	224.65 /LF	28.56 /LF	52.68 /LF	/LF	/LF	305.89 /LF	61,178	553.24 /LF	110,648
		28.10.FA				Fire Alarm System										
			26.0			Electrical Work										
				26.15		Process Electrical										
					26.00.99.00	Electrical, Other										
						Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,820.00 lf	7.98 /lf	-	1.07 /lf	-	-	9.05 /lf	16,477	16.68 /lf	30,358
						Outlet boxes, pressed steel, 4" square, 2-1/8" deep, 1" KO	60.00 ea	51.89 /ea	-	3.37 /ea	-	-	55.26 /ea	3,316	101.59 /ea	6,095
						Outlet boxes, pressed steel, covers, blank, 4" square	8.00 ea	16.22 /ea	-	0.77 /ea	-	-	16.99 /ea	136	31.21 /ea	250
						Outlet boxes, pressed steel, plaster rings, 4" square, concealed	52.00 ea	16.22 /ea	-	1.66 /ea	-	-	17.88 /ea	930	32.90 /ea	1,711
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,858	/SF	38,414
					26.15.01.00	Process Electrical, Wire/Cable										
						Wire, copper, stranded, 600 volt, #14, type XHHW, in raceway	300.00 clf	79.83 /clf	-	9.70 /clf	-	-	89.53 /clf	26,860	164.90 /clf	49,469
						26.15.01.00 Process Electrical, Wire/Cable	0.00	/LF	/LF	/LF	/LF	/LF	/LF	26,860	/LF	49,469
						26.15 Process Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	47,719	/SF	87,883
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	47,719	/SF	87,883
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Detection Systems, fire alarm control panel, alarm device, excluding wires & conduits	24.00 ea	129.73 /ea	-	230.00 /ea	-	-	359.73 /ea	8,634	586.44 /ea	14,074
						Detection Systems, fire alarm control panel, actuating device, excluding wires & conduits	4.00 ea	129.73 /ea	-	340.00 /ea	-	-	469.73 /ea	1,879	768.64 /ea	3,075
						Detection Systems, fire alarm control panel, addressable without voice, up to 200 points, excluding wires & conduits, inluding vendor design, startup	1.00 ea	1,816.00 /ea	-	4,575.00 /ea	2,500.00 /ea	-	8,891.00 /ea	8,891	14,413.72 /ea	14,414
						Detection Systems, fire alarm control panel, battery & rack, excluding wires & conduits	1.00 ea	259.46 /ea	-	460.00 /ea	-	-	719.46 /ea	719	1,172.87 /ea	1,173
						Detection Systems, fire alarm control panel, battery & rack, automatic charger, excluding wires & conduits	1.00 ea	129.73 /ea	-	525.00 /ea	-	-	654.73 /ea	655	1,075.06 /ea	1,075
						Detection Systems, visual alarm, ADA type, excluding wires & conduits	24.00 ea	154.90 /ea	-	119.00 /ea	-	-	273.90 /ea	6,574	442.45 /ea	10,619
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,429
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,429
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	27,351	/SF	44,429
						28.10.FA Fire Alarm System	**14.550.00** SF	3.58 /SF	/SF	1.41 /SF	0.17 /SF	/SF	5.16 /SF	75,070	9.09 /SF	132,312
		28.20.AC				Access Control System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Card reader - all in allowance per each (incl circuit, cards, CX)	7.00 ea	1,556.77 /ea	-	800.00 /ea	-	-	2,356.77 /ea	16,497	3,790.78 /ea	26,535
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,535
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,535
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	16,497	/SF	26,535
						28.20.AC Access Control System	**12.00** DOOR	908.12 /DOOR	/DOOR	466.67 /DOOR	/DOOR	/DOOR	1,374.78 /DOOR	16,497	2,211.29 /DOOR	26,535
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Camera allowance (licenses, circuit, startup, CX)	1.00 LS	25,946.13 /LS	-	10,000.00 /LS	10,000.00 /LS	-	45,946.13 /LS	45,946	84,983.51 /LS	84,984
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,984
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,984
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	45,946	/SF	84,984
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Closed circuit television system (CCTV), industrial quality, for additional camera stations, add	12.00 ea	384.39 /ea	-	690.00 /ea	-	-	1,074.39 /ea	12,893	1,751.70 /ea	21,020
						Closed circuit television system (CCTV), industrial quality, for weatherproof camera station, add	12.00 ea	798.34 /ea	-	540.00 /ea	-	-	1,338.34 /ea	16,060	2,158.89 /ea	25,907
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,927
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,927
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	28,953	/SF	46,927
						28.20.CCTV Closed Circuit TV and Cameras	**12.00** CAM	3,344.91 /CAM	/CAM	2,063.33 /CAM	833.33 /CAM	/CAM	6,241.57 /CAM	74,899	10,992.55 /CAM	131,911
		28.20.ID				Intrusion Detection System										
			28.0			Electronic Safety and Security										
				28.00		Electronic Safety and Security										
					28.35.01.00	Electronic Safety and Security										
						Securitized door, all-in allowance per each (incl circuit, devices, CX)	7.00 ea	2,594.61 /ea	-	1,000.00 /ea	-	-	3,594.61 /ea	25,162	5,765.85 /ea	40,361
						Door controller (all-in cost including vendor program and startup)	3.00 ea	648.65 /ea	-	2,000.00 /ea	500.00 /ea	-	3,148.65 /ea	9,446	5,132.00 /ea	15,396

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						28.35.01.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,757
						28.00 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,757
						28.0 Electronic Safety and Security	0.00	/SF	/SF	/SF	/SF	/SF	/SF	34,608	/SF	55,757
						28.20.ID Intrusion Detection System	16.00 DOOR	1,256.77 /DOOR	/DOOR	812.50 /DOOR	93.75 /DOOR	/DOOR	2,163.02 /DOOR	34,608	3,484.81 /DOOR	55,757
						04.04 TRR Reservoir Electrical Building	**14,384.00 SF**	**158.01 /SF**	**10.15 /SF**	**645.11 /SF**	**56.54 /SF**	**/SF**	**869.81 /SF**	**12,511,294**	**1,632.31 /SF**	**23,479,107**
	04.05					**TRR Reservoir Site Electrical**										
		26.20.DB				Site Ductbanks										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						In addition to those itemized, lump sum allowance	1.00 ls	-	-	-	50,000.00 /ls	-	50,000.00 /ls	50,000	91,692.74 /ls	91,693
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	50,000	/SF	91,693
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	50,000	/SF	91,693
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	50,000	/SF	91,693
						26.20.DB Site Ductbanks	1.00 LS	/LS	/LS	/LS	50,000.00 /LS	/LS	50,000.00 /LS	50,000	91,692.74 /LS	91,693
		26.26.EXTLTG				Exterior Lighting and Control										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Site lighting, pole, base, circuit, controls, per each (qty assumed)	25.00 ea	-	-	-	5,000.00 /ea	-	5,000.00 /ea	125,000	9,169.27 /ea	229,232
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	125,000	/SF	229,232
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	125,000	/SF	229,232
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	125,000	/SF	229,232
						26.26.EXTLTG Exterior Lighting and Control	1.00 LS	/LS	/LS	/LS	125,000.00 /LS	/LS	125,000.00 /LS	125,000	229,231.81 /LS	229,232
		28.20.AC				Access Control System										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Gate Operator, with card reader, power and control circuit, per each	2.00 ea	-	-	-	10,000.00 /ea	-	10,000.00 /ea	20,000	18,338.55 /ea	36,677
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,000	/SF	36,677
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,000	/SF	36,677
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	20,000	/SF	36,677
						28.20.AC Access Control System	2.00 DOOR	/DOOR	/DOOR	/DOOR	10,000.00 /DOOR	/DOOR	10,000.00 /DOOR	20,000	18,338.55 /DOOR	36,677
		28.20.CCTV				Closed Circuit TV and Cameras										
			26.0			Electrical Work										
				26.00		Electrical										
					26.00.99.00	Electrical, Other										
						Cameras, installed on site ltg poles, assumed qty, per each	10.00 ea	-	-	-	7,500.00 /ea	-	7,500.00 /ea	75,000	13,753.91 /ea	137,539
						26.00.99.00 Electrical, Other	0.00	/SF	/SF	/SF	/SF	/SF	/SF	75,000	/SF	137,539
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	75,000	/SF	137,539
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	75,000	/SF	137,539
						28.20.CCTV Closed Circuit TV and Cameras	10.00 CAM	/CAM	/CAM	/CAM	7,500.00 /CAM	/CAM	7,500.00 /CAM	75,000	13,753.91 /CAM	137,539
						04.05 TRR Reservoir Site Electrical	**1.00 LS**	**/LS**	**/LS**	**/LS**	**270,000.00 /LS**	**/LS**	**270,000.00 /LS**	**270,000**	**495,140.74 /LS**	**495,141**
	04.06					**Funks Reservoir PGP Sitework**										
		31.00.400				TRR PGP Earthworks										
			01.0			General Requirements										
				01.01		Construction Operations										
					01.01.05.00	General Conditions, Other										
						Funks Reservoir, Dewatering/Erosion Controls/Dust Abatement Allowance	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	-	-	60,000.00 /MO	2,160,000	96,118.77 /MO	3,460,276
						01.01.05.00 General Conditions, Other	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,118.77 /MO	3,460,276
						01.01 Construction Operations	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,118.77 /MO	3,460,276
						01.0 General Requirements	36.00 MO	15,000.00 /MO	30,000.00 /MO	15,000.00 /MO	/MO	/MO	60,000.00 /MO	2,160,000	96,118.77 /MO	3,460,276
			31.0			Earthwork										
				31.25		Earthworks, Structural										
					31.16.01.00	Earthworks, Sheeting and Shoring										
						Sheet Pile Wall	27,450.00 SF				45.00 /SF		45.00 /SF	1,235,250	71.27 /SF	1,956,456
						31.16.01.00 Earthworks, Sheeting and Shoring	27,450.00 SF	/SF	/SF	/SF	45.00 /SF	/SF	45.00 /SF	1,235,250	71.27 /SF	1,956,456
					31.25.01.00	Earthworks, Structural, Excavation										
						Structural Excavation, excludes sheeting or dewatering	135,000.00 CY	2.65 /CY	3.23 /CY	-	-	-	5.88 /CY	794,111	9.32 /CY	1,257,756
						Stockpile Excavated Spoils	135,000.00 cy	1.24 /cy	1.35 /cy	0.25 /cy	-	-	2.84 /cy	383,019	4.51 /cy	609,094
						31.25.01.00 Earthworks, Structural, Excavation	135,000.00 CY	3.89 /CY	4.58 /CY	0.25 /CY	/CY	/CY	8.72 /CY	1,177,130	13.83 /CY	1,866,849
					31.25.02.00	Earthworks, Structural, Import Aggregates (Slab)										
						Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 12" deep	2,100.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	-	-	50.50 /CY	106,051	82.52 /CY	173,298
						31.25.02.00 Earthworks, Structural, Import Aggregates (Slab)	2,100.00 CY	14.75 /CY	0.76 /CY	35.00 /CY	/CY	/CY	50.50 /CY	106,051	82.52 /CY	173,298
					31.25.03.00	Earthworks, Structural, Backfill										
						Backfill, Native material	86,710.00 CY	6.18 /CY	1.69 /CY	-	-	-	7.87 /CY	682,514	12.47 /CY	1,081,003
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	69,370.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	140,872	3.22 /cy	223,121
						Compaction, 4 passes, 13" to 18", 8" lifts, rammer tamper	17,340.00 cy	1.29 /cy	0.15 /cy	-	-	-	1.44 /cy	24,927	2.28 /cy	39,480
						Compaction, water for, 6000 gallon wagon, 6 mile haul	86,710.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	160,734	3.02 /cy	262,123
						31.25.03.00 Earthworks, Structural, Backfill	86,710.00 CY	7.45 /CY	2.98 /CY	1.20 /CY	/CY	/CY	11.64 /CY	1,009,046	18.52 /CY	1,605,727
					31.25.05.00	Earthworks, Structural, Hauling and Disposal										
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	48,290.00 CY	7.24 /CY	8.80 /CY	-	-	-	16.04 /CY	774,348	25.40 /CY	1,226,455
						Load excavated spoils	48,290.00 cy	1.03 /cy	1.13 /cy	-	-	-	2.16 /cy	104,112	3.41 /cy	164,899
						31.25.05.00 Earthworks, Structural, Hauling and Disposal	48,290.00 CY	8.27 /CY	9.92 /CY	/CY	/CY	/CY	18.19 /CY	878,461	28.81 /CY	1,391,354
						31.25 Earthworks, Structural	272,100.00 CY	5.88 /CY	4.99 /CY	0.78 /CY	4.54 /CY	/CY	16.19 /CY	4,405,938	25.70 /CY	6,993,685
						31.0 Earthwork	272,100.00 CY	5.88 /CY	4.99 /CY	0.78 /CY	4.54 /CY	/CY	16.19 /CY	4,405,938	25.70 /CY	6,993,685
						31.00.400 TRR PGP Earthworks	272,100.00 CY	7.87 /CY	8.96 /CY	2.76 /CY	4.54 /CY	/CY	24.13 /CY	6,565,938	36.42 /CY	10,453,960
		32.00.400				TRR PGP Site Improvements										
			32.0			Exterior Improvements										
				32.12		Paving										
					32.40.03.00	Site Improvements, Paving, Concrete										
						C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	2,086.00 sfca	8.32 /sfca	-	0.97 /sfca	-	-	9.29 /sfca	19,372	14.78 /sfca	30,829
						Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	167.50 ton	1,370.94 /ton	-	1,200.00 /ton	-	-	2,570.94 /ton	430,633	4,159.00 /ton	696,633
						Reinforcing in place, unloading & sorting, add to above - slabs	167.50 ton	49.21 /ton	6.50 /ton	-	-	-	55.71 /ton	9,331	88.23 /ton	14,778
						Struct concrete,ready mix,normal wt,4500 osi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives and treatments	2,284.70 cy	-	-	131.00 /cy	-	-	131.00 /cy	299,296	216.98 /cy	495,740
						Structural concrete, placing, slab on grade, pumped, over 6" thick, includes strike off & consolidation, excludes material	2,240.48 CY	23.45 /CY	5.55 /CY	-	-	-	29.00 /CY	64,976	45.93 /CY	102,912
						Cfnsh,firs,for spcf rndm accs flrs aci clss 1,2,3 and 4,achv a cmps ovrl flr fltn&vln val f35/25,bull flt,mchn flt&stl trwl (wlk-bhn),excl plcn,strkn	90,284.00 sf	0.91 /sf	0.03 /sf	-	-	-	0.94 /sf	84,566	1.48 /sf	133,940
						Curing, sprayed membrane curing compound	902.84 csf	10.60 /csf	-	12.45 /csf	-	-	23.05 /csf	20,809	37.41 /csf	33,774
						Fine grading, fine grade for slab on grade, machine	10,031.56 SY	1.19 /SY	0.68 /SY	-	-	-	1.87 /SY	18,802	2.97 /SY	29,779
						32.40.03.00 Site Improvements, Paving, Concrete	10,031.56 SY	41.02 /SY	2.27 /SY	51.19 /SY	/SY	/SY	94.48 /SY	947,783	153.35 /SY	1,538,384
					32.40.04.00	Site Improvements, Access Roads, Gravel										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	18,893.00 SY	0.62 /SY	0.35 /SY	-	-	-	0.98 /SY	18,413	1.54 /SY	29,164
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,6"deep	18,893.00 sy	0.94 /sy	0.92 /sy	7.30 /sy	-	-	9.16 /sy	173,037	15.04 /sy	284,064
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	18,893.00 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	18,421	1.54 /sy	29,176
						32.40.04.00 Site Improvements, Access Roads, Gravel	18,893.00 SY	2.13 /SY	1.68 /SY	7.30 /SY	/SY	/SY	11.11 /SY	209,871	18.12 /SY	342,404
					32.40.04.90	Site Improvements, Access Roads, Asphalt										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
					32.40.04.90	Site Improvements, Access Roads, Asphalt										
						Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	4,692.00 sy	0.62 /sy	0.35 /sy	-	-	-	0.98 /sy	4,573	1.54 /sy	7,243
						Base course drainage layers,aggregate base course for roadways and large paved areas,crushed stone base,compacted,crushed 1-1/2"stone base,12"deep	4,692.00 sy	1.34 /sy	1.31 /sy	15.00 /sy	-	-	17.64 /sy	82,773	29.03 /sy	136,204
						Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	4,692.00 sy	0.57 /sy	0.41 /sy	-	-	-	0.98 /sy	4,575	1.54 /sy	7,246
						Plant-mix asphalt paving, for highways and large paved areas, binder course, 2" thick, no hauling included	4,692.00 SY	0.99 /SY	0.39 /SY	7.40 /SY	-	-	8.78 /SY	41,209	14.45 /SY	67,786
						Plant-mix asphalt paving, for highways and large paved areas, wearing course, 2" thick, no hauling included	4,692.00 sy	1.11 /sy	0.43 /sy	8.25 /sy	-	-	9.79 /sy	45,930	16.10 /sy	75,554
						32.40.04.90 Site Improvements, Access Roads, Asphalt	4,692.00 SY	4.62 /SY	2.89 /SY	30.65 /SY	/SY	/SY	38.16 /SY	179,060	62.67 /SY	294,032
						32.12 Paving	33,616.56 SY	14.08 /SY	2.03 /SY	23.66 /SY	/SY	/SY	39.76 /SY	1,336,715	64.69 /SY	2,174,820
				32.31		Fencing										
					32.45.01.00	Fencing, Chain Link										
						Fence,chain link industrial,galvanized steel,3 strands barb wire,2"posts @ 10'oc,9ga wire,6'high,schedule 40,includes excavation,& concrete	1,400.00 LF	6.52 /LF	0.94 /LF	19.95 /LF	-	-	27.41 /LF	38,369	44.85 /LF	62,795
						Fence, chain link industrial, gate, chain link, 8' high, to 18' wide, includes excavation, in concrete	60.00 LF	95.45 /LF	28.04 /LF	176.00 /LF	-	-	299.49 /LF	17,970	487.11 /LF	29,227
						32.45.01.00 Fencing, Chain Link	1,460.00 LF	10.17 /LF	2.05 /LF	26.36 /LF	/LF	/LF	38.59 /LF	56,338	63.03 /LF	92,022
						32.31 Fencing	1,460.00 LF	10.17 /LF	2.05 /LF	26.36 /LF	/LF	/LF	38.59 /LF	56,338	63.03 /LF	92,022
						32.0 Exterior Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,841.80 /LS	2,266,842
						32.00.400 TRR PGP Site Improvements	1.00 LS	488,194.34 /LS	71,080.21 /LS	833,778.18 /LS	/LS	/LS	1,393,052.73 /LS	1,393,053	2,266,841.80 /LS	2,266,842
		33.00.400				TRR PGP Yard Piping										
			33.2			Pipeline Specialties										
				33.01		Pipeline Specialties										
					33.10.99.01	Buried Pipe Specials, Other										
						Excavating, trench or continuous footing, common earth, 2-1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	36,710.00 cy	1.99 /cy	2.43 /cy	-	-	-	4.41 /cy	161,954	6.99 /cy	256,512
						Pipe bedding and zone, CLSM	20,832.00 cy	4.52 /cy	0.71 /cy	70.00 /cy	-	-	75.23 /cy	1,567,242	124.23 /cy	2,588,005
						Backfill native material	9,350.00 cy	6.18 /cy	1.69 /cy		-	-	7.87 /cy	73,596	12.47 /cy	116,565
						Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	27,360.00 cy	7.24 /cy	8.80 /cy	-	-	-	16.04 /cy	438,728	25.40 /cy	694,881
						Load excavated spoils	27,360.00 cy	0.77 /cy	0.84 /cy		-	-	1.62 /cy	44,241	2.56 /cy	70,071
						Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	9,350.00 cy	0.82 /cy	1.21 /cy	-	-	-	2.03 /cy	18,987	3.22 /cy	30,073
						Compaction, water for, 6000 gallon wagon, 6 mile haul	9,350.00 cy	0.35 /cy	0.30 /cy	1.20 /cy	-	-	1.85 /cy	17,332	3.02 /cy	28,265
						Piping, pipe, WSP, plain end, welded, 144" diameter, excludes excavation or backfill	1,850.00 LF	121.97 /LF	62.10 /LF	970.00 /LF	-	-	1,154.07 /LF	2,135,022	1,898.20 /LF	3,511,666
						Pipe Fittings and Connections Allowance	1.00 ls	162,500.00 /ls	162,500.00 /ls	325,000.00 /ls	-	-	650,000.00 /ls	650,000	1,053,067.95 /ls	1,053,068
						33.10.99.01 Buried Pipe Specials, Other	1,850.00 LF	455.79 /LF	364.83 /LF	1,939.98 /LF	/LF	/LF	2,760.60 /LF	5,107,102	4,513.03 /LF	8,349,107
						33.01 Pipeline Specialties	1.00 LS	843,212.34 /LS	674,929.96 /LS	3,588,960.00 /LS	/LS	/LS	5,107,102.30 /LS	5,107,102	8,349,106.77 /LS	8,349,107
						33.2 Pipeline Specialties	1.00 LS	843,212.34 /LS	674,929.96 /LS	3,588,960.00 /LS	/LS	/LS	5,107,102.30 /LS	5,107,102	8,349,106.77 /LS	8,349,107
						33.00.400 TRR PGP Yard Piping	1,850.00 LF	455.79 /LF	364.83 /LF	1,939.98 /LF	/LF	/LF	2,760.60 /LF	5,107,102	4,513.03 /LF	8,349,107
						04.06 Funks Reservoir PGP Sitework	**1.00 LS**	**3,472,440.83 /LS**	**3,184,362.15 /LS**	**5,174,040.18 /LS**	**1,235,250.00 /LS**	**/LS**	**13,066,093.16 /LS**	**13,066,093**	**21,069,908.87 /LS**	**21,069,909**
						04 Terminal Regulating Reservoir (TRR) PGP	***1.00 LS***	***12,684,841.40 /LS***	***3,732,724.47 /LS***	***23,832,141.19 /LS***	***3,402,650.00 /LS***	***21,876,526.00 /LS***	***65,528,883.06 /LS***	***65,528,883***	***96,347,247.71 /LS***	***96,347,248***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	12,684,841		137,176.944 hrs	
Material	23,832,141			
Allowance	3,402,650			
Equipment	3,732,724		36,470.123 hrs	
Subtotal Direct Costs	**43,652,356**	**43,652,356**		
Material Sales Tax, Dunnigan Ca	1,727,830			7.250 %
Subtotal W/ Sales Tax	**1,727,830**	**45,380,186**		
Masonry Work I,OH&P	76,892			20.000 %
Metals Work I,OH&P	232,914			20.000 %
Architectural (Div 6-12)I,OH&P	35,778			20.000 %
Mechanical Work I,OH&P	153,701			20.000 %
Electrical Work I,OH&P	3,104,621			25.000 %
Instruments & Controls I,OH&P				20.000 %
Subtotal W/ Subcontractor OH&P	**3,603,906**	**48,984,092**		
General Conditions	2,449,205			5.000 %
Subtotal W/ General Conditions	**2,449,205**	**51,433,297**		
Mobilization/Demobilization	1,542,999			3.000 %
Prime Contractor Overhead	5,297,630			10.000 %
Prime Contractor Profit	3,496,436			6.000 %
Bonds & Insurance	1,340,417			2.170 %
Subtotal W/ Prime Markups	**11,677,482**	**63,110,779**		
Contractor Contingency	1,893,323			3.000 %
Design Contingency	9,466,617			15.000 %
Subtotal W/ Contingency	**11,359,940**	**74,470,719**		
Non-Markup Items	21,876,526			
Subtotal W/ Non-Markup Items	**21,876,526**	**96,347,245**		
Total Construction Cost		**96,347,245**		
Non-Contract Costs	16,379,032			17.000 %
Total Project Costs	**16,379,032**	**112,726,277**		

TRR West Transmission Power Lines - WAPA

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 TRR West Transmission Lines WAPA Rev 0
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 0 / Mar 22, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
10			Transmission Lines for WAPA Connection										
	10.01		Funks to WAPA Connection										
		34.07.MISC	MISC. SUPERVISION, ROADS & MATTING	1.00 LS	120,950.00 /LS	/LS	70,000.00 /LS	231,000.00 /LS	5,000,000.00 /LS	5,421,950.00 /LS	5,421,950	8,429,682.94 /LS	8,429,683
		34.09.FNDT	T-LINE FOUNDATIONS	1.00 MO	212,206.80 /MO	56,155.50 /MO	103,371.40 /MO	/MO	/MO	371,733.70 /MO	371,734	585,093.01 /MO	585,093
		34.11.STRC	T-LINE STRUCTURES	1.00 MO	468,187.20 /MO	99,928.50 /MO	870,000.00 /MO	/MO	/MO	1,438,115.70 /MO	1,438,116	2,297,614.41 /MO	2,297,614
		34.13.WIRE	T-LINE WIRE WORK	1.00 MO	251,085.89 /MO	64,704.75 /MO	106,125.00 /MO	/MO	/MO	421,915.64 /MO	421,916	663,265.16 /MO	663,265
			10.01 Funks to WAPA Connection	2.00 MI	526,214.94 /MI	110,394.38 /MI	574,748.20 /MI	115,500.00 /MI	2,500,000.00 /MI	3,826,857.52 /MI	7,653,715	5,987,827.76 /MI	11,975,656
	10.02		Funks to TRR										
		34.07.MISC	MISC. SUPERVISION, ROADS & MATTING	1.00 LS	447,115.00 /LS	/LS	40,000.00 /LS	670,000.00 /LS	5,000,000.00 /LS	6,157,115.00 /LS	6,157,115	9,569,804.88 /LS	9,569,805
		34.09.FNDT	T-LINE FOUNDATIONS	3.00 MO	255,980.40 /MO	56,155.50 /MO	131,737.40 /MO	/MO	/MO	443,873.30 /MO	1,331,620	699,239.82 /MO	2,097,719
		34.11.STRC	T-LINE STRUCTURES	3.00 MO	384,446.40 /MO	99,928.50 /MO	653,333.33 /MO	/MO	/MO	1,137,708.23 /MO	3,413,125	1,815,133.95 /MO	5,445,402
		34.13.WIRE	T-LINE WIRE WORK	7.00 MO	91,404.60 /MO	36,974.14 /MO	44,571.43 /MO	/MO	/MO	172,950.17 /MO	1,210,651	271,960.82 /MO	1,903,726
			10.02 Funks to TRR	2.00 MI	1,504,113.78 /MI	363,535.50 /MI	1,353,606.10 /MI	335,000.00 /MI	2,500,000.00 /MI	6,056,255.38 /MI	12,112,511	9,508,325.98 /MI	19,016,652
			10 Transmission Lines for WAPA Connection	4.00 MI	1,015,164.36 /MI	236,964.94 /MI	964,177.15 /MI	225,250.00 /MI	2,500,000.00 /MI	4,941,556.45 /MI	19,766,226	7,748,076.87 /MI	30,992,307

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	6,309,436		34,061.853 hrs	
Material	6,272,152			
Allowance	1,399,971			
Equipment	1,472,781		9,720.000 hrs	
Other	15,537,967			
Total Construction Cost	**30,992,307**	**30,992,307**		
Non-Contract Costs	4,648,846			15.000 %
Total Project Costs	**4,648,846**	**35,641,153**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 TRR West Transmission Lines WAPA Rev 0
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 0 / Mar 22, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
10						***Transmission Lines for WAPA Connection***										
	10.01					**Funks to WAPA Connection**										
		34.07.MISC				*MISC, SUPERVISION, ROADS & MATTING*										
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Matting Structure Work Pad 50'x50'	7.00 ea		-		7,000.00 /ea	-	7,000.00 /ea	49,000	10,876.58 /ea	76,136
						Matting per foot (through wetlands)	700.00 lf		-		150.00 /lf	-	150.00 /lf	105,000	233.07 /lf	163,149
						Access Road per foot	1,700.00 lf		-		40.00 /lf	-	40.00 /lf	68,000	62.15 /lf	105,658
						ROW clearing	3.00 acre		-		3,000.00 /acre	-	3,000.00 /acre	9,000	4,661.39 /acre	13,984
						Field Construction Coordinator	800.00 hr	118.95 /hr	-			-	118.95 /hr	95,160	184.82 /hr	147,859
						General Supervision	200.00 hr	128.95 /hr	-			-	128.95 /hr	25,790	200.36 /hr	40,072
						Misc Material	1.00 ls		-	70,000.00 /ls		-	70,000.00 /ls	70,000	113,840.77 /ls	113,841
						Allowance at BUDGET LEVEL (Other cost type)	1.00 ls		-			5,000,000.00 /ls	5,000,000.00 /ls	5,000,000	7,768,983.44 /ls	7,768,983
						33.71.91.00 Transmission Line	***1.00*** *LS*	*120,950.00 /LS*	*/LS*	*70,000.00 /LS*	*231,000.00 /LS*	*5,000,000.00 /LS*	*5,421,950.00 /LS*	*5,421,950*	*8,429,682.94 /LS*	*8,429,683*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*5,421,950*	*/SF*	*8,429,683*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*5,421,950*	*/LF*	*8,429,683*
						34.07.MISC MISC, SUPERVISION, ROADS & MATTING	***1.00*** *LS*	*120,950.00 /LS*	*/LS*	*70,000.00 /LS*	*231,000.00 /LS*	*5,000,000.00 /LS*	*5,421,950.00 /LS*	*5,421,950*	*8,429,682.94 /LS*	*8,429,683*
		34.09.FNDT				*T-LINE FOUNDATIONS*										
			26.0			*Electrical Work*										
				26.00		*Electrical*										
					01.01.06.03	*GC Equip, Tools, & Consumables*										
						Rent auger, truck-mounted, for caissons, water wells	30.00 day	-	771.10 /day	-	-	-	771.10 /day	23,133	1,198.13 /day	35,944
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	30.00 day	-	629.75 /day	-	-	-	629.75 /day	18,893	978.50 /day	29,355
						Rent crane truck mounted, hydraulic, 12 ton capacity	30.00 day	-	471.00 /day	-	-	-	471.00 /day	14,130	731.84 /day	21,955
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*56,155.50 /LS*	*/LS*	*/LS*	*/LS*	*56,155.50 /LS*	*56,156*	*87,254.22 /LS*	*87,254*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*56,156*	*/SF*	*87,254*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*56,156*	*/SF*	*87,254*
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Mobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,268.34 /ls	33,268
						Foundation 7' dia x 30' caisson	2.00 ea	19,032.00 /ea	-	12,477.00 /ea	-	-	31,509.00 /ea	63,018	49,863.16 /ea	99,726
						Foundation 8' dia x 30' caisson	1.00 ea	28,548.00 /ea	-	14,532.40 /ea	-	-	43,080.40 /ea	43,080	67,991.77 /ea	67,992
						Foundation 10' dia x 30' caisson	3.00 ea	34,257.60 /ea	-	21,295.00 /ea	-	-	55,552.60 /ea	166,658	87,861.34 /ea	263,584
						Demobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,268.35 /ls	33,268
						33.71.91.00 Transmission Line	***1.00*** *LS*	*212,206.80 /LS*	*/LS*	*103,371.40 /LS*	*/LS*	*/LS*	*315,578.20 /LS*	*315,578*	*497,838.79 /LS*	*497,839*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*315,578*	*/SF*	*497,839*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*315,578*	*/LF*	*497,839*
						34.09.FNDT T-LINE FOUNDATIONS	***1.00*** *MO*	*212,206.80 /MO*	*56,155.50 /MO*	*103,371.40 /MO*	*/MO*	*/MO*	*371,733.70 /MO*	*371,734*	*585,093.01 /MO*	*585,093*
		34.11.STRC				*T-LINE STRUCTURES*										
			26.0			*Electrical Work*										
				26.00		*Electrical*										
					01.01.06.03	*GC Equip, Tools, & Consumables*										
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	30.00 day	-	629.75 /day	-	-	-	629.75 /day	18,893	978.50 /day	29,355
						Rent forklift, for rough terrain, 42' lift, 35' reach, 9000 lb., 110 H.P.	30.00 day	-	534.20 /day	-	-	-	534.20 /day	16,026	830.04 /day	24,901
						Rent crane truck mount, cable 8x4 drive 90 ton, 15' radius	30.00 day	-	1,696.00 /day	-	-	-	1,696.00 /day	50,880	2,635.24 /day	79,057
						Rent crane truck mounted, hydraulic, 12 ton capacity	30.00 day	-	471.00 /day	-	-	-	471.00 /day	14,130	731.84 /day	21,955
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*99,928.50 /LS*	*/LS*	*/LS*	*/LS*	*99,928.50 /LS*	*99,929*	*155,268.58 /LS*	*155,269*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*99,929*	*/SF*	*155,269*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*99,929*	*/SF*	*155,269*
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Mobilization	1.00 LS	57,096.00 /LS	-		-	-	57,096.00 /LS	57,096	88,715.57 /LS	88,716
						Install Steel Double Circuit Suspension Pole	2.00 ea	45,676.80 /ea	-	85,000.00 /ea	-	-	130,676.80 /ea	261,354	209,207.68 /ea	418,415
						Install Steel Double Circuit Light Angle Pole	1.00 ea	57,096.00 /ea	-	130,000.00 /ea	-	-	187,096.00 /ea	187,096	300,134.14 /ea	300,134
						Install Steel Double Circuit Heavy Angle Pole	1.00 ea	68,515.20 /ea	-	170,000.00 /ea	-	-	238,515.20 /ea	238,515	382,929.12 /ea	382,929
						Install Steel Single Circuit H-Deadend Structure	***0.00 ea***	***0.00 /ea***	***-***	***0.00 /ea***	***-***	***-***	***0.00 /ea***	***0***	***0.00 /ea***	***0***
						Install Steel Single Circuit 3P Structure	2.00 ea	68,515.20 /ea	-	200,000.00 /ea	-	-	268,515.20 /ea	537,030	431,718.03 /ea	863,436
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,715.58 /ls	88,716
						33.71.91.00 Transmission Line	*1.00 LS*	*468,187.20 /LS*	*/LS*	*870,000.00 /LS*	*/LS*	*/LS*	*1,338,187.20 /LS*	*1,338,187*	*2,142,345.83 /LS*	*2,142,346*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*1,338,187*	*/SF*	*2,142,346*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*1,338,187*	*/LF*	*2,142,346*
						34.11.STRC T-LINE STRUCTURES	***1.00*** *MO*	*468,187.20 /MO*	*99,928.50 /MO*	*870,000.00 /MO*	*/MO*	*/MO*	*1,438,115.70 /MO*	*1,438,116*	*2,297,614.41 /MO*	*2,297,614*
		34.13.WIRE				*T-LINE WIRE WORK*										
			26.0			*Electrical Work*										
				26.00		*Electrical*										
					01.01.06.03	*GC Equip, Tools, & Consumables*										
						Rent dozer, crawler, torque converter, diesel 200 HP	15.00 day	-	1,504.00 /day	-	-	-	1,504.00 /day	22,560	2,336.91 /day	35,054
						Rent trailer with cable reel for high voltage line work	15.00 day	-	64.10 /day	-	-	-	64.10 /day	962	99.60 /day	1,494
						Rent trailer with cable tensioning rig, for high voltage line work	15.00 day	-	110.40 /day	-	-	-	110.40 /day	1,656	171.54 /day	2,573
						Rent trailer with cable pulling rig, for high voltage line work	15.00 day	-	607.15 /day	-	-	-	607.15 /day	9,107	943.39 /day	14,151
						Rent crane truck mount, cable 8x4 drive 40 ton, 12' radius	15.00 day	-	2,028.00 /day	-	-	-	2,028.00 /day	30,420	3,151.10 /day	47,267
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*64,704.75 /LS*	*/LS*	*/LS*	*/LS*	*64,704.75 /LS*	*64,705*	*100,538.02 /LS*	*100,538*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*64,705*	*/SF*	*100,538*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*64,705*	*/SF*	*100,538*
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Overhead line conductors & devices, conductors, primary circuits, per wire, 1000 to 1600 kcmil	18,500.00 lf	5.15 /lf		2.25 /lf	-	-	7.40 /lf	136,800	11.65 /lf	215,577
						Overhead line conductors & devices, insulators and hardware, primary circuits, disk insulators, 345 to 500 kV	6.00 ea	2,854.80 /ea		9,000.00 /ea	-	-	11,854.80 /ea	71,129	19,072.45 /ea	114,435
						Overhead line conductors & devices, overhead ground wire	7,000.00 lf	7.59 /lf		1.50 /lf	-	-	9.09 /lf	63,638	14.23 /lf	99,642
						Mobilization	1.00 ls	42,822.00 /ls	-		-	-	42,822.00 /ls	42,822	66,536.69 /ls	66,537
						Demobilization	1.00 ls	42,822.00 /ls	-		-	-	42,822.00 /ls	42,822	66,536.66 /ls	66,537
						33.71.91.00 Transmission Line	***1.00*** *LS*	*251,085.89 /LS*	*/LS*	*106,125.00 /LS*	*/LS*	*/LS*	*357,210.89 /LS*	*357,211*	*562,727.14 /LS*	*562,727*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*357,211*	*/SF*	*562,727*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*357,211*	*/LF*	*562,727*
						34.13.WIRE T-LINE WIRE WORK	***1.00*** *MO*	*251,085.89 /MO*	*64,704.75 /MO*	*106,125.00 /MO*	*/MO*	*/MO*	*421,915.64 /MO*	*421,916*	*663,265.16 /MO*	*663,265*
						10.01 Funks to WAPA Connection	***2.00*** **MI**	**526,214.94 /MI**	**110,394.38 /MI**	**574,748.20 /MI**	**115,500.00 /MI**	**2,500,000.00 /MI**	**3,826,857.52 /MI**	**7,653,715**	**5,987,827.76 /MI**	**11,975,656**
	10.02					**Funks to TRR**										
		34.07.MISC				*MISC, SUPERVISION, ROADS & MATTING*										
			33.0			*Utilities*										
				26.20		*Facility Electrical*										
					33.71.91.00	*Transmission Line*										
						Matting Structure Work Pad 50'x50'	20.00 ea		-		7,000.00 /ea	-	7,000.00 /ea	140,000	10,876.58 /ea	217,532
						Matting per foot (through wetlands)	2,000.00 lf		-		150.00 /lf	-	150.00 /lf	300,000	233.07 /lf	466,139
						Access Road per foot	5,000.00 lf		-		40.00 /lf	-	40.00 /lf	200,000	62.15 /lf	310,759
						ROW clearing	10.00 acre		-		3,000.00 /acre	-	3,000.00 /acre	30,000	4,661.39 /acre	46,614
						Field Construction Coordinator	3,000.00 hr	118.95 /hr	-			-	118.95 /hr	356,850	184.82 /hr	554,472
						General Supervision	700.00 hr	128.95 /hr	-			-	128.95 /hr	90,265	200.36 /hr	140,253
						Misc Material	1.00 ls		-	40,000.00 /ls		-	40,000.00 /ls	40,000	65,051.88 /ls	65,052
						Allowance at BUDGET LEVEL (Other cost type)	1.00 ls		-			5,000,000.00 /ls	5,000,000.00 /ls	5,000,000	7,768,983.40 /ls	7,768,983
						33.71.91.00 Transmission Line	***1.00*** *LS*	*447,115.00 /LS*	*/LS*	*40,000.00 /LS*	*670,000.00 /LS*	*5,000,000.00 /LS*	*6,157,115.00 /LS*	*6,157,115*	*9,569,804.88 /LS*	*9,569,805*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*6,157,115*	*/SF*	*9,569,805*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*6,157,115*	*/LF*	*9,569,805*

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
						34.07.MISC MISC, SUPERVISION, ROADS & MATTING	1.00 LS	447,115.00 /LS	/LS	40,000.00 /LS	670,000.00 /LS	5,000,000.00 /LS	6,157,115.00 /LS	6,157,115	9,569,804.88 /LS	9,569,805
		34.09.FNDT				T-LINE FOUNDATIONS										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent auger, truck-mounted, for caissons, water wells	90.00 day	-	771.10 /day	-	-	-	771.10 /day	69,399	1,198.13 /day	107,832
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	90.00 day	-	629.75 /day	-	-	-	629.75 /day	56,678	978.50 /day	88,065
						Rent crane truck mounted, hydraulic, 12 ton capacity	90.00 day	-	471.00 /day	-	-	-	471.00 /day	42,390	731.84 /day	65,865
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	168,466.50 /LS	/LS	/LS	/LS	168,466.50 /LS	168,467	261,762.70 /LS	261,763
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	168,467	/SF	261,763
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	168,467	/SF	261,763
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,268.34 /ls	33,268
						Foundation 7' dia x 30' caisson	8.00 ea	22,838.40 /ea	-	12,477.00 /ea	-	-	35,315.40 /ea	282,523	55,777.54 /ea	446,220
						Foundation 8' dia x 30' caisson	13.00 ea	28,548.00 /ea	-	14,532.40 /ea	-	-	43,080.40 /ea	560,045	67,991.78 /ea	883,893
						Foundation 10' dia x 30' caisson	5.00 ea	34,257.60 /ea	-	21,295.00 /ea	-	-	55,552.60 /ea	277,763	87,861.34 /ea	439,307
						Demobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,268.32 /ls	33,268
						33.71.91.00 Transmission Line	1.00 LS	767,941.20 /LS	/LS	395,212.20 /LS	/LS	/LS	1,163,153.40 /LS	1,163,153	1,835,956.77 /LS	1,835,957
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,163,153	/SF	1,835,957
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,163,153	/LF	1,835,957
						34.09.FNDT T-LINE FOUNDATIONS	3.00 MO	255,980.40 /MO	56,155.50 /MO	131,737.40 /MO	/MO	/MO	443,873.30 /MO	1,331,620	699,239.82 /MO	2,097,719
		34.11.STRC				T-LINE STRUCTURES										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	90.00 day	-	629.75 /day	-	-	-	629.75 /day	56,678	978.50 /day	88,065
						Rent forklift, for rough terrain, 42' lift, 35' reach, 9000 lb., 110 H.P.	90.00 day	-	534.20 /day	-	-	-	534.20 /day	48,078	830.04 /day	74,703
						Rent crane truck mount, cable 8x4 drive 90 ton, 15' radius	90.00 day	-	1,696.00 /day	-	-	-	1,696.00 /day	152,640	2,635.24 /day	237,172
						Rent crane truck mounted, hydraulic, 12 ton capacity	90.00 day	-	471.00 /day	-	-	-	471.00 /day	42,390	731.84 /day	65,865
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	299,785.50 /LS	/LS	/LS	/LS	299,785.50 /LS	299,786	465,805.72 /LS	465,806
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	299,786	/SF	465,806
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	299,786	/SF	465,806
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 LS	57,096.00 /LS	-		-	-	57,096.00 /LS	57,096	88,715.57 /LS	88,716
						Install Steel Double Circuit Suspension Pole	8.00 ea	45,676.80 /ea	-	85,000.00 /ea	-	-	130,676.80 /ea	1,045,414	209,207.68 /ea	1,673,661
						Install Steel Double Circuit Light Angle Pole	1.00 ea	57,096.00 /ea	-	130,000.00 /ea	-	-	187,096.00 /ea	187,096	300,134.14 /ea	300,134
						Install Steel Double Circuit Heavy Angle Pole	5.00 ea	68,515.20 /ea	-	170,000.00 /ea	-	-	238,515.20 /ea	1,192,576	382,929.13 /ea	1,914,646
						Install Steel Single Circuit H-Deadend Structure	6.00 ea	45,676.80 /ea	-	50,000.00 /ea	-	-	95,676.80 /ea	574,061	152,287.29 /ea	913,724
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,715.59 /ls	88,716
						33.71.91.00 Transmission Line	1.00 LS	1,153,339.20 /LS	/LS	1,960,000.00 /LS	/LS	/LS	3,113,339.20 /LS	3,113,339	4,979,596.13 /LS	4,979,596
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,113,339	/SF	4,979,596
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	3,113,339	/LF	4,979,596
						34.11.STRC T-LINE STRUCTURES	3.00 MO	384,446.40 /MO	99,928.50 /MO	653,333.33 /MO	/MO	/MO	1,137,708.23 /MO	3,413,125	1,815,133.95 /MO	5,445,402
		34.13.WIRE				T-LINE WIRE WORK										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent dozer, crawler, torque converter, diesel 200 HP	60.00 day	-	1,504.00 /day	-	-	-	1,504.00 /day	90,240	2,336.91 /day	140,215
						Rent trailer with cable reel for high voltage line work	60.00 day	-	64.10 /day	-	-	-	64.10 /day	3,846	99.60 /day	5,976
						Rent trailer with cable tensioning rig, for high voltage line work	60.00 day	-	110.40 /day	-	-	-	110.40 /day	6,624	171.54 /day	10,292
						Rent trailer with cable pulling rig, for high voltage line work	60.00 day	-	607.15 /day	-	-	-	607.15 /day	36,429	943.39 /day	56,603
						Rent crane truck mount, cable 8x4 drive 40 ton, 12' radius	60.00 day	-	2,028.00 /day	-	-	-	2,028.00 /day	121,680	3,151.10 /day	189,066
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	258,819.00 /LS	/LS	/LS	/LS	258,819.00 /LS	258,819	402,152.09 /LS	402,152
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	258,819	/SF	402,152
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	258,819	/SF	402,152
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Overhead line conductors & devices, conductors, primary circuits, per wire, 795 to 954 kcmil	66,000.00 lf	4.57 /lf		1.50 /lf	-	-	6.07 /lf	400,538	9.54 /lf	629,533
						Overhead line conductors & devices, insulators and hardware, primary circuits, disk insulators, 345 to 500 kV	20.00 ea	2,854.80 /ea		9,000.00 /ea	-	-	11,854.80 /ea	237,096	19,072.45 /ea	381,449
						Overhead line conductors & devices, overhead ground wire	22,000.00 lf	7.59 /lf		1.50 /lf	-	-	9.09 /lf	200,006	14.23 /lf	313,161
						Mobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,715.55 /ls	88,716
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,715.59 /ls	88,716
						33.71.91.00 Transmission Line	1.00 LS	639,832.17 /LS	/LS	312,000.00 /LS	/LS	/LS	951,832.17 /LS	951,832	1,501,573.68 /LS	1,501,574
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	951,832	/SF	1,501,574
						33.0 Utilities	44,000.00 LF	14.54 /LF	/LF	7.09 /LF	/LF	/LF	21.63 /LF	951,832	34.13 /LF	1,501,574
						34.13.WIRE T-LINE WIRE WORK	7.00 MO	91,404.60 /MO	36,974.14 /MO	44,571.43 /MO	/MO	/MO	172,950.17 /MO	1,210,651	271,960.82 /MO	1,903,726
						10.02 Funks to TRR	2.00 MI	1,504,113.78 /MI	363,535.50 /MI	1,353,606.10 /MI	335,000.00 /MI	2,500,000.00 /MI	6,056,255.38 /MI	12,112,511	9,508,325.98 /MI	19,016,652
						10 Transmission Lines for WAPA Connection	***4.00 MI***	***1,015,164.36 /MI***	***236,964.94 /MI***	***964,177.15 /MI***	***225,250.00 /MI***	***2,500,000.00 /MI***	***4,941,556.45 /MI***	***19,766,226***	***7,748,076.87 /MI***	***30,992,307***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	4,060,657		34,061.853 hrs	
Material	3,856,709			
Allowance	901,000			
Equipment	947,860		9,720.000 hrs	
Other	10,000,000			
Subtotal Direct Costs	**19,766,226**	**19,766,226**		
Material Sales Tax, Dunnigan Ca	279,611			7.250 %
Subtotal W/ Sales Tax	**279,611**	**20,045,837**		
General Conditions	1,002,292			5.000 %
Subtotal W/ General Conditions	**1,002,292**	**21,048,129**		
Mobilization/Demobilization	631,444			3.000 %
Prime Contractor Overhead	2,167,957			10.000 %
Prime Contractor Profit	1,430,852			6.000 %
Bonds & Insurance	548,541			2.170 %
Subtotal W/ Prime Markups	**4,778,794**	**25,826,923**		
Contractor Contingency	1,291,346			5.000 %
Design Contingency	3,874,038			15.000 %
Subtotal W/ Contingency	**5,165,384**	**30,992,307**		
Total Construction Cost		**30,992,307**		
Non-Contract Costs	4,648,846			15.000 %
Total Project Costs	**4,648,846**	**35,641,153**		

TRR West Transmission Power Lines - PGE

Jacobs

SUMMARY REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 TRR West Transmission Lines PG&E Rev 0
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 0 / Mar 22, 2021
Estimate Class: 4

Area	Facility	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
11			***Transmission Lines for PG&E Connection***										
	11.01		TRR to PGE Connection										
		34.07.MISC	MISC. SUPERVISION, ROADS & MATTING	1.00 LS	181,425.00 /LS	/LS	30,000.00 /LS	365,000.00 /LS	5,000,000.00 /LS	5,576,425.00 /LS	5,576,425	8,673,566.70 /LS	8,673,567
		34.09.FNDT	T-LINE FOUNDATIONS	1.75 MO	226,752.69 /MO	37,437.00 /MO	127,958.29 /MO	/MO	/MO	392,147.97 /MO	686,259	619,070.65 /MO	1,083,374
		34.11.STRC	T-LINE STRUCTURES	1.50 MO	578,572.80 /MO	66,619.00 /MO	1,173,333.33 /MO	/MO	/MO	1,818,525.13 /MO	2,727,788	2,912,889.83 /MO	4,369,335
		34.13.WIRE	T-LINE WIRE WORK	1.50 MO	218,188.56 /MO	86,273.00 /MO	125,500.00 /MO	/MO	/MO	429,961.56 /MO	644,942	677,692.89 /MO	1,016,539
			11.01 TRR to PGE Connection	2.00 MI	886,692.12 /MI	147,426.38 /MI	1,101,088.50 /MI	182,500.00 /MI	2,500,000.00 /MI	4,817,707.00 /MI	9,635,414	7,571,407.21 /MI	15,142,814
	11.02		TRR to Funks										
		34.07.MISC	MISC. SUPERVISION, ROADS & MATTING	1.00 LS	447,115.00 /LS	/LS	40,000.00 /LS	670,000.00 /LS	5,000,000.00 /LS	6,157,115.00 /LS	6,157,115	9,577,269.94 /LS	9,577,270
		34.09.FNDT	T-LINE FOUNDATIONS	3.00 MO	255,980.40 /MO	56,155.50 /MO	131,737.40 /MO	/MO	/MO	443,873.30 /MO	1,331,620	699,777.99 /MO	2,099,334
		34.11.STRC	T-LINE STRUCTURES	3.00 MO	384,446.40 /MO	99,928.50 /MO	653,333.33 /MO	/MO	/MO	1,137,708.23 /MO	3,413,125	1,816,513.33 /MO	5,449,540
		34.13.WIRE	T-LINE WIRE WORK	2.00 MO	319,916.09 /MO	129,409.50 /MO	156,000.00 /MO	/MO	/MO	605,325.58 /MO	1,210,651	952,596.81 /MO	1,905,194
			11.02 TRR to Funks	2.00 MI	1,504,113.78 /MI	363,535.50 /MI	1,353,606.10 /MI	335,000.00 /MI	2,500,000.00 /MI	6,056,255.38 /MI	12,112,511	9,515,668.77 /MI	19,031,338
			11 Transmission Lines for PG&E Connection	***4.00 MI***	***1,195,402.95 /MI***	***255,480.94 /MI***	***1,227,347.30 /MI***	***258,750.00 /MI***	***2,500,000.00 /MI***	***5,436,981.19 /MI***	***21,747,925***	***8,543,537.98 /MI***	***34,174,152***

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	7,435,450		40,114.433 hrs	
Material	7,990,076			
Allowance	1,609,434			
Equipment	1,589,101		10,440.000 hrs	
Other	15,550,091			
Total Construction Cost	**34,174,152**	**34,174,152**		
Non-Contract Costs	5,126,123			15.000 %
Total Project Costs	**5,126,123**	**39,300,275**		

Jacobs

DETAIL REPORT

Project type:
Job Size:
Duration:

Project Name: Sites Reservoir Project Task Order 1 TRR West Transmission Lines PG&E Rev 0
Project Number: D3380602
Design Stage: Feasibility

Estimator: Wells/Cavalleri - Jacobs
Revision/Date: 0 / Mar 22, 2021
Estimate Class: 4

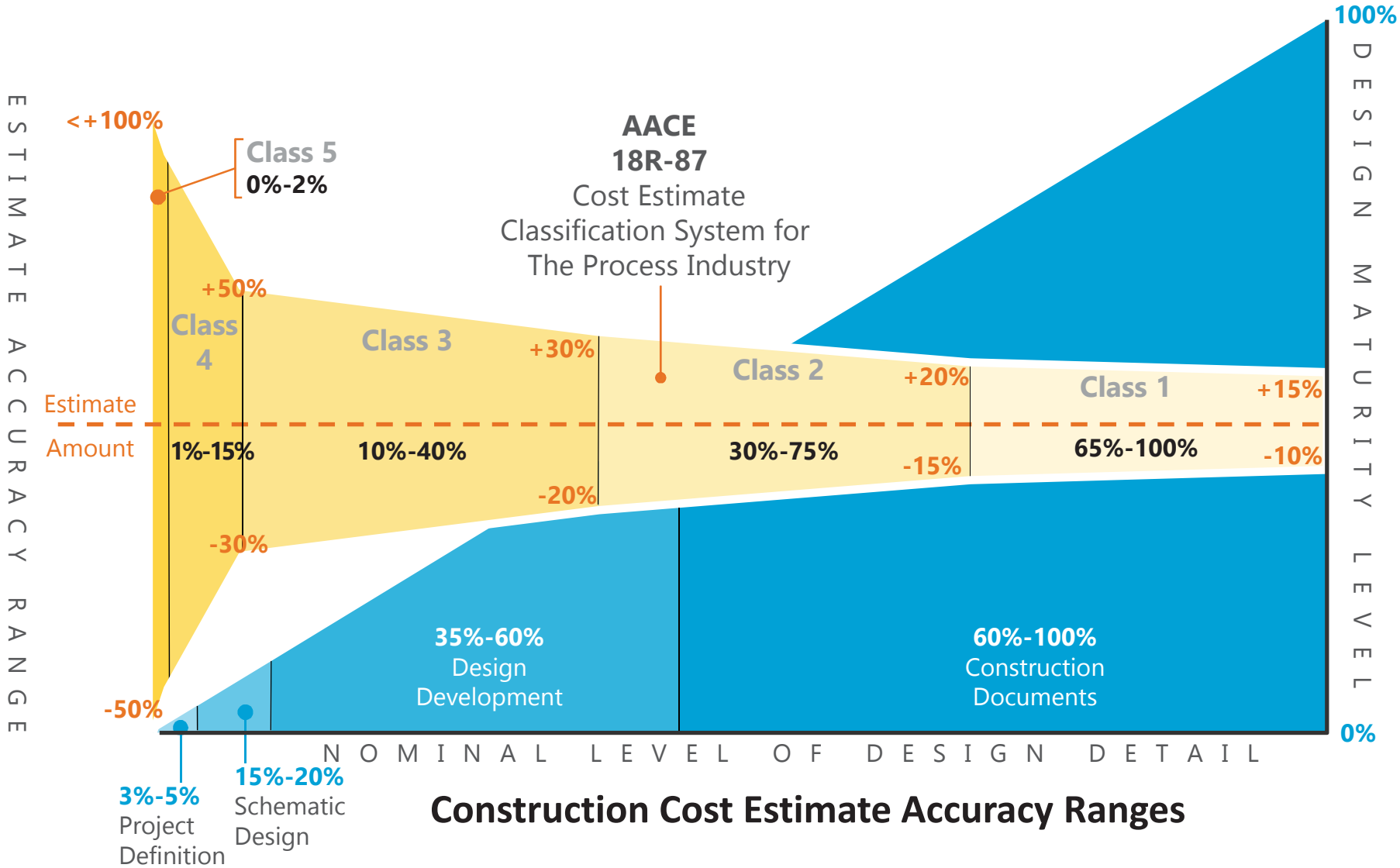
Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
11						***Transmission Lines for PG&E Connection***										
	11.01					TRR to PGE Connection										
		34.07.MISC				MISC, SUPERVISION, ROADS & MATTING										
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Matting Structure Work Pad 50'x50'	19.00 ea		-		7,000.00 /ea	-	7,000.00 /ea	133,000	10,885.06 /ea	206,816
						Matting per foot (through wetlands)	800.00 lf		-		150.00 /lf	-	150.00 /lf	120,000	233.25 /lf	186,601
						Access Road per foot	2,500.00 lf		-		40.00 /lf	-	40.00 /lf	100,000	62.20 /lf	155,501
						ROW clearing	4.00 acre		-		3,000.00 /acre	-	3,000.00 /acre	12,000	4,665.03 /acre	18,660
						Field Construction Coordinator	1,200.00 hr	118.95 /hr	-			-	118.95 /hr	142,740	184.97 /hr	221,962
						General Supervision	300.00 hr	128.95 /hr	-			-	128.95 /hr	38,685	200.52 /hr	60,156
						Misc Material	1.00 ls		-	30,000.00 /ls		-	30,000.00 /ls	30,000	48,825.27 /ls	48,825
						Allowance at BUDGET LEVEL (Other cost type)	1.00 ls		-			5,000,000.00 /ls	5,000,000.00 /ls	5,000,000	7,775,045.58 /ls	7,775,046
						33.71.91.00 Transmission Line	***1.00*** *LS*	*181,425.00 /LS*	*/LS*	*30,000.00 /LS*	*365,000.00 /LS*	*5,000,000.00 /LS*	*5,576,425.00 /LS*	*5,576,425*	*8,673,566.70 /LS*	*8,673,567*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*5,576,425*	*/SF*	*8,673,567*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*5,576,425*	*/LF*	*8,673,567*
						34.07.MISC MISC, SUPERVISION, ROADS & MATTING	***1.00*** *LS*	*181,425.00 /LS*	*/LS*	*30,000.00 /LS*	*365,000.00 /LS*	*5,000,000.00 /LS*	*5,576,425.00 /LS*	*5,576,425*	*8,673,566.70 /LS*	*8,673,567*
		34.09.FNDT				T-LINE FOUNDATIONS										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent auger, truck-mounted, for caissons, water wells	35.00 day	-	771.10 /day	-	-	-	771.10 /day	26,989	1,199.07 /day	41,967
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	35.00 day	-	629.75 /day	-	-	-	629.75 /day	22,041	979.27 /day	34,274
						Rent crane truck mounted, hydraulic, 12 ton capacity	35.00 day	-	471.00 /day	-	-	-	471.00 /day	16,485	732.41 /day	25,634
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*65,514.75 /LS*	*/LS*	*/LS*	*/LS*	*65,514.75 /LS*	*65,515*	*101,876.04 /LS*	*101,876*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*65,515*	*/SF*	*101,876*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*65,515*	*/SF*	*101,876*
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,294.30 /ls	33,294
						Foundation 7' dia x 30' caisson	6.00 ea	19,032.00 /ea	-	12,477.00 /ea	-	-	31,509.00 /ea	189,054	49,901.36 /ea	299,408
						Foundation 8' dia x 30' caisson	***0.00 ea***	***0.00 /ea***	***-***	***0.00 /ea***	***-***	***-***	***0.00 /ea***	***0***	***0.00 /ea***	***0***
						Foundation 10' dia x 30' caisson	7.00 ea	34,257.60 /ea	-	21,295.00 /ea	-	-	55,552.60 /ea	388,868	87,928.69 /ea	615,501
						Demobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,294.30 /ls	33,294
						33.71.91.00 Transmission Line	***1.00*** *LS*	*396,817.20 /LS*	*/LS*	*223,927.00 /LS*	*/LS*	*/LS*	*620,744.20 /LS*	*620,744*	*981,497.59 /LS*	*981,498*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*620,744*	*/SF*	*981,498*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*620,744*	*/LF*	*981,498*
						34.09.FNDT T-LINE FOUNDATIONS	***1.75*** *MO*	*226,752.69 /MO*	*37,437.00 /MO*	*127,958.29 /MO*	*/MO*	*/MO*	*392,147.97 /MO*	*686,259*	*619,070.65 /MO*	*1,083,374*
		34.11.STRC				T-LINE STRUCTURES										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	30.00 day	-	629.75 /day	-	-	-	629.75 /day	18,893	979.27 /day	29,378
						Rent forklift, for rough terrain, 42' lift, 35' reach, 9000 lb., 110 H.P.	30.00 day	-	534.20 /day	-	-	-	534.20 /day	16,026	830.69 /day	24,921
						Rent crane truck mount, cable 8x4 drive 90 ton, 15' radius	30.00 day	-	1,696.00 /day	-	-	-	1,696.00 /day	50,880	2,637.30 /day	79,119
						Rent crane truck mounted, hydraulic, 12 ton capacity	30.00 day	-	471.00 /day	-	-	-	471.00 /day	14,130	732.41 /day	21,972
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*99,928.50 /LS*	*/LS*	*/LS*	*/LS*	*99,928.50 /LS*	*99,929*	*155,389.72 /LS*	*155,390*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*99,929*	*/SF*	*155,390*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*99,929*	*/SF*	*155,390*
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 LS	57,096.00 /LS	-		-	-	57,096.00 /LS	57,096	88,784.82 /LS	88,785
						Install Steel Double Circuit Suspension Pole	6.00 ea	45,676.80 /ea	-	85,000.00 /ea	-	-	130,676.80 /ea	784,061	209,366.11 /ea	1,256,197
						Install Steel Double Circuit Light Angle Pole	***0.00 ea***	***0.00 /ea***	***-***	***0.00 /ea***	***-***	***-***	***0.00 /ea***	***0***	***0.00 /ea***	***0***
						Install Steel Double Circuit Heavy Angle Pole	5.00 ea	68,515.20 /ea	-	170,000.00 /ea	-	-	238,515.20 /ea	1,192,576	383,218.31 /ea	1,916,092
						Install Steel Single Circuit 3P Structure	2.00 ea	68,515.20 /ea	-	200,000.00 /ea	-	-	268,515.20 /ea	537,030	432,043.58 /ea	864,087
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,784.81 /ls	88,785
						33.71.91.00 Transmission Line	*1.00 LS*	*867,859.20 /LS*	*/LS*	*1,760,000.00 /LS*	*/LS*	*/LS*	*2,627,859.20 /LS*	*2,627,859*	*4,213,945.02 /LS*	*4,213,945*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*2,627,859*	*/SF*	*4,213,945*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*2,627,859*	*/LF*	*4,213,945*
						34.11.STRC T-LINE STRUCTURES	***1.50*** *MO*	*578,572.80 /MO*	*66,619.00 /MO*	*1,173,333.33 /MO*	*/MO*	*/MO*	*1,818,525.13 /MO*	*2,727,788*	*2,912,889.83 /MO*	*4,369,335*
		34.13.WIRE				T-LINE WIRE WORK										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent dozer, crawler, torque converter, diesel 200 HP	30.00 day	-	1,504.00 /day	-	-	-	1,504.00 /day	45,120	2,338.73 /day	70,162
						Rent trailer with cable reel for high voltage line work	30.00 day	-	64.10 /day	-	-	-	64.10 /day	1,923	99.68 /day	2,990
						Rent trailer with cable tensioning rig, for high voltage line work	30.00 day	-	110.40 /day	-	-	-	110.40 /day	3,312	171.67 /day	5,150
						Rent trailer with cable pulling rig, for high voltage line work	30.00 day	-	607.15 /day	-	-	-	607.15 /day	18,215	944.12 /day	28,324
						Rent crane truck mount, cable 8x4 drive 40 ton, 12' radius	30.00 day	-	2,028.00 /day	-	-	-	2,028.00 /day	60,840	3,153.56 /day	94,607
						01.01.06.03 GC Equip, Tools, & Consumables	***1.00*** *LS*	*/LS*	*129,409.50 /LS*	*/LS*	*/LS*	*/LS*	*129,409.50 /LS*	*129,410*	*201,232.95 /LS*	*201,233*
						26.00 Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*129,410*	*/SF*	*201,233*
						26.0 Electrical Work	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*129,410*	*/SF*	*201,233*
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Overhead line conductors & devices, conductors, primary circuits, per wire, 1000 to 1600 kcmil	25,000.00 lf	5.15 /lf		2.25 /lf	-	-	7.40 /lf	184,865	11.66 /lf	291,544
						Overhead line conductors & devices, insulators and hardware, primary circuits, disk insulators, 345 to 500 kV	13.00 ea	2,854.80 /ea		9,000.00 /ea	-	-	11,854.80 /ea	154,112	19,086.82 /ea	248,129
						Overhead line conductors & devices, overhead ground wire	10,000.00 lf	7.59 /lf		1.50 /lf	-	-	9.09 /lf	90,912	14.25 /lf	142,456
						Mobilization	1.00 ls	42,822.00 /ls	-		-	-	42,822.00 /ls	42,822	66,588.60 /ls	66,589
						Demobilization	1.00 ls	42,822.00 /ls	-		-	-	42,822.00 /ls	42,822	66,588.60 /ls	66,589
						33.71.91.00 Transmission Line	***1.00*** *LS*	*327,282.84 /LS*	*/LS*	*188,250.00 /LS*	*/LS*	*/LS*	*515,532.84 /LS*	*515,533*	*815,306.39 /LS*	*815,306*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*515,533*	*/SF*	*815,306*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*515,533*	*/LF*	*815,306*
						34.13.WIRE T-LINE WIRE WORK	***1.50*** *MO*	*218,188.56 /MO*	*86,273.00 /MO*	*125,500.00 /MO*	*/MO*	*/MO*	*429,961.56 /MO*	*644,942*	*677,692.89 /MO*	*1,016,539*
						11.01 TRR to PGE Connection	***2.00*** **MI**	**886,692.12 /MI**	**147,426.38 /MI**	**1,101,088.50 /MI**	**182,500.00 /MI**	**2,500,000.00 /MI**	**4,817,707.00 /MI**	**9,635,414**	**7,571,407.21 /MI**	**15,142,814**
	11.02					**TRR to Funks**										
		34.07.MISC				MISC, SUPERVISION, ROADS & MATTING										
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Matting Structure Work Pad 50'x50'	20.00 ea		-		7,000.00 /ea	-	7,000.00 /ea	140,000	10,885.06 /ea	217,701
						Matting per foot (through wetlands)	2,000.00 lf		-		150.00 /lf	-	150.00 /lf	300,000	233.25 /lf	466,503
						Access Road per foot	5,000.00 lf		-		40.00 /lf	-	40.00 /lf	200,000	62.20 /lf	311,002
						ROW clearing	10.00 acre		-		3,000.00 /acre	-	3,000.00 /acre	30,000	4,665.03 /acre	46,650
						Field Construction Coordinator	3,000.00 hr	118.95 /hr	-			-	118.95 /hr	356,850	184.97 /hr	554,905
						General Supervision	700.00 hr	128.95 /hr	-			-	128.95 /hr	90,265	200.52 /hr	140,363
						Misc Material	1.00 ls		-	40,000.00 /ls		-	40,000.00 /ls	40,000	65,100.36 /ls	65,100
						Allowance at BUDGET LEVEL (Other cost type)	1.00 ls		-			5,000,000.00 /ls	5,000,000.00 /ls	5,000,000	7,775,045.57 /ls	7,775,046
						33.71.91.00 Transmission Line	***1.00*** *LS*	*447,115.00 /LS*	*/LS*	*40,000.00 /LS*	*670,000.00 /LS*	*5,000,000.00 /LS*	*6,157,115.00 /LS*	*6,157,115*	*9,577,269.94 /LS*	*9,577,270*
						26.20 Facility Electrical	*0.00*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*/SF*	*6,157,115*	*/SF*	*9,577,270*
						33.0 Utilities	*0.00*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*/LF*	*6,157,115*	*/LF*	*9,577,270*
						34.07.MISC MISC, SUPERVISION, ROADS & MATTING	***1.00*** *LS*	*447,115.00 /LS*	*/LS*	*40,000.00 /LS*	*670,000.00 /LS*	*5,000,000.00 /LS*	*6,157,115.00 /LS*	*6,157,115*	*9,577,269.94 /LS*	*9,577,270*
		34.09.FNDT				T-LINE FOUNDATIONS										

Area	Facility	WorkActiv	Work Pkg	Trade Pkg	Unit Price	Description	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Allowance Cost/Unit	Other Cost/Unit	Direct Total Cost/Unit	Direct Total	Grand Total Price	Grand Total with Markups
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent auger, truck-mounted, for caissons, water wells	90.00 day	-	771.10 /day	-	-	-	771.10 /day	69,399	1,199.07 /day	107,916
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	90.00 day	-	629.75 /day	-	-	-	629.75 /day	56,678	979.27 /day	88,134
						Rent crane truck mounted, hydraulic, 12 ton capacity	90.00 day	-	471.00 /day	-	-	-	471.00 /day	42,390	732.41 /day	65,917
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	168,466.50 /LS	/LS	/LS	/LS	168,466.50 /LS	168,467	261,966.94 /LS	261,967
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	168,467	/SF	261,967
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	168,467	/SF	261,967
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,294.30 /ls	33,294
						Foundation 7' dia x 30' caisson	8.00 ea	22,838.40 /ea	-	12,477.00 /ea	-	-	35,315.40 /ea	282,523	55,820.35 /ea	446,563
						Foundation 8' dia x 30' caisson	13.00 ea	28,548.00 /ea	-	14,532.40 /ea	-	-	43,080.40 /ea	560,045	68,044.01 /ea	884,572
						Foundation 10' dia x 30' caisson	5.00 ea	34,257.60 /ea	-	21,295.00 /ea	-	-	55,552.60 /ea	277,763	87,928.69 /ea	439,643
						Demobilization	1.00 ls	21,411.00 /ls	-		-	-	21,411.00 /ls	21,411	33,294.30 /ls	33,294
						33.71.91.00 Transmission Line	1.00 LS	767,941.20 /LS	-	395,212.20 /LS	/LS	/LS	1,163,153.40 /LS	1,163,153	1,837,367.04 /LS	1,837,367
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	1,163,153	/SF	1,837,367
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	1,163,153	/LF	1,837,367
						34.09.FNDT T-LINE FOUNDATIONS	3.00 MO	255,980.40 /MO	56,155.50 /MO	131,737.40 /MO	/MO	/MO	443,873.30 /MO	1,331,620	699,777.99 /MO	2,099,334
		34.11.STRC				T-LINE STRUCTURES										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent backhoe-loader wheel type 112 HP, 1-1/2 CY capacity	90.00 day	-	629.75 /day	-	-	-	629.75 /day	56,678	979.27 /day	88,134
						Rent forklift, for rough terrain, 42' lift, 35' reach, 9000 lb., 110 H.P.	90.00 day	-	534.20 /day	-	-	-	534.20 /day	48,078	830.69 /day	74,762
						Rent crane truck mount, cable 8x4 drive 90 ton, 15' radius	90.00 day	-	1,696.00 /day	-	-	-	1,696.00 /day	152,640	2,637.30 /day	237,357
						Rent crane truck mounted, hydraulic, 12 ton capacity	90.00 day	-	471.00 /day	-	-	-	471.00 /day	42,390	732.41 /day	65,917
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	299,785.50 /LS	/LS	/LS	/LS	299,785.50 /LS	299,786	466,169.18 /LS	466,169
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	299,786	/SF	466,169
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	299,786	/SF	466,169
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Mobilization	1.00 LS	57,096.00 /LS	-		-	-	57,096.00 /LS	57,096	88,784.79 /LS	88,785
						Install Steel Double Circuit Suspension Pole	8.00 ea	45,676.80 /ea	-	85,000.00 /ea	-	-	130,676.80 /ea	1,045,414	209,366.11 /ea	1,674,929
						Install Steel Double Circuit Light Angle Pole	1.00 ea	57,096.00 /ea	-	130,000.00 /ea	-	-	187,096.00 /ea	187,096	300,361.00 /ea	300,361
						Install Steel Double Circuit Heavy Angle Pole	5.00 ea	68,515.20 /ea	-	170,000.00 /ea	-	-	238,515.20 /ea	1,192,576	383,218.31 /ea	1,916,092
						Install Steel Single Circuit H-Deadend Structure	6.00 ea	45,676.80 /ea	-	50,000.00 /ea	-	-	95,676.80 /ea	574,061	152,403.30 /ea	914,420
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,784.77 /ls	88,785
						33.71.91.00 Transmission Line	1.00 LS	1,153,339.20 /LS	-	1,960,000.00 /LS	/LS	/LS	3,113,339.20 /LS	3,113,339	4,983,370.81 /LS	4,983,371
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	3,113,339	/SF	4,983,371
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	3,113,339	/LF	4,983,371
						34.11.STRC T-LINE STRUCTURES	3.00 MO	384,446.40 /MO	99,928.50 /MO	653,333.33 /MO	/MO	/MO	1,137,708.23 /MO	3,413,125	1,816,513.33 /MO	5,449,540
		34.13.WIRE				T-LINE WIRE WORK										
			26.0			Electrical Work										
				26.00		Electrical										
					01.01.06.03	GC Equip, Tools, & Consumables										
						Rent dozer, crawler, torque converter, diesel 200 HP	60.00 day	-	1,504.00 /day	-	-	-	1,504.00 /day	90,240	2,338.73 /day	140,324
						Rent trailer with cable reel for high voltage line work	60.00 day	-	64.10 /day	-	-	-	64.10 /day	3,846	99.68 /day	5,981
						Rent trailer with cable tensioning rig, for high voltage line work	60.00 day	-	110.40 /day	-	-	-	110.40 /day	6,624	171.67 /day	10,300
						Rent trailer with cable pulling rig, for high voltage line work	60.00 day	-	607.15 /day	-	-	-	607.15 /day	36,429	944.12 /day	56,647
						Rent crane truck mount, cable 8x4 drive 40 ton, 12' radius	60.00 day	-	2,028.00 /day	-	-	-	2,028.00 /day	121,680	3,153.56 /day	189,213
						01.01.06.03 GC Equip, Tools, & Consumables	1.00 LS	/LS	258,819.00 /LS	/LS	/LS	/LS	258,819.00 /LS	258,819	402,465.91 /LS	402,466
						26.00 Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	258,819	/SF	402,466
						26.0 Electrical Work	0.00	/SF	/SF	/SF	/SF	/SF	/SF	258,819	/SF	402,466
			33.0			Utilities										
				26.20		Facility Electrical										
					33.71.91.00	Transmission Line										
						Overhead line conductors & devices, conductors, primary circuits, per wire, 795 to 954 kcmil	66,000.00 lf	4.57 /lf		1.50 /lf	-	-	6.07 /lf	400,538	9.55 /lf	630,018
						Overhead line conductors & devices, insulators and hardware, primary circuits, disk insulators, 345 to 500 kV	20.00 ea	2,854.80 /ea		9,000.00 /ea	-	-	11,854.80 /ea	237,096	19,086.82 /ea	381,736
						Overhead line conductors & devices, overhead ground wire	22,000.00 lf	7.59 /lf		1.50 /lf	-	-	9.09 /lf	200,006	14.25 /lf	313,403
						Mobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,784.80 /ls	88,785
						Demobilization	1.00 ls	57,096.00 /ls	-		-	-	57,096.00 /ls	57,096	88,784.80 /ls	88,785
						33.71.91.00 Transmission Line	1.00 LS	639,832.17 /LS	-	312,000.00 /LS	/LS	/LS	951,832.17 /LS	951,832	1,502,727.71 /LS	1,502,728
						26.20 Facility Electrical	0.00	/SF	/SF	/SF	/SF	/SF	/SF	951,832	/SF	1,502,728
						33.0 Utilities	0.00	/LF	/LF	/LF	/LF	/LF	/LF	951,832	/LF	1,502,728
						34.13.WIRE T-LINE WIRE WORK	2.00 MO	319,916.09 /MO	129,409.50 /MO	156,000.00 /MO	/MO	/MO	605,325.58 /MO	1,210,651	952,596.81 /MO	1,905,194
						11.02 TRR to Funks	2.00 MI	1,504,113.78 /MI	363,535.50 /MI	1,353,606.10 /MI	335,000.00 /MI	2,500,000.00 /MI	6,056,255.38 /MI	12,112,511	9,515,668.77 /MI	19,031,338
						11 Transmission Lines for PG&E Connection	**4.00 MI**	**1,195,402.95 /MI**	**255,480.94 /MI**	**1,227,347.30 /MI**	**258,750.00 /MI**	**2,500,000.00 /MI**	**5,436,981.19 /MI**	**21,747,925**	**8,543,537.98 /MI**	**34,174,152**

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	4,781,612		40,114.433 hrs	
Material	4,909,389			
Allowance	1,035,000			
Equipment	1,021,924		10,440.000 hrs	
Other	10,000,000			
Subtotal Direct Costs	**21,747,925**	**21,747,925**		
Material Sales Tax, Dunnigan Ca	355,931			7.250 %
Subtotal W/ Sales Tax	**355,931**	**22,103,856**		
General Conditions	1,105,193			5.000 %
Subtotal W/ General Conditions	**1,105,193**	**23,209,049**		
Mobilization/Demobilization	696,271			3.000 %
Prime Contractor Overhead	2,390,532			10.000 %
Prime Contractor Profit	1,577,751			6.000 %
Bonds & Insurance	604,857			2.170 %
Subtotal W/ Prime Markups	**5,269,411**	**28,478,460**		
Contractor Contingency	1,423,923			5.000 %
Design Contingency	4,271,769			15.000 %
Subtotal W/ Contingency	**5,695,692**	**34,174,152**		
Escalation				
Subtotal W/ Escalation		**34,174,152**		
Total Construction Cost		**34,174,152**		
Non-Contract Costs	5,126,123			15.000 %
Total Project Costs	**5,126,123**	**39,300,275**		

Appendix C
AACEI Classification



Construction Cost Estimate Accuracy Ranges

Estimate Class	Class 5		Class 4		Class 3		Class 2		Class 1	
LEVEL OF PROJECT DEFINITION Expressed as a % of complete definition	**0% to 2%**		**1% to 15%**		**10% to 40%**		**30% to 70%**		**50% to 100%**	
END USAGE Typical Purpose of Estimate	**Concept Screening**		**Study or Feasibility**		**Budget Authorization, or Control**		**Control or Bid / Tender**		**Check Estimate or Bid / Tender**	
METHODOLOGY Typical estimating method	**Capacity Factored, Parametric Models, Judgment, or Analogy**		**Equipment Factored or Parametric Models**		**Semi-Detailed Unit Costs with Assembly Level Line Items**		**Detailed Unit Cost with Forced Detailed Take-Off**		**Detailed Unit Cost with Detailed Take-Off**	
EXPECTED ACCURACY RANGE Typical variation in low and high ranges [a]	**L: -20% to -50%**	**H: +30% to +100%**	**L: -15% to -30%**	**H: +20% to +50%**	**L: -10% to -20%**	**H: +10% to +30%**	**L: -5% to -15%**	**H: +5% to +20%**	**L: -3% to -10%**	**H: +3% to +15%**
PREPARATION EFFORT Typical degree of effort relative to least cost index of 1 [b]	**1**		**2 to 4**		**3 to 10**		**4 to 20**		**5 to 100**	
REFINED CLASS DEFINITION	Class 5 estimates are generally prepared based on very limited information, and subsequently have very wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systematic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with very little effort expended - sometimes requiring less than 1 hour to prepare. Often, little more than proposed plant type, location, and capacity are known at the time of estimate preparation.		Class 4 estimates are generally prepared based on very limited information, and subsequently have very wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 5% complete, and would comprise at a minimum the following: plant capacity, block schematics, indicated layout, process flow diagrams (PFDs) for main process systems and preliminary engineered process and utility equipment lists. Level of Project Definition Required: 1% to 15% of full project definition.		Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored. Typically, engineering is from 10% to 40% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, preliminary piping and instrument diagrams, utility flow diagrams, preliminary piping and instrument diagrams, plot plan, developed layout drawings, and essentially complete engineering process and utility equipment lists. Level Of Project Definition Required: 10% to 40% of full project definition.		Class 2 estimates are generally prepared to form a detailed control baseline against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the "bid" estimate to establish contract value. Typically, engineering is from 30% to 70% complete, and would comprise at a minimum the following: Process flow diagrams, utility flow diagrams, piping and instrument flow diagrams, heat and material balances, final plot plan, final layout drawings, complete engineered process and utility equipment lists, single line diagrams for electrical, electrical equipment and motor schedules, vendor quotations, detailed project execution plans, resourcing and work force plans, etc.		Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than generating this level of detail for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute claims. Typically, engineering is from 50% to 100% complete, and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans. Level for Project Definition Required: 50% to 100% of full project definition.	
END USAGE DEFINED	Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.		Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.		Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase "control estimate" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate may be the last estimate required and could well form the only basis for cost/schedule control.		Class 2 estimates are typically prepared as the detailed control baseline against which all actual costs an resources will now be monitored for variation to the budget, and form a part of the change/variation control program.		Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual coasts and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.	
ESTIMATING METHODS USED	Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques.		Class 4 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, the Miller method, gross unit costs/ratios, and other parametric and modeling techniques.		Class 3 estimates usually involve more deterministic estimating methods that stochastic methods. They usually involve a high degree of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less-significant areas of the project.		Class 2 estimates always involve a high degree of deterministic estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detailed takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods.		Class 1 estimates involve the highest degree of deterministic estimating methods, and require a great amount of effort. Class 1 estimates are prepared in great detail, and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities.	
EXPECTED ACCURACY RANGE	Typical accuracy ranges for Class 5 estimates are -20% to -50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.		Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.		Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.		Typical accuracy ranges for Class 2 estimates are -5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.		Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	
EFFORT TO PREPARE (for US$20MM project):	As little as 1 hour or less to prepare to perhaps more than 200 hours, depending on the project and the estimating methodology used.		Typically, as little as 20 hours or less to perhaps more than 300 hours, depending on the project and the estimating methodology used.		Typically, as little as 150 hours or less to perhaps more than 1500 hours, depending on the project and the estimating methodology used.		Typically, as little as 300 hours or less to perhaps more than 3000 hours, depending on the project and the estimating methodology used. Bid Estimates typically require more effort than estimates used for funding or control purposes		Class 1 estimates require the most effort to create, and as such are generally developed for only selected areas of the project, or for bidding purposes. A complete Class 1 estimate may involve as little as 600 hours or less, to perhaps more than 6,000 hours, depending on the project and the estimating methodology used. Bid estimate typically require more effort than estimates used for funding or control purposes.	
ANSI Standard Reference Z94.2-1989 name; Alternate Estimate Names, Terms, Expressions, Synonyms:	Order of Magnitude Estimate; Ratio, ballpark, blue sky, seat-of-pants, ROM, idea study, prospect estimate, concession license estimate, guesstimate, rule-of thumb.		Budget Estimate; Screening, top-down, feasibility, authorization, factored, pre-design, pre-study.		Budget Estimate; Budget, scope, sanction, semi-detailed, authorization, preliminary control, concept study, development, basic engineering phase estimate, target estimate.		Definitive Estimate; Detailed Control, forced detail, execution phase, master control, engineering, bid, tender, change order estimate.		Definitive Estimate; Full detail, release, fall-out, tender, firm price, bottoms-up, final, detailed control, forced detail, execution phase, master control, fair price, definitive, change order estimate.	

Estimate Class	Class 5	Class 4	Class 3	Class 2	Class 1
Estimate Input Checklist and Maturity Index	Class 5	Class 4	Class 3	Class 2	Class 1
GENERAL PROJECT DATA					
Project Scope Description	General	Preliminary	Defined	Defined	Defined
Plant Production / Facility Capacity	Assumed	Preliminary	Defined	Defined	Defined
Plant Location	General	Approximate	Specific	Specific	Specific
Soils & Hydrology	None	Preliminary	Defined	Defined	Defined
Integrated Project Plan	None	Preliminary	Defined	Defined	Defined
Project Master Schedule	None	Preliminary	Defined	Defined	Defined
Escalation Strategy	None	Preliminary	Defined	Defined	Defined
Work Breakdown Structure	None	Preliminary	Defined	Defined	Defined
Project Code of Accounts	None	Preliminary	Defined	Defined	Defined
Contracting Strategy	Assumed	Assumed	Preliminary	Defined	Defined
ENGINEERING DELIVERABLES:	**Class 5**	**Class 4**	**Class 3**	**Class 2**	**Class 1**
Block Flow Diagrams	Started / Preliminary	Preliminary / Complete	Complete	Complete	Complete
Plot Plans		Started	Preliminary / Complete	Complete	Complete
Process Flow Diagrams (PFDs)		Started / Preliminary	Preliminary / Complete	Complete	Complete
Utility Flow Diagrams (UFDs)		Started / Preliminary	Preliminary / Complete	Complete	Complete
Piping & Instrument Diagrams (P&IDS)		Started	Preliminary / Complete	Complete	Complete
Heat and Material Balances		Started	Preliminary / Complete	Complete	Complete
Process Equipment List		Started / Preliminary	Preliminary / Complete	Complete	Complete
Utility Equipment List		Started / Preliminary	Preliminary / Complete	Complete	Complete
Electrical One Line Drawings		Started / Preliminary	Preliminary / Complete	Complete	Complete
Specifications and Datasheets		Started	Preliminary / Complete	Complete	Complete
General Equipment Arrangement Drawings		Started	Preliminary / Complete	Complete	Complete
Spare Parts Lists			Started / Preliminary	Preliminary	Complete
Architectural Details / Schedules		Started	Preliminary / Complete	Complete	Complete
Structural Details		Started	Preliminary / Complete	Complete	Complete
Mechanical Discipline Drawings			Started	Preliminary	Preliminary / Complete
Electrical Discipline Drawings			Started	Preliminary	Preliminary / Complete
System Discipline Drawings			Started	Preliminary	Preliminary / Complete
Civil/Site Discipline Drawings			Started	Preliminary	Preliminary / Complete
Demolition Details		Started	Preliminary / Complete	Complete	Complete

Appendix C.2. Operating Cost

Appendix C.2.A Reservoir Operations and Maintenance

Operations and Maintenance Technical Memorandum

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	February 26, 2021
From:	Michael Forrest, P.E., G.E.; Mike Smith, P.E., G.E; Idit Zarchi, P.E.; Howard Michael, P.E.; Syed Kazmi, P.E.; Peter Morris (AECOM)
Quality Review:	Joe Barnes, P.E. (AECOM)
Authority Agent Review:	Henry Luu, P.E. (HDR)
Subject:	Operations and Maintenance for HR Facilities – Draft Task Order No. 2, Task HR58.3

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Appendix A. Estimated O&M Costs

Acronyms and Abbreviations

ABME	Area Bridge Maintenance Engineers
ADAS	automated data acquisition system
Authority	Sites Project Authority
Caltrans	California Department of Transportation
cfs	cubic feet per second
DSOD	State of California Department of Water Resources, Division of Safety of Dams
DWR	California Department of Water Resources
ft	feet
I/O	Inlet/Outlet Works
MAF	million-acre-foot
MUTCD	Manual on Uniform Traffic Control Devices
O&M	operations and maintenance
ROV	remotely operated vehicle
SM&I	Caltrans Structures and Bridge Maintenance
TM	technical memorandum

1.0 Introduction

1.1 Project Overview and Reservoir Alternatives

The Sites Project Authority (Authority) is preparing a feasibility-level evaluation for a 1.5-million-acre-foot (MAF) reservoir as a preferred alternative ("Alternative 1") for the Sites Reservoir Project. Figure 1-1 shows the location of Sites Reservoir, and the various dams, roads, and other features to be constructed to form the reservoir. Sites Reservoir would have a nominal total storage capacity of 1.5 MAF. Table 1-1 outlines key aspects of the reservoir.

Table 1-1. Sites Reservoir

Total Storage Capacity	1.5 MAF
Active Storage Capacity	1.4 MAF
Approximate Inundation Area	13,200 acres
Dam/Saddle Dam Crest Elevation (Without Camber)	517 feet
Normal Maximum Reservoir Water Surface Elevation	498 feet
Minimum Operating Water Elevation	340 feet
Top of Dead Pool Elevation	300 feet
Inlet/Outlet Facilities Conveyance Capacity:	
Tehama-Colusa Canal	2,100 cfs
Glenn-Colusa Irrigation District Canal	1,800 cfs

cfs = cubic feet per second
MAF = million acre feet

The reservoir boundaries and water surface elevations provided in Table 1-1 are based on topographic information provided by the California Department of Water Resources (DWR) for their use on the project. New topographic information will be obtained for the reservoir site in future phases of the project. The information provided in Table 1-1 should be verified when the new surveys are completed.

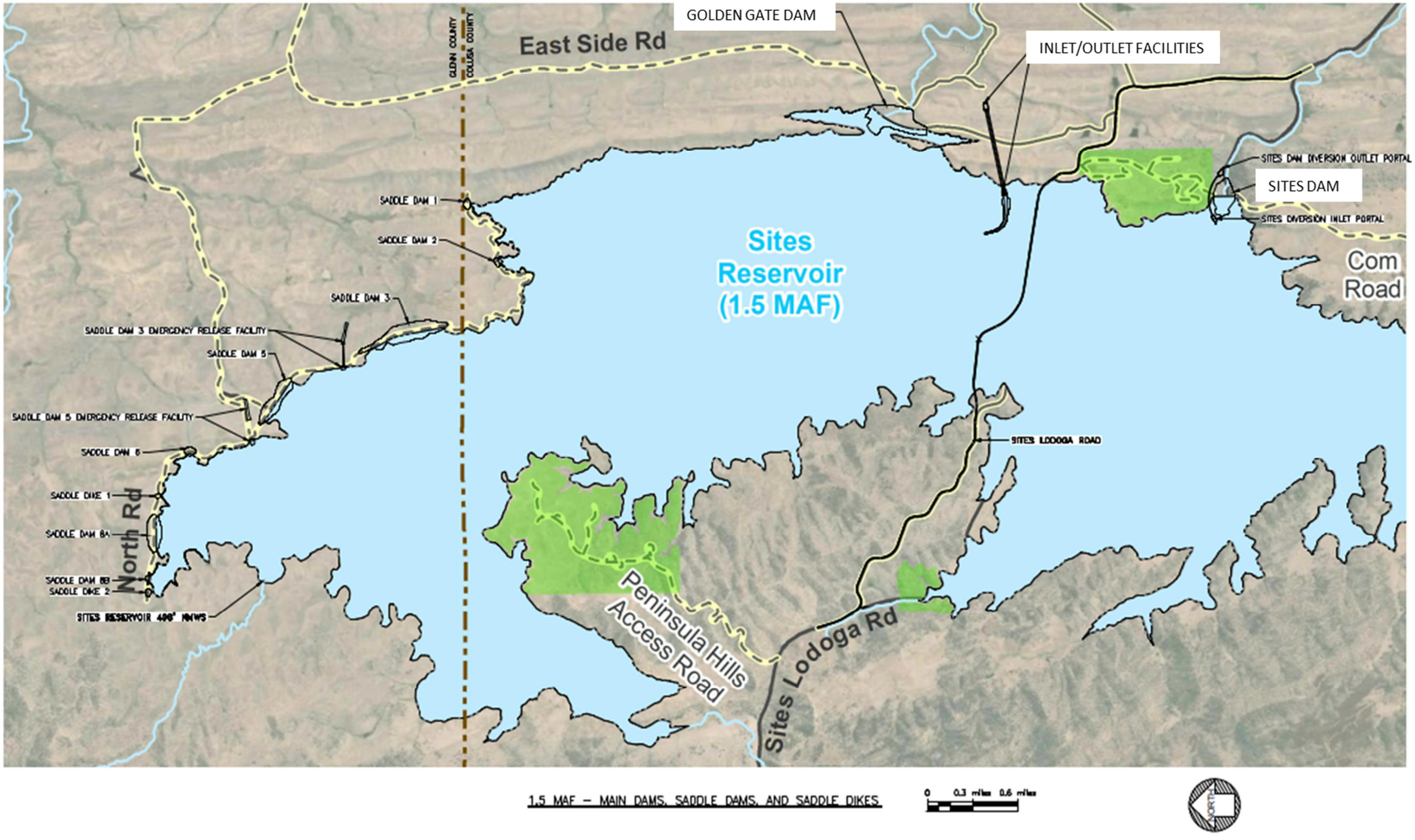

Figure 1-1. Alternative 1 Reservoir

The key dimensions of the facilities are included in Table 1-2.

- Main Dams, Saddle Dams and Dikes, and Reservoir Rim: The Sites Reservoir dams include two main dams, Golden Gate Dam on Funks Creek and Sites Dam on Stone Corral Creek, and saddle dams and dikes on the reservoir rim on tributaries to the Hunters Creek drainage.
- Spillway: This structure is a concrete overflow spillway located at Saddle Dam 8B that would discharge into Hunters Creek to the north.
- Inlet/Outlet (I/O) Works: These facilities include a vertical tower with multiple intake levels connected to two inlet/outlet tunnels. These provide for normal reservoir operation and for making the major portion of emergency reservoir releases that will be required by DSOD as part of dam permitting. The tunnels connect to reservoir conveyance pipelines (HC) at the downstream tunnel portal.
- Sites Dam Outlet Works: This outlet works tunnel would be located in the north abutment of Sites Dam; it would be used initially for construction diversion for both main dams and subsequently for stream maintenance and a portion of the emergency reservoir releases to Stone Corral Creek after construction.
- Emergency Release Structures: These structures provide emergency release capacity to supplement the release capacities at the I/O Works and Sites Dam tunnel. They include intakes and tunnels located at Saddle Dams 3 and 5 for Alternative 1 only; they would discharge to Hunter's Creek tributaries on the north side of the reservoir.
- Roads: Roads include local roads (recreational use and public access), maintenance roads, and construction access roads.
- Bridges: Two bridges crossing the reservoir (lengths of 1,400 feet and 1,633 feet for the west bridge and east bridge, respectively) with fill prisms, providing an east-west connection from rural communities of Maxwell, Lodoga, and Stonyford for Alternative 1 only. For Alternative 2, there will be a southern road alignment around the south end of reservoir, providing an east-west connection from Maxwell to the rural communities of Lodoga and Stonyford.

Table 1-2. Reservoir Facility Descriptions

Reservoir Elevation at full pool (feet)	498.0
Reservoir Area at full pool (acres)	13,200
Dam / Dike Crest Elevation (feet) (without camber)	517.0
Main Dams	2 main dams – see below
Saddle Dams	7 saddle dams and 2 saddle dikes – see below
Dam / Dike:	Max. Ht. Above Streambed / Crest Length (ft)
Golden Gate Dam	287 / 2,221
Sites Dam	267 / 781
Saddle Dam 1	27 / 318
Saddle Dam 2	57 / 250
Saddle Dam 3	107 / 3,422
Saddle Dam 5	77 / 1,894
Saddle Dam 6	47 / 362
Saddle Dam 8A	82 / 1,300

Saddle Dam 8B	37 / 475
Saddle Dike 1	12 / 122
Saddle Dike 2	12 / 198
Saddle Dike 3	Not required
I/O Tower	Top elev. 558 ft. 258 ft high / 7 elevations to draw water from reservoir
I/O Tunnels	Approx. 3,110 ft long/Dual 23 ft Internal diameter tunnels
Sites Diversion/Outlet Tunnels	Approx. 1,590 ft long/12 ft internal diameter tunnel
Emergency Release System (on north rim)	Two emergency release systems located at Saddle Dams 3 and 5
Spillway	Weir crest length = 85.5 feet, crest elevation = 504 feet

ft = feet
I/O = Inlet/outlet works
MAF = million acre feet

1.2 Purpose and Scope

The purpose of this task is to prepare a description of the inspection and O&M activities associated with each of the HR project facilities. This TM also includes a general description of the dam safety monitoring program, including instrumentation, monitoring seismic activity and maintenance. This task supports the Sites Project Feasibility Report, but does not purport to be a detailed inspection and O&M manual that would be used for the constructed facilities.

1.3 Limitations

The scope of work for this TM was restricted to the development of the inspection and O&M activities for the Sites Reservoir under the Reservoir (HR) contract. O&M for the conveyance facilities are separately considered in a companion TM for the HC contract.

AECOM represents that our services were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession, within the limits prescribed by our client.

2.0 Inspection and O&M for HR Facilities.

Table 2-1 presents a simplified summary of inspection and O&M for the HR facilities for the dams, spillway, inlet/outlet works (I/O), high-level emergency release structures, roads, and bridges. This table shows the estimated frequency that may be needed for inspection and O&M activities.

Table 2-1. Summary of Inspection and O&M for HR Facilities[1]

Feature	Inspection or O&M Est. Frequency / Duration (Approx.)
Dams and Abutments	Inspection: First 5 years, daily / 1 day Years 6-10, weekly / 1 day Years 11 – onward,-monthly / 1 day O&M: Annually / 4 days
Monument surveys (by subcontractor)	Inspection (Surveys): Semi-annually / 2 days
Replace instrumentation (by subcontractor)	O&M: 25 years / 25 days each time
Reservoir Rim and Spillway	Inspection: First 5 years, weekly / 2 days Years 6-10, quarterly/2 days > 10 years, monthly / 2 days O&M: Annually / 4 days
Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures	Inspection: First 5 years, weekly / 2 days Years 6-10, monthly/2 days >10 years, quarterly / 2 days O&M: Annually / 4 days
Mechanical equipment/gates/valves (by subcontractor)	Inspection: Semi-annually / 1 day >6 years, annually/2 days 5 years for tunnel ROV / 8 days O&M: 25 years / 8 days each time
4. Roads – Sites Lodoga Road Causeway	Inspection: Years 1-5: Weekly first 6 mo., Monthly next 54 mo. / 1 day > 5 years: Every 3 months / 1 day O&M: Annually / 1 day
Local Roads	Inspection: Years 1-5: Monthly first 6 mo; Every 3 mo. next 54 mo. / 1 day >5 years: Every 3 months / 2 days O&M: Annually / 2 day
Main Roads	Inspection: Years 1-5: Every 3 months / 2 days >5 years: Every 6 months / 2 days O&M: Every 3 years / 4 days (see note below)
Bridges	Inspection:

Feature	Inspection or O&M Est. Frequency / Duration (Approx.)
	Years 1-5, semi-annually / 2 days >5 years, annually / 1 day O&M: Annually / 2 days
Monument surveys (by subcontractor)	Inspection (Surveys) – (timed with surveys for dams and abutments): Semi-annually / 2 days

1. Routine O&M (Maintenance, Management, Repair, and Operation) for feasibility study O&M

3.0 Dams, Abutments, Rim and Spillway

3.1 Inspection

3.1.1 Visual Inspections

Visual inspections are an integral part of evaluating the performance of the dams. Systematic visual inspections of the dams will be required once filling has commenced. The visual inspections will be carried out by walking a prescribed route at the dams. Visual observations include, but are not limited to, the following:

- Deformation and Cracking: Cracks, bulges, alignment deviations in the crest, depressions, sinkholes, slides.
- Seepage: Seepage at the downstream face or abutments, turbid or cloudy seepage, evidence of piping (internal erosion of embankment or foundation materials) or transport of materials.
- Surface Conditions: Erosion gullies, excessive vegetation that can obscure observation, rodent burrows, debris, and condition of the riprap on the upstream face of the dams
- Rim observations would include erosion or slumps on the reservoir side and seeps or slumps on the outboard side of the rim.

If unusual conditions are observed, more frequent visual inspections (such as daily) and further investigation of that condition would be undertaken. Also, more frequent visual inspections would be performed after earthquakes that are felt in the site or after major rain storm events. Instrumentation data would also be monitored and recorded more frequently after earthquakes. Monitoring would include more frequent data recording for seepage to check for increased flow, and the piezometers would be read more frequently. Action items, such as needed repairs or follow-up on specific inspections, will be identified and brought to the attention of engineers.

Dams and abutments inspection frequencies are presented in Table 2-1.

3.1.2 Instrumentation Data and Monitoring

Instrumentation will be installed in the dam embankment and foundation, downstream of the dam, and in the abutments. The primary objective of the instrumentation is to provide data to evaluate whether the dam is performing as expected and to warn of changes that could impair dam safety.

Instrumentation data will initially be used to evaluate the behavior of the dam during the first filling of the reservoir and whether conditions are consistent with the design assumptions. During long-term operation of the project, instrumentation data will also be used to monitor the performance of the dam. As data are compiled, trends under normal operation will be established, and the significance of variations under unusual events or loads, such as earthquakes, can be evaluated.

Instrumentation will be installed to enable monitoring of the following performance parameters:

- Piezometer Water Levels: Water levels within the downstream shell zone, will be monitored to check for potential saturation of the shell zone. Water levels for foundation piezometers will be monitored to check piezometric pressures in the foundation.
- Seepage (Seepage weirs): Seepage rates will be measured at the dam toe to check for potential internal problems in the dam. In addition, clarity or turbidity of the seepage will be monitored; turbid seepage could indicate piping. Turbidity indicates that material is migrating from the foundation and/or from the dam embankment.
- Embankment Movement (Inclinometer and survey monuments): Horizontal and vertical surface movements of the embankments will be monitored by surveys to check for settlement and deformation. Horizontal movements of the embankment will also be monitored with an inclinometer.
- Earthquake Accelerations (Accelerographs): Accelerations at the dam crest and left abutment will be measured by accelerographs.
- Reservoir Level: Reservoir levels will be monitored to correlate with seepage and piezometric data.

The data recording frequencies are indicated in Table 2-1 and would be increased of any if the of the following is observed:

- Unusual conditions are observed during visual inspections.
- Rapidly changing instrumentation data are recorded.
- Established trends in data change.
- Piezometer readings exceed pre-established levels.
- After earthquakes that trigger at least one of the accelerographs or are felt at the dam site.
- After major rainstorms.

3.2 Maintenance

Maintenance of the dams will include:

- Standard maintenance:
    - Trim vegetative growth on the downstream face of the dam, abutments, and the toe on a regular basis.
    - Clear the spillway channels of trees and shrubs.
    - Clean out and fill rodent holes with hand-tamped sandy gravel materials.
    - Repair erosion rills.
    - Clean out any debris on the downstream face, abutments, access road ditches, approach channel to the Saddle Dam 8B spillway structure.
- Following any major rain storm event:
    - Observe the downstream face of the dam for signs of erosion, and repair any erosional features.
    - Observe culverts for blockage, and clear as necessary.

4.0 Inlet/Outlet Works and Sites Dam Outlet

4.1 Inspection

Trained operators will conduct periodic inspections of the Inlet/Outlet Works at Golden Gate Dam and the Outlet Works at Sites Dam. Inspections of the intake/outlet works would include the following:

- Checking gates, valves, screens and operators for leaks, corrosion, rust, or unusually large vibrations.
- Actuating gates and valves periodically to confirm functionality without unnecessary discharges.
- Inspecting concrete structures and lining for significant cracks, areas of spalling, voids, and joints.
- Inspecting Stone Corral creek channel for erosion.

Inundated infrastructure, such as the inlets and tunnels, will likely be inspected with remotely operated vehicles (ROVs). Above-ground infrastructure, such as the Sites Dam outlet structure, can be inspected by crews and operators.

4.2 Maintenance

Regular maintenance of the screens at the I/O tower or Sites inlet is not anticipated. However, at the I/O tower they should have any accumulated debris scraped off of them once they are hoisted above the water surface. For all instrumentation and electrical components, routine maintenance such as calibration or testing, should be performed as stated in the manufacturer's O&M manuals. Refurbishment or replacement of gates and valves, both at the I/O tower and Sites inlet and outlet structures, would need to occur periodically as noted in Table 2-1.

If inspections of concrete structure and linings reveals significant defects, maintenance will be required to repair or replace concrete as needed.

4.3 Operation

During typical operations the I/O ports at the tower will be opened based on inflow/outflow demands, port submergence considerations, and desired water quality characteristics (e.g., temperature, dissolved oxygen, etc.). The Sites Dam outlet will typically have a valve open to convey instream beneficial releases to Stone Corral Creek, in accordance with environmental requirements.

In an emergency situation both the I/O works and the Sites Dam Outlet will be operated to drawdown the reservoir according to DSOD emergency drawdown requirements.

5.0 High Level Emergency Release Structures

5.1 Inspection

Trained operators will conduct periodic inspections of the high-level emergency release structures. Inspections would include the following:

- Checking gates, valves, and operators for leaks, corrosion, rust, or unusually large vibrations.
- Actuating gates and valves periodically to confirm functionality without discharging flows.
- Inspecting concrete structures and lining for significant cracks, areas of spalling, voids, and joints.
- Inspecting Stone Corral creek channel for erosion (following emergency releases).

Inundated infrastructure, such as the inlets and tunnels, will likely be inspected with ROVs. Above-ground infrastructure, such as the outlet structures, can be inspected by crews and operators.

5.2 Maintenance

Trashracks should periodically have any accumulated debris scraped off of them. For all instrumentation and electrical components, routine maintenance such as calibration or testing should be performed as stated in the manufacturer's O&M manuals. Refurbishment or replacement of gates and valves would need to occur periodically as noted in Table 2-1.

If inspections of concrete structure and linings reveals significant defects, maintenance will be required to repair or replace concrete as needed.

5.3 Emergency Operation

In an emergency situation the high level emergency release structures will be operated to drawdown the reservoir according to DSOD emergency drawdown requirements.

6.0 Roads

6.1 Functional Classification

The maintenance level assigned to a road considers the road functional classification, traffic volume, road condition, surface type, travel speed, user comfort and convenience, user safety, budget constraints, and environmental concerns.

Three types of roads have been defined for this Sites Reservoir project to provide for three functions: Local Access, Construction Access, and Maintenance Access. Local Access roads are Colusa County and Glenn County roads used for conveyance of the general traveling public. These roads will be maintained by the agency having jurisdiction of the roadway. Construction Access roads are specific to construction equipment/material transport and utilize Local Access roads in part.

6.2 Operations

6.2.1 Local Access Roads

The Local Access Road classification is assigned to roads that provide a high degree of user comfort and convenience. These roads are two lanes with shoulders, paved facilities and have the following attributes:

- Provides a high degree of user comfort and convenience for drivers in a standard passenger car (daily and during temporary construction operations)
- Provides smooth road surface, free of obstructions and debris
- Inspires confidence in the driver's expectations that hazards will be few and identified well in advance with clear visibility.
- Provides a visually pleasing roadway.
- Provides driver guidance and follows the requirements of the "Manual on Uniform Traffic Control Devices" (MUTCD) for signs and markings.
- Operates with higher traffic volume and speeds.
- Provides drainage via culverts.
- Functions as an arterial or collector.
- Provides a smooth paved road surface with lane striping and defined shoulders
- Operates as an access controlled facility
- Maintained by the local agency having jurisdiction – Glenn or Colusa Counties

6.2.2 Maintenance Access Roads

Maintenance Access Roads The Maintenance Access Road classification is assigned to roads open and maintained for travel by a driver in a standard passenger car. User comfort and convenience are not considered priorities. These roads have restricted access (maintenance personnel and adjacent landowners) are often unpaved gravel roads and have the following attributes:

- Are passable to drivers in passenger cars.
- Usually do not consider user comfort and convenience priorities.
- Are subject to the requirements MUTCD for signs.
- Provides a single lane with turnouts visible from either direction.
- Operates typically at low speeds.
- Functions as a local or collector.
- Operates with low- to moderate-traffic volume.
- Provides drainage via a combination of dips and culverts.
- Typically, may have wash-boarding.

6.3 Inspection and Maintenance

6.3.1 Local Access Roads Maintenance

Maintenance of Local Access roadways will be the responsibility of the local agency having jurisdiction of the roadway – Glenn or Colusa Counties.

Traveled way and shoulders. Maintain to provide for the protection of investment and resource values, and for a high degree of user comfort and convenience for all motor vehicles including standard passenger cars.

Drainage. Drain as necessary to keep drainage facilities functional and prevent unacceptable environmental damage while maintaining a high degree of user comfort and convenience.

Roadway. Control vegetation to provide sight distance. Repair and/or remove slides, slumps and debris to provide passage by the traveling public and to control resource damage. Surface repair includes pothole patching, crack sealing, chip sealing and removal of unsuitable material.

Roadside. Clean up litter in accordance with road management objectives. Remove trees that threaten safety to the general public and maintain vegetation as required. Cut and remove fallen trees for appropriate horizontal clearance. Remove debris and maintain fencing. Remove graffiti from roadside signs and barrier rails.

Structures. Maintain all structures (e.g., culverts) to provide for passage of traffic and to preserve structures for future use. Remove graffiti from columns, barrier rails, etc..

Traffic service. Install and maintain appropriate route markers, warning, regulatory, and guide signs, and other traffic control devices as warranted in a sign plan. Maintain centerlines, edge stripes, and other pavement and curb markings as needed.

Maintenance Cycle. Typically, annually.

6.3.2 Maintenance Access Roads Maintenance

Maintenance Access roads are specific for the use to maintain facilities. Maintenance of Maintenance Access roadways would be the responsibility of the Sites Authority, unless used by the contractor; then maintenance responsibility would be that of the contractor until the Authority takes ownership.

Traveled way and shoulders. Maintain to provide travel by drivers in standard passenger cars. Some surface roughness is acceptable. Maintain a traveled way crown or cross slope to provide adequate drainage. Replace the base course and surfacing as needed to protect the resources.

Drainage. Drain as necessary to keep drainage facilities functional and prevent unacceptable environmental damage while maintaining passage for drivers in standard passenger cars.

Roadway. Control vegetation to provide sight distance. Repair and/or remove slides, slumps and debris to provide passage by the traveling public and to control resource damage. Blade surface to maintain template and drainage. Surface is compact, crowned or sloped to drain without segregation of surface materials – no ruts or rills. Suitable material is recovered and incorporated. Unsuitable material is removed. Surface repair may include pothole patching, crack sealing, chip sealing and removal of unsuitable material.

Roadside. Clean up litter in accordance with road management objectives. Remove trees that threaten safety and maintain vegetation as required. Remove logs and debris when interfering with drainage or operation of maintenance equipment. Remove debris and maintain fencing. Remove debris and maintain fencing. Remove graffiti from roadside signs and barrier rails.

Structures. Maintain all structures (e.g., culverts) to provide for passage of traffic and to preserve structures for future use. Remove graffiti from columns, barrier rails, etc.

Traffic service. Install and maintain appropriate route markers, warning, regulatory, and guide signs and other traffic control devices as warranted in a sign plan.

Maintenance Cycle. Typically, 3 years.

7.0 Bridges

7.1 Inspection and Maintenance

It is assumed that County would be providing maintenance services generally in response to a problem on a bridge that affects public safety or the structural integrity of the structure. However, for periodic engineering Inspections, County would have arrangements with Caltrans to perform Inspection and Maintenance services. Caltrans “Maintenance Manual, Chapter H” is therefore used primarily in listing the below information. It is anticipated that the County will periodically re-surface and re-stripe the bridge. Signage may also be replaced and guardrails may be painted.

7.2 Inspections by Caltrans Area Bridge Maintenance Engineers

To comply with federal regulations, bridge structures would be periodically inspected by Caltrans Structures and Bridge Maintenance (SM&I) Area Bridge Maintenance Engineers (ABME), and more frequently when the need is determined by the ABME. Work recommendations are made for any corrective actions required.

When work recommendations are made, the recommendations will suggest the work be done either by contract or by maintenance crews. These recommendations are for guidance and the County has the

flexibility to accomplish the work by any means available. However, it should be noted that many of the repair recommendations affect structural components and are engineered solutions. Therefore, the repair recommendations, methods, and procedures would need to be followed. Often, the ABME will require assistance from the County crews to perform the bridge Inspections. Each work recommendation is identified by action type, target completion time, and accompanied by an estimated cost to do the work. SM&I staff would be contacted if assistance is needed in marking work complete.

7.3 Inspections by County Maintenance

Periodic walk through inspections would be made by County to detect obvious defects, hazards or potential problems and also to monitor known problems. The purpose of these inspections is to supplement the more detailed, but less frequent inspections by the ABME. Special attention should be given to any condition that affects the safety and/or structural capacity. If there is a question as to the relevance of a structural condition, the ABME would be notified.

When major defects or hazards are found, they would be immediately reported to SM&I. If an emergency condition exists, appropriate action would be taken as soon as possible to provide for public safety and to prevent further structural damage from occurring. This includes, but is not limited to, restricting traffic on the bridge or closing it completely, installing temporary support systems, or making temporary repairs. After a major storm, earthquake, or other natural event that may cause damage to bridges, the County would inspect all bridges in the affected area for signs of damage. Any damage found should be reported to SM&I.

7.4 Post-earthquake Inspections

Post bridge earthquake inspections will be conducted under the direction of SM&I ABME's, and Structure Construction Engineers depending on the level of intensity and extent of damage. SM&I would be notified of any earthquake-related damage.

An earthquake of less than 5.5 magnitude is considered too low to cause bridge damage. Although unexpected, any earthquake related damage found by County Maintenance personnel would be reported to SM&I in Sacramento. For earthquake magnitudes higher than 5.5 magnitude, ABME's team would carry out inspections.

7.5 Minor Defects

Minor defects are those that can be corrected with little or no risk of structure collapse or rendering of damage to adjacent or related members while making repairs or replacements and include the following:

- Damaged or misplaced clearance markers.
- Damaged or missing advisory and warning signs
- Damaged or deteriorated railings
- Uneven or cracked approach and deck surfacing.
- Joint Seals
- Accumulated drift adjacent to bents and piers.
- Minor erosion.
- Accumulated dirt or debris on decks
- Plugged drains.
- Settlement or roughness of approach.

- Fire hazards.
- Faulty electrical contacts

7.6 Major Defects

Some defects are considered major because they involve individual members that affect the structural stability of an entire span, thus requiring underpinning of the span or supplementing of the member before removal and include:

- Bent or damaged girders
- Cracked or spalled concrete members
- Defective bearings
- Joint Seal Assemblies
- Settled bents or piers
- Major erosion or scour
- Extensive fire damage

8.0 Annualized Cost of Operations and Maintenance

The estimated frequency and the level of labor and equipment that may be needed for inspection and O&M are indicated in Appendix A. The O&M tables in this appendix were used for estimating the approximate annualized costs for inspection and O&M. The cost tables pertain to routine O&M (maintenance, management, repair, and operation) for feasibility evaluation for the HR facilities. The inspection costs assume that the dam instrumentation is connected to an automated data acquisition system (ADAS), which would allow for remote data collection. An allowance is also included for the annual DSOD fee and providing support for the annual required DSOD inspection.

The O&M tables do not include costs for security, water quality monitoring, environmental protection, recreation, warehousing, office space, or HC facilities. Also, no allowance is made for any possible overlap in staff or equipment for O&M between the HR and HC contracts.

Dams: The tables include allowances for Engineer inspection report preparation as follows:

- Initial filling: first 5 years (can vary greatly): 40 hours/month for 5 years
- Long-term: 80 hours/year after end of year 5

Roads: The annualized costs assumed the following responsibilities for inspecting and maintaining the roads post-construction (to be confirmed with the Counites):

- Local Access Roads – Inspection and maintenance of Local Access roadways would be the responsibility of the agency having jurisdiction of the roadway: Colusa County or Glenn County.
- Maintenance Access Roads – Inspection and maintenance of Maintenance Access roadways would be the responsibility of the Sites Authority.
- Colusa County would continue to inspect and maintain the realigned Sites Lodoga Road and Huffmaster Road as the County is currently doing.

The estimated annualized O&M costs for the HR facilities are summarized in Table 8-1, from Appendix A:

Table 8-1. Summary of Estimated Annualized O&M Costs for HR Facilities

Years or Period	Activity	Estimated Annualized Costs
Years 1-5	Inspection and O&M	$2,323,000
Years 6-10	Inspection and O&M	$1,045,000
Years 11 onward	Inspection and O&M	$856,000
Periodic (5 years)	Periodic maintenance and repairs	$5,133,000
Periodic (25 years)	Periodic maintenance and repairs	$34,186,000

The total average annual operating cost for the HR facilities is about $2,944,000 over 40 years.

Appendix A
Estimated O&M Costs

Cost Summary

Annual Costs

Years 1 - 5	
Dams	$1,139,816
Reservoir Rim and Spillway	$190,376
Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures	$158,980
Roads	$96,225
Bridges	$44,200
General	$390,800
Unlisted items allowance	$303,060
Total: Years 1 - 5	$2,323,457

Years 6 - 10	
Dams	$284,936
Reservoir Rim and Spillway	$58,856
Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures	$49,380
Roads	$84,580
Bridges	$40,090
General	$390,800
Unlisted items allowance	$136,296
Total: Years 6 - 10	$1,044,938

Sites Reservoir
Sites, CA
Operations & Maintenance Cost Model

Operations & Maintenance Cost Model
AACEI Class 5
February 26, 2021

Cost Summary

Years 11 on	
Dams	$120,536
Reservoir Rim and Spillway	$80,776
Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures	$27,460
Roads	$84,580
Bridges	$40,090
General	$390,800
Unlisted items allowance	$111,636
Total: Years 11 on	$855,878
Average Annual Cost over 40 years (Rounded)	$1,063,000
Periodic Costs	
Every 3 Years	$0
Every 5 Years	$5,133,100
Every 25 Years	$34,186,135
Average Periodic Cost over 40 years (Rounded)	$1,881,000
Total Average Annual Operating Cost	**$2,944,000**

Excludes costs related to:
- Security and protective services
- Water quality
- Recreation facilities

Years 1 - 5: Reservoir Filling

1. Dams and Abutments

Dams								
Inspection:								
Daily / 1 day								
Inspectors	6	EA	2,600	Hr/Yr	15,600	Hr	$55.00	$858,000
Pick-up trucks	6	EA	260	Day/Yr	1,560	Day	$95.00	$148,200
Misc equipment	6	EA	260	Day/Yr	1,560	Day	$40.00	$62,400
								$1,068,600
O&M:								
Annually / 4 days								
Inspectors	2	EA	40	Hr/Yr	80	Hr	$55.00	$4,400
Laborers	2	EA	40	Hr/Yr	80	Hr	$65.00	$5,200
Operators	2	EA	40	Hr/Yr	80	Hr	$100.00	$8,000
Truck drivers	2	EA	40	Hr/Yr	80	Hr	$70.00	$5,600
Materials allowance	1	LS			1	LS	$5,000.00	$5,000
Pick-up trucks	4	EA	4	Day/Yr	16	Day	$95.00	$1,520
Dump truck	2	EA	4	Day/Yr	8	Day	$720.00	$5,760
Backhoe	2	EA	4	Day/Yr	8	Day	$600.00	$4,800
Compactor	2	EA	4	Day/Yr	8	Day	$792.00	$6,336
Misc equipment	8	EA	4	Day/Yr	32	Day	$40.00	$1,280
								$47,896
Monument surveys								
Inspection (Surveys): Subcontractor								
Semi-annually / 2 days								
Survey Crew Chief	1	EA	40	Hr/Yr	40	Hr	$115.00	$4,600
Survey Technician	5	EA	40	Hr/Yr	200	Hr	$75.00	$15,000
Pick-up trucks	6	EA	2	Day/Yr	12	Day	$130.00	$1,560
Survey/GPS instruments	6	EA	2	Day/Yr	12	Day	$125.00	$1,500
Misc equipment	6	EA	2	Day/Yr	12	Day	$55.00	$660
								$23,320
Subtotal Dams								$1,139,816

2. Reservoir Rim and Spillway

Inspection:								
Weekly / 2 days								
Inspectors	2	EA	1,040	Hr/Yr	2,080	Hr	$55.00	$114,400
ATV	2	EA	104	Day/Yr	208	Day	$95.00	$19,760
Misc equipment	2	EA	104	Day/Yr	208	Day	$40.00	$8,320
								$142,480
O&M:								
Annually / 4 days								
Inspectors	2	EA	40	Hr/Yr	80	Hr	$55.00	$4,400
Laborers	2	EA	40	Hr/Yr	80	Hr	$65.00	$5,200
Operators	2	EA	40	Hr/Yr	80	Hr	$100.00	$8,000
Truck drivers	2	EA	40	Hr/Yr	80	Hr	$70.00	$5,600
Materials allowance	1	LS			1	LS	$5,000.00	$5,000
Pick-up trucks	4	EA	4	Day/Yr	16	Day	$95.00	$1,520
Dump truck	2	EA	4	Day/Yr	8	Day	$720.00	$5,760
Backhoe	2	EA	4	Day/Yr	8	Day	$600.00	$4,800
Compactor	2	EA	4	Day/Yr	8	Day	$792.00	$6,336
Misc equipment	8	EA	4	Day/Yr	32	Day	$40.00	$1,280
								$47,896
Subtotal Reservoir Rim and Spillway								$190,376

3. Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures

I/O Works

Inspection:								
Weekly / 2 days								
Inspectors	2	EA	1,040	Hr/Yr	2,080	Hr	$55.00	$114,400
Pick-up trucks	2	EA	104	Day/Yr	208	Day	$95.00	$19,760
Misc equipment	2	EA	104	Day/Yr	208	Day	$40.00	$8,320
								$142,480

O&M:						
Annually / 4 days						
Inspectors	2	EA	40 Hr/Yr	80 Hr	$55.00	$4,400
Laborers	2	EA	40 Hr/Yr	80 Hr	$65.00	$5,200
Materials allowance	1	LS		1 LS	$1,000.00	$1,000
Pick-up trucks	4	EA	4 Day/Yr	16 Day	$95.00	$1,520
Misc equipment	4	EA	4 Day/Yr	16 Day	$40.00	$640
						$12,760
Mechanical equipment/gates/valves (by subcontractor)						
Inspection:						
Semi-annually / 1 day						
Inspectors	2	EA	20 Hr/Yr	40 Hr	$75.00	$3,000
Pick-up trucks	2	EA	2 Day/Yr	4 Day	$130.00	$520
Misc equipment	2	EA	2 Day/Yr	4 Day	$55.00	$220
						$3,740
Subtotal Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures						$158,980

4. Roads – Sites Lodoga Road Causeway, Local Roads, Main. Roads

Inspection:						
Sites Ladoga Causeway: 1 day/week for 6 mo, then 1 day/month, average 20 days per year						
Local Roads: 1 day/month for 6 mo, then 1 day/3 months, average 5 days per year						
Main Roads: 2 days/3 months, average 8 days per year						
TOTAL Inspection	33	Days				
Inspectors	1	EA	330 Hr/Yr	330 Hr	$55.00	$18,150
Pick-up trucks	1	EA	33 Day/Yr	33 Day	$95.00	$3,135
Misc equipment	1	EA	33 Day/Yr	33 Day	$40.00	$1,320
						$22,605

O&M:

Sites Ladoga Causeway: 1 day/year
Local Roads: 2 days/year
Main Roads: 4 days/3 years, average 1.33 days/year

TOTAL O&M	5	Days				
Inspectors	2	EA	50	Hr/Yr	100 Hr	$55.00	$5,500
Laborers	2	EA	50	Hr/Yr	100 Hr	$65.00	$6,500
Operators	2	EA	50	Hr/Yr	100 Hr	$100.00	$10,000
Truck drivers	2	EA	50	Hr/Yr	100 Hr	$70.00	$7,000
Materials allowance	1	LS			1 LS	$20,000.00	$20,000
Pick-up trucks	4	EA	5	Day/Yr	20 Day	$95.00	$1,900
Dump truck	2	EA	5	Day/Yr	10 Day	$720.00	$7,200
Backhoe	2	EA	5	Day/Yr	10 Day	$600.00	$6,000
Compactor	2	EA	5	Day/Yr	10 Day	$792.00	$7,920
Misc equipment	8	EA	5	Day/Yr	40 Day	$40.00	$1,600
							$73,620
Subtotal Roads							$96,225

5. Bridges

Inspection:

Semi-annually / 2 day

Inspectors	2	EA	40	Hr/Yr	80 Hr	$55.00	$4,400
Pick-up trucks	2	EA	4	Day/Yr	8 Day	$95.00	$760
Misc equipment	2	EA	4	Day/Yr	8 Day	$40.00	$320
							$5,480

O&M:

Annually / 2 days

Inspectors	1	EA	20	Hr/Yr	20 Hr	$55.00	$1,100
Laborers	3	EA	20	Hr/Yr	60 Hr	$65.00	$3,900
Operators	1	EA	20	Hr/Yr	20 Hr	$100.00	$2,000
Materials							$5,000
Pick-up trucks	4	EA	2	Day/Yr	8 Day	$95.00	$760
Crane	1	EA	2	Day/Yr	2 Day	$1,120.00	$2,240
Misc equipment	5	EA	2	Day/Yr	10 Day	$40.00	$400
							$15,400

Monument surveys						
Inspection (Surveys): Subcontractor						
Semi-annually / 2 days						
Survey Crew Chief		1 EA	40 Hr/Yr	40 Hr	$115.00	$4,600
Survey Technician		5 EA	40 Hr/Yr	200 Hr	$75.00	$15,000
Pick-up trucks		6 EA	2 Day/Yr	12 Day	$130.00	$1,560
Survey/GPS instruments		6 EA	2 Day/Yr	12 Day	$125.00	$1,500
Misc equipment		6 EA	2 Day/Yr	12 Day	$55.00	$660
						$23,320
Subtotal Bridges						$44,200
General						
General Management						
Senior Inspector	Report writing/filings	1 LS	480 Hr/Yr	480 Hr	$85.00	$40,800
DSOD fees				1 LS	$350,000.00	$350,000
						$390,800
Office and related Expenses						
Office provided by HC Facilities						$0
						$0
Subtotal General						$390,800
Unlisted items allowance						
Unlisted Items Allowance						
Senior Inspector	Report writing/filings			15%	$2,020,397	$303,060
						$303,060
Subtotal General						$303,060
Total: Years 1 - 5						$2,323,457

Years 6 - 10

1. Dams and Abutments

Dams					
Inspection:					
Weekly / 1 day					
Inspectors	6 EA	520 Hr/Yr	3,120 Hr	$55.00	$171,600
Pick-up trucks	6 EA	52 Day/Yr	312 Day	$95.00	$29,640
Misc equipment	6 EA	52 Day/Yr	312 Day	$40.00	$12,480
					$213,720
O&M:					
Annually / 4 days					
Inspectors	2 EA	40 Hr/Yr	80 Hr	$55.00	$4,400
Laborers	2 EA	40 Hr/Yr	80 Hr	$65.00	$5,200
Operators	2 EA	40 Hr/Yr	80 Hr	$100.00	$8,000
Truck drivers	2 EA	40 Hr/Yr	80 Hr	$70.00	$5,600
Materials allowance	1 LS		1 LS	$5,000.00	$5,000
Pick-up trucks	4 EA	4 Day/Yr	16 Day	$95.00	$1,520
Dump truck	2 EA	4 Day/Yr	8 Day	$720.00	$5,760
Backhoe	2 EA	4 Day/Yr	8 Day	$600.00	$4,800
Compactor	2 EA	4 Day/Yr	8 Day	$792.00	$6,336
Misc equipment	8 EA	4 Day/Yr	32 Day	$40.00	$1,280
					$47,896
Monument surveys					
Inspection (Surveys): Subcontractor					
Semi-annually / 2 days					
Survey Crew Chief	1 EA	40 Hr/Yr	40 Hr	$115.00	$4,600
Survey Technician	5 EA	40 Hr/Yr	200 Hr	$75.00	$15,000
Pick-up trucks	6 EA	2 Day/Yr	12 Day	$130.00	$1,560
Survey/GPS instruments	6 EA	2 Day/Yr	12 Day	$125.00	$1,500
Misc equipment	6 EA	2 Day/Yr	12 Day	$55.00	$660
					$23,320
Subtotal Dams					$284,936

Years 6 - 10

2. Reservoir Rim and Spillway

Inspection:					
Quarterly/2 days					
Inspectors	2 EA	80 Hr/Yr	160 Hr	$55.00	$8,800
ATV	2 EA	8 Day/Yr	16 Day	$95.00	$1,520
Misc equipment	2 EA	8 Day/Yr	16 Day	$40.00	$640
					$10,960
O&M:					
Annually / 4 days					
Inspectors	2 EA	40 Hr/Yr	80 Hr	$55.00	$4,400
Laborers	2 EA	40 Hr/Yr	80 Hr	$65.00	$5,200
Operators	2 EA	40 Hr/Yr	80 Hr	$100.00	$8,000
Truck drivers	2 EA	40 Hr/Yr	80 Hr	$70.00	$5,600
Materials allowance	1 LS		1 LS	$5,000.00	$5,000
Pick-up trucks	4 EA	4 Day/Yr	16 Day	$95.00	$1,520
Dump truck	2 EA	4 Day/Yr	8 Day	$720.00	$5,760
Backhoe	2 EA	4 Day/Yr	8 Day	$600.00	$4,800
Compactor	2 EA	4 Day/Yr	8 Day	$792.00	$6,336
Misc equipment	8 EA	4 Day/Yr	32 Day	$40.00	$1,280
					$47,896
Subtotal Reservoir Rim and Spillway					$58,856

3. Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures

I/O Works

Inspection:					
Monthly/2 days					
Inspectors	2 EA	240 Hr/Yr	480 Hr	$55.00	$26,400
Pick-up trucks	2 EA	24 Day/Yr	48 Day	$95.00	$4,560
Misc equipment	2 EA	24 Day/Yr	48 Day	$40.00	$1,920
					$32,880

Years 6 - 10

O&M:						
Annually / 4 days						
Inspectors	2	EA	40 Hr/Yr	80 Hr	$55.00	$4,400
Laborers	2	EA	40 Hr/Yr	80 Hr	$65.00	$5,200
Materials allowance	1	LS		1 LS	$1,000.00	$1,000
Pick-up trucks	4	EA	4 Day/Yr	16 Day	$95.00	$1,520
Misc equipment	4	EA	4 Day/Yr	16 Day	$40.00	$640
						$12,760
Mechanical equipment/gates/valves (by subcontractor)						
Inspection:						
Annually/2 days						
Inspectors	2	EA	20 Hr/Yr	40 Hr	$75.00	$3,000
Pick-up trucks	2	EA	2 Day/Yr	4 Day	$130.00	$520
Misc equipment	2	EA	2 Day/Yr	4 Day	$55.00	$220
						$3,740
Subtotal Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures						$49,380

4. Roads – Sites Lodoga Road Causeway, Local Roads, Main. Roads

Inspection:						
Sites Ladoga Causeway: 1 day/3 months, average 4 days per year						
Local Roads: 2 days/3 months, average 8 days per year						
Main Roads: 2 days/6 months, average 4 days per year						
TOTAL Inspection	16	Days				
Inspectors	1	EA	160 Hr/Yr	160 Hr	$55.00	$8,800
Pick-up trucks	1	EA	16 Day/Yr	16 Day	$95.00	$1,520
Misc equipment	1	EA	16 Day/Yr	16 Day	$40.00	$640
						$10,960

Years 6 - 10

O&M:

Sites Ladoga Causeway: 1 day/year
Local Roads: 2 days/year
Main Roads: 4 days/3 years, average 1.33 days/year

TOTAL O&M	5	Days				
Inspectors	2	EA	50 Hr/Yr	100 Hr	$55.00	$5,500
Laborers	2	EA	50 Hr/Yr	100 Hr	$65.00	$6,500
Operators	2	EA	50 Hr/Yr	100 Hr	$100.00	$10,000
Truck drivers	2	EA	50 Hr/Yr	100 Hr	$70.00	$7,000
Materials allowance	1	LS		1 LS	$20,000.00	$20,000
Pick-up trucks	4	EA	5 Day/Yr	20 Day	$95.00	$1,900
Dump truck	2	EA	5 Day/Yr	10 Day	$720.00	$7,200
Backhoe	2	EA	5 Day/Yr	10 Day	$600.00	$6,000
Compactor	2	EA	5 Day/Yr	10 Day	$792.00	$7,920
Misc equipment	8	EA	5 Day/Yr	40 Day	$40.00	$1,600
						$73,620
Subtotal Roads						$84,580

5. Bridges

Inspection:

Annually / 1 day

Inspectors	2	EA	10 Hr/Yr	20 Hr	$55.00	$1,100
Pick-up trucks	2	EA	1 Day/Yr	2 Day	$95.00	$190
Misc equipment	2	EA	1 Day/Yr	2 Day	$40.00	$80
						$1,370

O&M:

Annually / 2 days

Inspectors	1	EA	20 Hr/Yr	20 Hr	$55.00	$1,100
Laborers	3	EA	20 Hr/Yr	60 Hr	$65.00	$3,900
Operators	1	EA	20 Hr/Yr	20 Hr	$100.00	$2,000
Materials						$5,000
Pick-up trucks	4	EA	2 Day/Yr	8 Day	$95.00	$760
Crane	1	EA	2 Day/Yr	2 Day	$1,120.00	$2,240
Misc equipment	5	EA	2 Day/Yr	10 Day	$40.00	$400
						$15,400

Years 6 - 10

Monument surveys							
Inspection (Surveys): Subcontractor							
Semi-annually / 2 days							
Survey Crew Chief		1	EA	40 Hr/Yr	40 Hr	$115.00	$4,600
Survey Technician		5	EA	40 Hr/Yr	200 Hr	$75.00	$15,000
Pick-up trucks		6	EA	2 Day/Yr	12 Day	$130.00	$1,560
Survey/GPS instruments		6	EA	2 Day/Yr	12 Day	$125.00	$1,500
Misc equipment		6	EA	2 Day/Yr	12 Day	$55.00	$660
							$23,320
Subtotal Bridges							$40,090
General							
General Management							
Senior Inspector	Report writing/filings	1	LS	480 Hr/Yr	480 Hr	$85.00	$40,800
DSOD fees					1 LS	$350,000.00	$350,000
							$390,800
Office and related Expenses							
Office provided by HC Facilities							$0
							$0
Subtotal General							$390,800
Unlisted items allowance							
Unlisted Items Allowance							
Senior Inspector	Report writing/filings				15%	$908,642	$136,296
							$136,296
Subtotal General							$136,296
Total: Years 6 - 10							$1,044,938

Years 11 onwards

1. Dams and Abutments

Dams								
Inspection:								
Monthly / 1 day								
Inspectors	6	EA	120	Hr/Yr	720	Hr	$55.00	$39,600
Pick-up trucks	6	EA	12	Day/Yr	72	Day	$95.00	$6,840
Misc equipment	6	EA	12	Day/Yr	72	Day	$40.00	$2,880
								$49,320
O&M:								
Annually / 4 days								
Inspectors	2	EA	40	Hr/Yr	80	Hr	$55.00	$4,400
Laborers	2	EA	40	Hr/Yr	80	Hr	$65.00	$5,200
Operators	2	EA	40	Hr/Yr	80	Hr	$100.00	$8,000
Truck drivers	2	EA	40	Hr/Yr	80	Hr	$70.00	$5,600
Materials allowance	1	LS			1	LS	$5,000.00	$5,000
Pick-up trucks	4	EA	4	Day/Yr	16	Day	$95.00	$1,520
Dump truck	2	EA	4	Day/Yr	8	Day	$720.00	$5,760
Backhoe	2	EA	4	Day/Yr	8	Day	$600.00	$4,800
Compactor	2	EA	4	Day/Yr	8	Day	$792.00	$6,336
Misc equipment	8	EA	4	Day/Yr	32	Day	$40.00	$1,280
								$47,896
Monument surveys								
Inspection (Surveys): Subcontractor								
Semi-annually / 2 days								
Survey Crew Chief	1	EA	40	Hr/Yr	40	Hr	$115.00	$4,600
Survey Technician	5	EA	40	Hr/Yr	200	Hr	$75.00	$15,000
Pick-up trucks	6	EA	2	Day/Yr	12	Day	$130.00	$1,560
Survey/GPS instruments	6	EA	2	Day/Yr	12	Day	$125.00	$1,500
Misc equipment	6	EA	2	Day/Yr	12	Day	$55.00	$660
								$23,320
Subtotal Dams								$120,536

Years 11 onwards

2. Reservoir Rim and Spillway

Inspection:							
Monthly/2 days							
Inspectors	2	EA	240	Hr/Yr	480	Hr	$55.00	$26,400
ATV	2	EA	24	Day/Yr	48	Day	$95.00	$4,560
Misc equipment	2	EA	24	Day/Yr	48	Day	$40.00	$1,920
								$32,880
O&M:								
Annually / 4 days								
Inspectors	2	EA	40	Hr/Yr	80	Hr	$55.00	$4,400
Laborers	2	EA	40	Hr/Yr	80	Hr	$65.00	$5,200
Operators	2	EA	40	Hr/Yr	80	Hr	$100.00	$8,000
Truck drivers	2	EA	40	Hr/Yr	80	Hr	$70.00	$5,600
Materials allowance	1	LS			1	LS	$5,000.00	$5,000
Pick-up trucks	4	EA	4	Day/Yr	16	Day	$95.00	$1,520
Dump truck	2	EA	4	Day/Yr	8	Day	$720.00	$5,760
Backhoe	2	EA	4	Day/Yr	8	Day	$600.00	$4,800
Compactor	2	EA	4	Day/Yr	8	Day	$792.00	$6,336
Misc equipment	8	EA	4	Day/Yr	32	Day	$40.00	$1,280
								$47,896
Subtotal Reservoir Rim and Spillway								$80,776

3. Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures

I/O Works

Inspection:							
Quarterly/2 days							
Inspectors	2	EA	80	Hr/Yr	160	Hr	$55.00	$8,800
Pick-up trucks	2	EA	8	Day/Yr	16	Day	$95.00	$1,520
Misc equipment	2	EA	8	Day/Yr	16	Day	$40.00	$640
								$10,960

Years 11 onwards

O&M:							
Annually / 4 days							
Inspectors	2	EA	40	Hr/Yr	80	Hr	$55.00	$4,400
Laborers	2	EA	40	Hr/Yr	80	Hr	$65.00	$5,200
Materials allowance	1	LS			1	LS	$1,000.00	$1,000
Pick-up trucks	4	EA	4	Day/Yr	16	Day	$95.00	$1,520
Misc equipment	4	EA	4	Day/Yr	16	Day	$40.00	$640
								$12,760
Mechanical equipment/gates/valves (by subcontractor)								
Inspection:								
Annually/2 days								
Inspectors	2	EA	20	Hr/Yr	40	Hr	$75.00	$3,000
Pick-up trucks	2	EA	2	Day/Yr	4	Day	$130.00	$520
Misc equipment	2	EA	2	Day/Yr	4	Day	$55.00	$220
								$3,740
Subtotal Inlet/Outlet Works, Sites Dam Outlet and Emergency Release Structures								$27,460

4. Roads – Sites Lodoga Road Causeway, Local Roads, Main. Roads

Inspection:							
Sites Ladoga Causeway: 1 day/3 months, average 4 days per year							
Local Roads: 2 days/3 months, average 8 days per year							
Main Roads: 2 days/6 months, average 4 days per year							
TOTAL Inspection	16	Days					
Inspectors	1	EA	160	Hr/Yr	160	Hr	$55.00	$8,800
Pick-up trucks	1	EA	16	Day/Yr	16	Day	$95.00	$1,520
Misc equipment	1	EA	16	Day/Yr	16	Day	$40.00	$640
								$10,960

Years 11 onwards

O&M:

Sites Ladoga Causeway: 1 day/year
Local Roads: 2 days/year
Main Roads: 4 days/3 years, average 1.33 days/year

TOTAL O&M	5	Days					
Inspectors	2	EA	50	Hr/Yr	100	Hr	$55.00	$5,500
Laborers	2	EA	50	Hr/Yr	100	Hr	$65.00	$6,500
Operators	2	EA	50	Hr/Yr	100	Hr	$100.00	$10,000
Truck drivers	2	EA	50	Hr/Yr	100	Hr	$70.00	$7,000
Materials allowance	1	LS			1	LS	$20,000.00	$20,000
Pick-up trucks	4	EA	5	Day/Yr	20	Day	$95.00	$1,900
Dump truck	2	EA	5	Day/Yr	10	Day	$720.00	$7,200
Backhoe	2	EA	5	Day/Yr	10	Day	$600.00	$6,000
Compactor	2	EA	5	Day/Yr	10	Day	$792.00	$7,920
Misc equipment	8	EA	5	Day/Yr	40	Day	$40.00	$1,600
								$73,620
Subtotal Roads								$84,580

5. Bridges

Inspection:

Annually / 1 day

Inspectors	2	EA	10	Hr/Yr	20	Hr	$55.00	$1,100
Pick-up trucks	2	EA	1	Day/Yr	2	Day	$95.00	$190
Misc equipment	2	EA	1	Day/Yr	2	Day	$40.00	$80
								$1,370

Years 11 onwards

O&M:							
Annually / 2 days							
Inspectors		1	EA	20 Hr/Yr	20 Hr	$55.00	$1,100
Laborers		3	EA	20 Hr/Yr	60 Hr	$65.00	$3,900
Operators		1	EA	20 Hr/Yr	20 Hr	$100.00	$2,000
Materials							$5,000
Pick-up trucks		4	EA	2 Day/Yr	8 Day	$95.00	$760
Crane		1	EA	2 Day/Yr	2 Day	$1,120.00	$2,240
Misc equipment		5	EA	2 Day/Yr	10 Day	$40.00	$400
							$15,400
Monument surveys							
Inspection (Surveys): Subcontractor							
Semi-annually / 2 days							
Survey Crew Chief		1	EA	40 Hr/Yr	40 Hr	$115.00	$4,600
Survey Technician		5	EA	40 Hr/Yr	200 Hr	$75.00	$15,000
Pick-up trucks		6	EA	2 Day/Yr	12 Day	$130.00	$1,560
Survey/GPS instruments		6	EA	2 Day/Yr	12 Day	$125.00	$1,500
Misc equipment		6	EA	2 Day/Yr	12 Day	$55.00	$660
							$23,320
Subtotal Bridges							$40,090
General							
General Management							
Senior Inspector	Report writing/filings	1	LS	480 Hr/Yr	480 Hr	$85.00	$40,800
DSOD fees					1 LS	$350,000.00	$350,000
							$390,800
Office and related Expenses							
Office provided by HC Facilities							$0
							$0
Subtotal General							$390,800

Years 11 onwards

Unlisted items allowance

Unlisted Items Allowance				
Senior Inspector	Report writing/filings	15%	$744,242	$111,636
				$111,636
Subtotal General				$111,636
Total: Years 6 - 10				$855,878

Periodic Costs

Every 3 Years

Roads: Included under Annual O&M						
Maintenance						
None						$0
						$0
Subtotal - 3 Years						$0

Every 5 Years

I/O Works						
Maintenance: ROV Inspection						
Inspectors	2	EA	40 Hr	80 Hr	$55.00	$4,400
Laborers	2	EA	40 Hr	80 Hr	$65.00	$5,200
Materials allowance	1	LS		1 LS	$1,000	$1,000
Pick-up trucks	4	EA	4 Day/Yr	16 Day	$95.00	$1,520
ROV Inspection equipment	2	EA	4 Day/Yr	8 Day	$2,400.00	$19,200
Misc equipment	4	EA	4 Day/Yr	16 Day	$40.00	$640
						$31,960
Roads						
Periodic Resurfacing and repair						
Allowance for resurfacing, repairs						
Gravel paving	2,550,570	SF		2,550,570 SF	$2.00	$5,101,140
						$5,101,140
Subtotal - 5 Years						$5,133,100

Periodic Costs

Every 25 Years

Dams							
Maintenance: Instrumentation							
Inspectors	2	EA	40	Hr/Yr	80	Hr	$55.00	$4,400
Drill Rig operators	2	EA	40	Hr/Yr	80	Hr	$105.00	$8,400
Drill Rig helpers	2	EA	40	Hr/Yr	80	Hr	$95.00	$7,600
Laborers	2	EA	20	Hr	40	Hr	$65.00	$2,600
Materials allowance	1	LS			1	LS	$25,000	$25,000
Pick-up trucks	4	EA	4	Day/Yr	16	Day	$95.00	$1,520
Drill Rig	2	EA	4	Day/Yr	8	Day	$1,440.00	$11,520
Backhoe	2	EA	4	Day/Yr	8	Day	$600.00	$4,800
Dump truck	2	EA	4	Day/Yr	8	Day	$720.00	$5,760
Misc equipment	8	EA	4	Day/Yr	32	Day	$40.00	$1,280
								$72,880
I/O Works: Mechanical equipment/gates/valves (by subcontractor)								
Maintenance								
Inspectors	1	EA	80	Hr/Yr	80	Hr	$75.00	$6,000
Operators	3	EA	80	Hr/Yr	240	Hr	$135.00	$32,400
Laborers	2	EA	80	Hr	160	Hr	$90.00	$14,400
Materials allowance	1	LS			1	LS	$25,000	$25,000
Pick-up trucks	4	EA	8	Day/Yr	32	Day	$95.00	$3,040
Crane	2	EA	8	Day/Yr	16	Day	$1,120.00	$17,920
Dump truck	2	EA	8	Day/Yr	16	Day	$720.00	$11,520
Misc equipment	6	EA	8	Day/Yr	48	Day	$40.00	$1,920
Vendor Cost for valve refurbishment	1	LS			1	LS	$10,000,000	$10,000,000
								$10,112,200
Roads								
Periodic Resurfacing and repair								
Allowance for resurfacing, repairs								
AC paving	4,800,211	SF			4,800,211	SF	$5.00	$24,001,055
								$24,001,055
Subtotal - 25 Years								$34,186,135

Cost Data

Labor

Senior Inspector	$85.00	per hr	Agency Employee	Based on $125,000 per year, plus 45% Burden(PRTI/Benefits)
Inspectors	$55.00	per hr	Agency Employee	Based on $80,000 per year, plus 45% Burden(PRTI/Benefits)
Laborers	$65.00	per hr	Agency Employee	Based on $32 (Prev Wage) plus 110% Fringe & Burden
Operators	$100.00	per hr	Agency Employee	Based on $52 (Prev Wage) plus 90% Fringe & Burden
Drill Rig operators	$105.00	per hr	Agency Employee	Based on $55 (Prev Wage) plus 90% Fringe & Burden
Drill Rig helpers	$95.00	per hr	Agency Employee	Based on $50 (Prev Wage) plus 90% Fringe & Burden
Truck drivers	$70.00	per hr	Agency Employee	Based on $33 (Prev Wage) plus 115% Fringe & Burden
Survey Crew Chief	$85.00	per hr	Agency Employee	Based on $125,000 per year, plus 45% Burden(PRTI/Benefits)
Survey Technician	$55.00	per hr	Agency Employee	Based on $80,000 per year, plus 45% Burden(PRTI/Benefits)

Equipment

Pick-up trucks	$95.00	per day	Agency Owned	Based on $45k per truck, per 3 years, plus annual $2k maint, $2k ins, $8k fuel = $25k/yr
ATV	$95.00	per day	Agency Owned	Based on $30k per ATV, per 2 years, plus annual $2k maint, $2k ins, $8k fuel = $25k/yr
ROV Inspection equ	$2,400.00	per day	Agency Owned	Allow $2400 per day
Dump truck	$720.00	per day	Agency Owned	Based on caltrans ownership rates, $90/hr
Backhoe	$600.00	per day	Agency Owned	Based on caltrans ownership rates, $75/hr
Compactor	$792.00	per day	Agency Owned	Based on caltrans ownership rates, $99/hr
Misc equipment	$40.00	per day	Agency Owned	Allow $5 per hour
Crane	$1,120.00	per day	Agency Owned	Based on caltrans ownership rates, $140/hr
Drill Rig	$1,440.00	per day	Agency Owned	Based on caltrans ownership rates, $180/hr

Sub Costs

	1.35	Direct cost above + 35% mark-up

Notes		
	Email from MH (2015 values)	
	Local road maint - $14,067/yr/mi	
	Maint Rd - $11,130/3yr/mi	
	DSOD Fees	
2/25/2021	Draft Updated/Issued 2/25/21	

Appendix C.2.B Final Conveyance Operations, Maintenance, and Replacement

Final HC Operations, Maintenance, and Replacement Technical Memorandum

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	May 17, 2021
From:	Jeff Smith, P.E./Jacobs
Quality Review by:	Peter Rude, P.E./Jacobs
Authority Agent Review by:	Henry Luu, P.E. (HDR)
Subject:	Operations, Maintenance, and Replacement for HC Facilities

1.0 Introduction

The project consists of a large reservoir, ancillary roads, and conveyance facilities. The Sites Joint Power Authority (Authority) decided to segregate the design of these facilities into two segments. The first segment, “HR” (Segment H Reservoir), is responsible for design of the reservoir features, including several dams, inlet/outlet tunnels at Golden Gate Dam, and relocation of roads displaced by the reservoir. The other segment is known as the “HC” segment (Segment H Conveyance) and includes improvements to the two existing diversion canals from the Sacramento River to the project area (Tehama-Colusa Canal [TCC] and Glenn-Colusa Irrigation District [GCID] Main Canal), regulating reservoirs (existing Funks Reservoir and a new Terminal Regulating Reservoir [TRR]), two pumping generating plants (PGPs) and their respective substations, electrical interconnection transmission lines, large-diameter pipelines from each PGP to Sites Reservoir, and a large-diameter pipeline to convey water from the TCC to the Colusa Basin Drain or Sacramento River near Dunnigan, California.

This technical memorandum will cover the HC facilities. Detailed descriptions of each facility are in the next section. An overall site plan of the project area is provided in Figure 1.

1.1 General Description of Facilities

Following is a list of the individual new facilities and existing facilities that require improvements.

- Improvements to the Tehama-Colusa Canal Authority (TCCA) Red Bluff Pumping Plant on the Sacramento River
- GCID Main Canal improvements upstream of the TRR
- TRR – East Alternative
- TRR – West Alternative
- TRR PGP with respective substation
- TRR pipelines

- Funks Reservoir – sediment removal
- Funks PGP with respective substation
- Funks pipelines
- Western Area Power Administration (WAPA) or Pacific Gas and Electric (PG&E) Substation/Switchyard
- Power transmission lines
- Dunnigan Pipeline (Alternative 1 and Alternative 2)
- Administration and operations building
- Maintenance and storage building
- Access roads

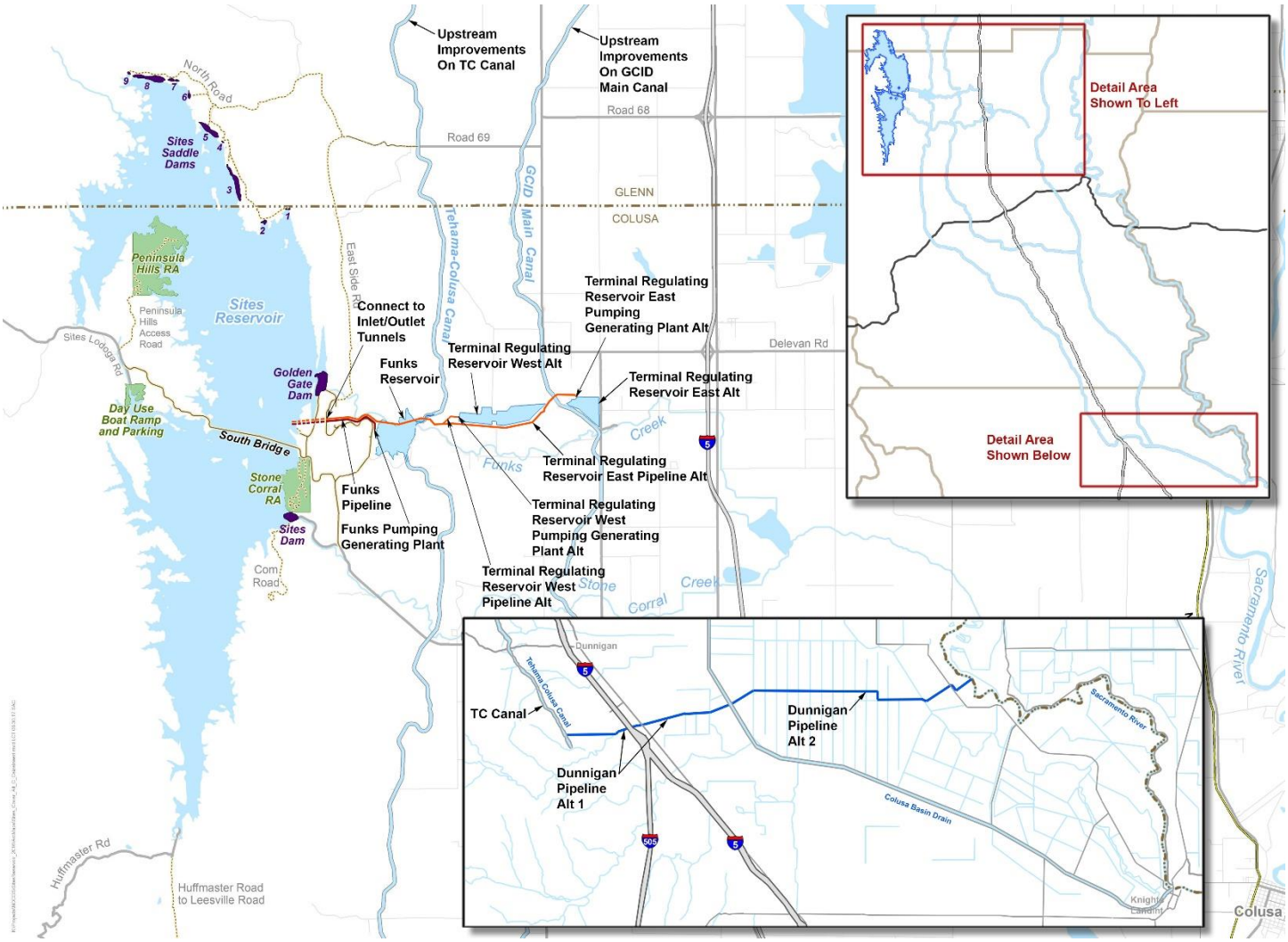

Figure 1: Project Area Site Plan

1.1.1 Improvements to the TCCA Red Bluff Pumping Plant

The Red Bluff Diversion is located on the Sacramento River in Red Bluff, California. The facility includes a 2,500 cubic feet per second (cfs) capacity, 1,180-foot-long fish screen structure, forebay, pumping plant (current capacity 2,000 cfs), an electrical switchyard, and a 660-foot-long access bridge, canal, and siphon under Red Bank Creek, to deliver water from the Sacramento River into the TCC and Corning Canal. This facility was constructed and put into operation in October 2012. The pumping plant was designed to

accommodate the Sites Project and includes space to add 2 additional, 250 cfs, 600-horsepower (hp) pumping units, bringing the total pumping capacity to 2,500 cfs.

1.1.2 GCID Main Canal Improvements

The GCID Main Canal delivers water from the Sacramento River to users along its route, from its diversion point approximately 5 miles northwest of Hamilton City to southeast of the City of Williams. The canal is a 65-mile-long, unlined, earthen channel, with capacity varying from 3,000 cfs at the upstream end to 300 cfs at the southern terminus. Water conveyed by the canal is pumped by the Hamilton City Main Pump Station into the GCID Main Canal.

Improvements to the GCID Main Canal will include a new 3,000 cfs headworks structure just downstream of the Hamilton City Diversion, two siphon structures (Willow Creek and Walker Creek), a railroad siphon at Willows, canal earthwork, and some canal bank gravel road improvements. The need for replacement of the siphons and railroad crossing will be determined after a canal hydraulic model and a condition assessment are completed, which is anticipated to be in Spring 2021.

1.1.3 TRR

This is a new reservoir that will be hydraulically connected to the GCID Main Canal about 3 miles east of Funks Reservoir and just upstream of the Funks Creek Siphon, at milepost 41.3 on the GCID Main Canal. The footprint of the TRR will be approximately 130 acres, with a storage volume of approximately 600 acre-feet. The TRR will also include gates to control water flow in and out of the GCID Main Canal. There are two alternative locations for the TRR: one on the eastern side of the GCID Main Canal (TRR East) and one on the western side of the GCID Main Canal (TRR West).

1.1.4 TRR PGP

This will be a pumping and generating plant that will be used to pump water from the TRR to the Sites Reservoir. This facility will also include hydroelectric turbines to generate electricity when flow is released from Sites Reservoir to the TRR and GCID Main Canal. As part of this PGP facility, there will also be an energy-dissipation facility that will allow releases back to the TRR as backup to the hydroelectric turbine facilities. The pumping plant will have a capacity of 1,800 cfs; the generating plant will have a capacity of 1,000 cfs.

1.1.5 TRR Pipelines

These are two, parallel, 12-foot-diameter pipelines that will be used to convey water between the TRR PGP and the Sites Reservoir. These pipelines will connect from the piping manifold at TRR PGP to the downstream side of the two proposed 23-foot-diameter tunnels connected to the Site Reservoir inlet/outlet structure. The approximate length of these pipelines will be 4.4 miles each. Just downstream of the piping manifold connecting the TRR pipelines with the two inlet/outlet tunnels, there is a 24-inch-diameter environmental water pipeline that is approximately 2,550 feet long and discharges into Funks Creek.

1.1.6 Funks Reservoir

The U.S. Bureau of Reclamation (Reclamation) constructed the Funks Reservoir in the mid-1970s with the intent of providing operational flexibility for the TCC. There are check structures on the TCC just upstream and downstream of the reservoir. The TCC is located about 1 mile east of the proposed Sites Reservoir. At the time of construction, the reservoir had a useable capacity of 1,170 acre-feet between operating levels of 199.5 and 205.2 feet elevation, and 1,080 acre-feet of inactive storage below elevation 199.5 feet, for a total capacity of 2,250 acre-feet; however, the addition of sediment from Funks Creek and the TCC have likely reduced the total storage volume. Additionally, a cofferdam will be constructed within Funks Reservoir to facilitate construction of the TRR pipelines. The resulting storage volume reductions will be offset by sediment removal and excavation where storage capacity can be regained. The spillway has a capacity of 2,500 cfs. The project will remove accumulated sediment to recapture the design storage volume.

1.1.7 Funks PGP

This is a pumping and generating plant that will be used to pump water from Funks Reservoir to the Sites Reservoir. This facility will also include hydroelectric turbines to generate electricity when flow is released from Sites Reservoir to Funks Reservoir and, ultimately, the TCC. There will also be an energy-dissipation facility as part of this PGP facility that will allow releases back to Funks Reservoir as backup to the hydroelectric turbine facilities. The pumping plant will have a capacity of 2,100 cfs and the generating plant will have a capacity of 2,000 cfs.

1.1.8 Funks Pipelines

These are 2 parallel, 12-foot-diameter pipelines used to convey water between the Funks PGP and the Sites Reservoir. These pipelines will connect from the piping manifold at Funks PGP to the downstream side of the two proposed 23-foot-diameter tunnels connected to the Site Reservoir inlet/outlet structure. The approximate length of these pipelines is 1 mile each.

1.1.9 Dunnigan Pipeline

The Dunnigan pipeline consists of either a 9- or 10.5-diameter pipeline that will be used to release water from the TCC to the Sacramento River. The concept is to release flow from Sites Reservoir to Funks Reservoir, where the flow will then go south about 40 miles to near the end of the TCC. At this point, flow will be diverted into the Dunnigan pipeline, where flow will head either to the Colusa Basin Drain (CBD), which flows to Sacramento River, or directly to the Sacramento River. If the pipeline discharges directly into the Sacramento River, a portion of the water will also be diverted and discharged in the CBD. Alternative 1 consists of a 9-foot-diameter pipeline that is about 4 miles long and discharges into the CBD. Alternative 2 consists of a 10.5-foot-diameter pipeline that is about 10 miles long and discharges directly into the Sacramento River.

1.1.10 WAPA or PG&E Substation/Switchyard

There are 230 kilovolt (kV) electrical transmission lines running near the proposed project area. Specifically, the WAPA transmission lines run very close to Funks Reservoir in a north-south direction, with a parallel 230 kV line owned by PG&E approximately 1 mile east of the WAPA transmission lines. It is anticipated that one of these transmission lines will be connected to provide power for the project, as well as receive generated electrical power from the hydroelectric turbines. Switchyards and substations will be needed to provide power to both the TRR PGP and Funks PGP sites.

1.1.11 Electrical Transmission Lines

Electrical transmission lines will be required to interconnect to the WAPA or PG&E 230 kV transmission lines and to the TRR PGP and the Funks PGP.

Administration and Operations Building

At this time, staffing requirements for operating and maintaining the Sites facilities have not been defined, but an administration and operations building is anticipated to be needed. This building is anticipated to be located next to the Funks PGP.

1.1.12 Maintenance and Storage Building

A building is also expected to be required to provide maintenance and storage associated with the project. This building is anticipated to be located next to the Funks PGP.

1.1.13 Access Roads

Access to the proposed TRR site would likely be from McDermott Road, which lies adjacent to the proposed reservoir. Access to the Funks complex (PGP and Reservoir) is currently accomplished using the operations and maintenance (O&M) road along the TCC. A new access road will be required that allows larger equipment

and year-round access. It is also anticipated that roads will be constructed within the TRR and Funks Pipeline easements, not only to provide access to the pipelines and electrical power transmission lines, but also as a secondary access road to the project facilities.

1.2 Purpose and Scope

The purpose of this task is to describe the inspection and OM&R activities associated with each of the HC project facilities. This task supports the Sites Project Feasibility Report, but is not intended to serve as a detailed inspection and O&M manual that would be used for the constructed facilities. It is also not intended to serve as the document used for replacement costs of the facility, but does provide rough numbers to use to determine long-term costs for replacement of facilities as they become non-operational.

1.3 Limitations

The scope of work for this TM was restricted to the development of the inspection and O&M activities for the Sites Reservoir under the Conveyance (HC) contract. O&M for the Sites Reservoir facilities are separately considered in a companion TM for the HR contract.

This TM is intended for the sole use of the Sites Project Authority. The scope of services performed may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

2.0 Facility Operation and Maintenance

This section describes typical O&M activities associated with each of the individual facilities.

2.1 TCCA Red Bluff Pumping Plant

The TCCA Red Bluff Pumping Plant is an existing facility that has a detailed O&M plan, which was developed when the facility was constructed. The addition of the two pumps and associated equipment is not anticipated to change the current O&M activities since this project is only replicating existing equipment Although performing the O&M activities for these two additional pumps may take a little more time, the types of activities will remain the same.

2.2 GCID Main Canal Improvements

Improvements to the GCID Main Canal entail replacement of existing structures to provide greater conveyance reliability and additional earthwork along the GCID Main Canal banks to provide freeboard and all-weather access. The GCID Main Canal is owned and operated by GCID, which is responsible for operating and maintaining the canal. O&M activities for these improvements are not anticipated to increase GCID’s workload.

2.3 Terminal Regulating Reservoir

For the TRR, regular inspections are included as part of the everyday operations where a worker periodically drives around to visually inspect the facilities for major obvious issues. Special inspection and additional items for TRR East and TRR West Alternates include details in the following subsections.

2.3.1 TRR East Alternate

- Annual dam safety inspection
- Five-year dam safety inspection, using a dam safety inspection team of experienced consultants from various firms appointed by the California Division of Safety of Dams
- Quarterly vegetation/weed abatement (such as, hydrophilic plant control) and rodent control activities along perimeter length of embankment
- Annual preventative leak location survey of the reservoir liner

- Bi-monthly instrumentation monitoring and maintenance
- Annual debris removal at spillway outfall to Funks Creek

2.3.2 TRR West Alternate

- We are assuming that this is a non-California Division of Safety of Dams jurisdictional facility that, therefore, will not require any dam safety inspections
- Quarterly vegetation/weed abatement (such as, hydrophilic plant control) and rodent control activities along perimeter length of inlet/outlet embankment
- Annual preventative leak location survey of the reservoir liner
- Bi-monthly instrumentation monitoring and maintenance

2.4 TRR and Funks PGPs

The TRR and Funks PGPs include several features that require individual attention. These individual facilities include: 1) pumping plant, 2) hydroelectric turbines, 3) energy-dissipating units, and 4) electrical switchgear.

2.4.1 Pumping Plant

Each of the pumping plants consist of 13 large, vertical, turbine pump units that include the motors and pumps. Operation of these units assumes control is dictated by starting up and shutting down pump motors, as well as fluctuating speed by a predisposed program within a programmable logic controller.

Maintenance of pumps requires a variety of activities at specific intervals as follows:

- Annually examine impeller thoroughly for cavitation or other damage. Use a nondestructive test to check for cracks in impeller vanes.
- Annually check condition of interior coating of pump casing and suction inlet.
- Annually check top and bottom wearing ring clearances at four points, 90 degrees apart. Compare to the design clearance and previous readings. If clearance is approaching 200 percent of design clearance, schedule wearing ring replacement.
- Weekly check flow and pressure of packing cooling water. Check for excessive heat and for leakage past the packing. Tighten the packing gland as leakage becomes excessive and grease the packing box when required.
- Weekly check the packing gland for excessive leakage.
- Daily check the bearing temperature and lubricant level.
- Annually take oil sample from all bearings, preferably while unit is running some time before a scheduled outage.
- Annually thoroughly inspect stress-carrying parts of rotor for cracks. Check bolted connections for tightness and any evidence of movement. Check stator frame for loose connections, cracks, or other damage. Check stator air gap at a minimum of four positions, top and bottom.
- Annually clean exterior surfaces of coils and check for leaks.

2.4.2 Hydroelectric Turbines

Each of the PGP’s has two hydroelectric turbines. Operation of these units assumes control is dictated by a predisposed program within a programmable logic controller that helps to control the turbine for a given flowrate.

Maintenance of these generators requires a variety of activities at specific intervals, as follows:

- Annually examine runner thoroughly for cavitation or other damage. Use a nondestructive test to check for cracks in runner buckets.
- Annually check condition of interior coating of spiral case and draft tube.
- Annually check top and bottom wearing ring clearances at four points, 90 degrees apart. Compare to the design clearance and previous readings. If clearance is approaching 200 percent of design clearance, schedule wearing ring replacement.
- Weekly check flow and pressure of packing cooling water. Check for excessive heat and for leakage past the packing. Tighten the packing gland as leakage becomes excessive and grease the packing box when required.
- Annually measure clearance between gates at the top, middle, and bottom with feeler gauges with gates closed and the servomotor pressure released. Check clearance between wicket gates and upper and lower facing plates. Check gates and facing plates for cavitation damage, corrosion, or other damage.
- Annually observe servomotor, shift ring, and wicket gate linkage as it is moved through its full range of motion in both directions.
- Weekly check the packing gland for excessive leakage.
- Daily check the bearing temperature and lubricant level.
- Annually check shaft runout with dial indicator or with proximity probes and a strip chart recorder. At a minimum, check runout at full load, and, if possible, record the runout as the unit is loaded from speed-no-load to full load.
- Annually take oil sample from all bearings, preferably while unit is running some time before a scheduled outage.
- Annually thoroughly inspect stress-carrying parts of rotor for cracks. Check bolted connections for tightness and any evidence of movement. Check stator frame for loose connections, cracks, or other damage. Check stator air gap at a minimum of four positions, top and bottom.
- Annually clean exterior surfaces of coils and check for leaks.
- Monthly check condition of brake airline filters and lubricators. If lubricator is not installed, operate unit jacks to lubricate brake cylinders.
- Annually measure brake shoe thickness and check condition of brake ring.

2.4.3 Energy-dissipating Units

There are two energy-dissipating units at each PGP. The energy-dissipating units are anticipated to be fixed cone valve type. These units require little maintenance due to their simple moving parts, combined with high-strength materials that make them resilient. Maintenance of these valves primarily involves visual inspection and lubrication of bearings as needed.

2.4.4 Electrical Switchgear

Each of the PGP’s has electrical switchgear that require the following tests to be performed annually.

- Visual/mechanical inspections
  - General visual and mechanical inspections
  - Moisture and corona inspections
  - Wiring and bolted connection checks
  - General wiring checks
  - Moving parts and interlocks

  - Insulators and barrier checks
- Electrical tests
  - Bolted connection electrical tests
  - Insulation electrical tests
  - Dielectric withstand tests
  - Control wiring electrical tests
  - Instrument transformers
  - Circuit breakers and switches
  - Control power transfer scheme
  - Metering electrical tests
  - Current injection tests
  - System function test
  - Cubicle heaters
  - Surge arresters
  - Dual-source phasing check

2.5 TRR, Funks, Funks Environmental and Dunnigan Pipelines

The pipelines will require very minimal maintenance, but require the following tasks to provide a longer life:

- Annually check cathodic-protection-test-stations, voltage-drop readings as an indicator of the useful status of the Cathodic Protection system.
- Every 5 years, drain the pipelines and visually inspect the lining of the pipe, making repairs as needed.
- Annually check all valves (including appurtenances) by opening and closing to make sure they are operational.
- Annually check the surge protection system, including the compressors and instrumentation, to confirm the surge system is functioning as intended.

For the energy-dissipating valves on the Funks Environmental and Dunnigan Pipeline at the CBD discharge facility, periodic visual inspection and lubrication of bearings is all that is required.

2.6 TRR and Funks Substations

- Annually perform visual inspection of electrical equipment.
- Annually perform Thermo-scan of electrical equipment.

2.7 Electrical Transmission Lines

- Twice a year, use helicopter or drones to fly over lines and identify hardware, insulators, conductors, and structure issues.
- Twice a year, use infrared inspection to identify hot spots on splices and at conductor attachment hardware.
- Every 5 years, use foot patrol inspection to identify issues not captured by aerial patrols.
- Every 20 years, perform tower inspection/tower footer repair including pole painting for galvanized poles.
- Every 3 years, perform tree trimming and conduct grass mowing as required.

3.0 Facility OM&R Costs

This section provides typical O&M costs associated with each of the individual facilities, as well as replacement costs for facilities based on durations of various components of each facility. For example, mechanical equipment is given a 20-year life before replacement is required, concrete and masonry should last 100 years before replacement is required and electrical equipment is typically about 40 years. Pipelines are expected to last 100 years before replacement is required, but replacement will require the entire cost of a new pipeline.

Table 1 provides a summary of the operations, maintenance, and replacement costs for each major facility including both TRR Alternatives (East and West). The breakdown of costs for each facility and activity are included in Appendix A. It should be noted that tables in Appendix A contain activities at various durations, such as every 6 months or every 20 years. Appendix A also includes the duration of various facility components by discipline (mechanical, structural, electrical, etc.) before replacement costs will be needed. The cost for each has been adjusted to reflect the annual cost in 2021 dollars, on an annual basis.

As shown in Table 1, pumping costs for the associated PGP's and replacement costs are the largest components of the total OM&R costs.

Pumping costs for the two PGPs are based on an average electrical rate of $0.03153/kilowatt-hour and Sites Reservoir at an average water surface elevation of 450 feet. This results in costs of $10/acre-foot for the Funks pumping and $14/acre-foot for pumping from the TRR East Alternative. There is very little energy saved for the TRR West Alternative, so this $14/acre-foot cost can be used for both alternatives. A pumping cost TM is provided in Appendix B.

Table 1 also includes only operational pumping costs for the TCCA pumping station at Red Bluff and the GCID Pumping Station at Hamilton City. Since these pumping stations are used to deliver irrigation water for their respective agencies, it was assumed the maintenance and replacement costs are covered elsewhere. The average annual volume of water pumped by the TCCA pumping station for the Sites Project is 197,000 acre-feet, while the pumping at GCID for the Sites Project is about 61,000 acre-feet. Based on data provided by TCCA and GCID, the amount of energy (kWh) required to pump one acre-foot of water is 19.45 for TCCA and 12.45 for GCID. The energy charge for TCCA is $0.03074/kilowatt-hour while GCID pays about $0.1273 per kWh. Using this data, the annual pumping cost for Sites Project water delivered in the TC Canal is about $117,600 while the water delivered in the GCID Main is about $97,000.

Table 1. Annual Operations, Maintenance, and Replacement Costs.

Summary OM&R Costs				
	Cost			
Facility	Operations	Maintenance	Replacement	Total
Funks PGP	$1,895,110	$46,200	$2,750,000	$4,691,310
TRR PGP	$1,167,200	$46,200	$2,750,000	$3,963,400
TCCA Pumping Station	$117,600	N/A	N/A	$117,600
GCID Main Pumping Station	$96,700	N/A	N/A	$96,700
Funks Reservoir	$0	$0	$0	$0
TRR - East Reservoir	$0	$133,000	$129,500	$262,500
TRR - West Reservoir	$0	$83,000	$129,500	$212,500
Pipelines (all)	$39,000	$16,000	$4,662,000.00	$4,717,000
Substations (two)	$39,000	$16,000	$6,309,000.00	$6,364,000
Transmission Lines	0	$72,000	$4,500,000	$4,572,000

Total (with TRR-East&Dunn #1)	**$3,315,610**	**$339,000**	**$15,624,833**	**$19,279,443**
Total (with TRR-West&Dunn #1)	**$3,315,610**	**$289,000**	**$15,624,833**	**$19,229,443**
Total (with TRR-East&Dunn #2)	**$3,315,610**	**$241,400**	**$11,938,500**	**$15,495,510**
Total (with TRR-West&Dunn #2)	**$3,315,610**	**$191,400**	**$11,938,500**	**$15,445,510**

Appendix A

Funks PGP							**$5,079,400**
Operations							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
	Entire PGP						
		Daily	Operator (1)	2088	hr	$75	$156,600
			Operator (2)	2088	hr	$75	$156,600
		Pumping	Average annual pumping - some years no pumping and others maximum pumping - take average	197,000	ac-ft	$10.00	$1,970,000
			Subtotal				**$2,283,200**
Maintenance							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
	Pumping Plant						
		Daily					
			Check bearing temperature and lubricant level.	180	hr	$50	$9,000
		Weekly		50	hr	$50	$2,500
			Check packing cooling water.				
			Check the packing gland for excessive leakage.				
		Annually		60	hr	$100	$6,000
			Examine impeller				
			Check condition of interior coating of pump casing and suction inlet				
			Check top and bottom wearing ring clearances				
			Obtain oil sample from all bearings				
			Inspect stress carrying parts of rotor for cracks				
			Check bolted connections for tightness and any evidence of movement.				
			Check stator frame for loose connections, cracks, or other damage.				
			Check stator air gap at a minimum of four positions, top, and bottom.				
			Clean exterior surfaces of coils and check for leaks.				

	Turbines						
		Daily					
			Check bearing temperature and lubricant level.	180	hr	$50	$9,000
		Weekly		50	hr	$50	$2,500
			Check packing cooling water.				
			Check the packing gland for excessive leakage.				
		Monthly		24	hr	$50	$1,200
			Check condition of brake air line filters and lubricators				
		Annually		80	hr	$100	$8,000
			Examine runner				
			Check condition of interior coating of spiral case and draft tube				
			Check top and bottom wearing ring clearances				
			Obtain oil sample from all bearings				
			Inspect stress carrying parts of rotor for cracks				
			Check bolted connections for tightness and any evidence of movement.				
			Check stator frame for loose connections, cracks, or other damage.				
			Check stator air gap at a minimum of four positions, top, and bottom.				
			Clean exterior surfaces of coils and check for leaks.				
			Measure clearance between gates at the top, middle, and bottom with feeler gauges with gates closed and the servomotor pressure released				
			Check clearance between wicket gates and upper and lower facing plates				
			Check gates and facing plates for cavitation damage, corrosion, or other damage				
			Observe servomotor, shift ring, and wicket gate linkage as it is moved through its full range of motion in both directions.				
			Check shaft runout with dial indicator or with proximity probes and a strip chart recorder				

			Measure brake shoe thickness and check condition of brake ring.				
	Switchgear						
		Annually		80	hr	$100	$8,000
			Visual Inspections				
			Tests				
			Subtotal				**$46,200**
Replacement				Cost ($M)			
	Unit		*Frequency (yrs)*	*Capital*	*Annual*		
	PGP	Mechanical	*20*	*35*	*1.75*		
		Structural	100	30	*0.3*		
		Electrical	40	28	*0.7*		
			Subtotal				**$2,750,000**

TRR PGP						**$3,963,400**
Operations						*Annual*
Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
Entire PGP						
	Daily	Operator (1)	2088	hr	$75	$156,600
		Operator (2)	2088	hr	$75	$156,600
	Pumping	Average annual pumping - some years no pumping and others maximum pumping - take average	61,000	ac-ft	$14.00	$854,000
		Subtotal				**$1,167,200**
Maintenance						*Annual*
Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
Pumping Plant						
	Daily					
		Check bearing temperature and lubricant level.	180	hr	$50	$9,000
	Weekly		50	hr	$50	$2,500
		Check packing cooling water.				
		Check the packing gland for excessive leakage.				
	Annually		60	hr	$100	$6,000
		Examine impeller				
		Check condition of interior coating of pump casing and suction inlet				
		Check top and bottom wearing ring clearances				
		Obtain oil sample from all bearings				
		Inspect stress carrying parts of rotor for cracks				
		Check bolted connections for tightness and any evidence of movement.				
		Check stator frame for loose connections, cracks, or other damage.				
		Check stator air gap at a minimum of four positions, top, and bottom.				

			Clean exterior surfaces of coils and check for leaks.				
	Turbines						
		Daily					
			Check bearing temperature and lubricant level.	180	hr	$50	$9,000
		Weekly		50	hr	$50	$2,500
			Check packing cooling water.				
			Check the packing gland for excessive leakage.				
		Monthly		24	hr	$50	$1,200
			Check condition of brake air line filters and lubricators				
		Annually		80	hr	$100	$8,000
			Examine runner				
			Check condition of interior coating of spiral case and draft tube				
			Check top and bottom wearing ring clearances				
			Obtain oil sample from all bearings				
			Inspect stress carrying parts of rotor for cracks				
			Check bolted connections for tightness and any evidence of movement.				
			Check stator frame for loose connections, cracks, or other damage.				
			Check stator air gap at a minimum of four positions, top, and bottom.				
			Clean exterior surfaces of coils and check for leaks.				
			Measure clearance between gates at the top, middle, and bottom with feeler gauges with gates closed and the servomotor pressure released				
			Check clearance between wicket gates and upper and lower facing plates				
			Check gates and facing plates for cavitation damage, corrosion, or other damage				

			Observe servomotor, shift ring, and wicket gate linkage as it is moved through its full range of motion in both directions.				
			Check shaft runout with dial indicator or with proximity probes and a strip chart recorder				
			Measure brake shoe thickness and check condition of brake ring.				
	Switchgear						
		Annually		80	hr	$100	$8,000
			Visual Inspections				
			Tests				
			Subtotal				**$46,200**
Replacement				Cost ($M)			
	Unit		*Frequency (yrs)*	*Capital*	*Annual*		
	PGP	Mechanical	*20*	*35*	*1.75*		
		Structural	100	30	*0.3*		
		Electrical	40	28	*0.7*		
			Subtotal				**$2,750,000**

All Pipelines						***Dunnigan Alt #1***	**$4,717,000**
						Dunnigan Alt #2	**$6,364,000**
Operations							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		Weekly	Operator (drive alignment)	200	hr	$75	$15,000
		5 years	New 4x4 Pickup	2	ea	$60,000	$24,000
			Subtotal				**$39,000**
Maintenance							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		Annually		100	hr	$100	$10,000
			Perform Cathodic Protection system test				
			Check condition of gates, valves, and appurtenances				
			Check surge control system				
			4x4 Pickup (fuel, oil,…)				$2,000
		5 Years		40	hr	$100	$4,000
			Visual Inspections of Inside (200 hours every 5 years)				
			Subtotal				**$16,000**
Replacement				Cost ($M)			
	Unit		*Frequency (yrs)*	*Capital*	*Annual*		
	Funks/TRR	Full	100	$ 369.60	*$3.70*		
	Dunn #1	Full	100	$96.6	*$0.97*		
	Dunn #2	Full	100	$261.3	*$2.61*		
			Subtotal with Dunnigan #1				**$4,662,000**
			Subtotal with Dunnigan #2				**$6,309,000**

TRR-East Reservoir							**$262,500**
Operations							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		None					
Maintenance							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		Daily					
			Regular site inspection (cost covered by PGP Operator)				
		Bi-monthly					
			Instrumentation monitoring and maintenance	6	ea	$10,000	$60,000
		Quarterly					
			Vegetation/weed abatement and rodent control	4	ea	$ 2,000	$8,000
		Annually					
			Annual Dam Safety inspection	1	ea	$15,000	$15,000
			Preventative leak location survey of reservoir liner	1	ea	$15,000	$15,000
			Debris removal at spillway outfall to Funks Creek	1	ea	$15,000	$15,000
		5-years					
			5-Year Dam Safety inspection	0.2	ea	$100,000	$20,000
			Subtotal				**$133,000**
Replacement				Cost ($M)			
	Unit		*Frequency (yrs)*	*Capital*	*Annual*		
	Structures	Mechanical	*20*	*$1.4*	*$0.07*		
		Structural	100	$5.2	*$0.05*		
		Electrical	40	$0.3	*$0.01*		
			Subtotal				**$129,500**

TRR-West Reservoir							**$212,500**
Operations							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		None					
Maintenance							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		Daily					
			Regular site inspection (cost covered by PGP Operator)				
		Bi-monthly					
			Instrumentation monitoring and maintenance	6	ea	$10,000	$ 60,000
		Quarterly					
			Vegetation/weed abatement and rodent control	4	ea	$2,000	$8,000
		Annually					
			Preventative leak location survey of reservoir liner	1	ea	$15,000	$15,000
			Subtotal				**$83,000**
Replacement				Cost ($M)			
	Unit		*Frequency (yrs)*	*Capital*	*Annual*		
	Structures	Mechanical	*20*	*$1.4*	*$0.07*		
		Structural	100	$5.2	*$0.05*		
		Electrical	40	$0.3	*$0.01*		
			Subtotal				**$129,500**

Substations (each)							**$2,286,000**
Operations							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		None					
Maintenance							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		Annually		240	hr	$150	$36,000
			Annually perform visual inspection of electrical equipment				
			Annually perform Thermo-scan of electrical equipment				
			Subtotal				**$36,000**
Replacement				Cost ($M)			
	Unit		*Frequency (yrs)*	*Capital*	*Annual*		
	Full	Electrical	*40*	*90*	*2.25*		
			Subtotal				**$2,250,000**

Transmission Lines							**$858,933**
Operations							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		None					
Maintenance							*Annual*
	Unit	*Frequency*	*Item*	*Quantity*	*Unit*	*Unit Cost*	*Cost*
		Every 6 months	Use helicopter or drones to fly over lines and identify hardware, insulator, conductor, and structure issues	16	hr	$600	$9,600
		Every 6 months	Conduct infrared inspection to identify hot spots on splices and at conductor attachment hardware	100	hr	$100	$10,000
		Every 5 Years	Conduct foot patrol inspection to identify issues not captured by aerial patrols (50 hours total)	20	hr	$150	$3,000
		Every 20 Years	Perform tower inspection/tower footer repair including pole painting for galvanized poles (200 hours total)	20	hr	$150	$3,000
			Subtotal				**$25,600**
Replacement				Cost ($M)			
	Unit		*Frequency (yrs)*	*Capital*	*Annual*		
	Full	Electrical	*60*	*$50*	*$0.83*		
			Subtotal				**$833,333**

Appendix B

Draft Pumping Costs Technical Memorandum

To:	Henry Luu/HDR
CC:	Other recipient(s)
Date:	March 19, 2021
From:	Jeff Smith/Jacobs
Quality Review:	Peter Rude/Jacobs
Authority Agent Review:	Reviewer
Subject:	Pump Costs Calculations

1.0 Purpose

The proposed Site Project consists of two pumping generating plants (PGPs) used to convey water up to the Sites Reservoir and generate electricity through releases from the reservoir. The two PGPs consist of Funks, located on the Tehama Colusa Canal, and the Terminal Regulating Reservoir (TRR), located on the Glenn-Colusa Irrigation District Main Canal. The purpose of this technical memorandum is to determine the estimated cost to pump water from each of these two PGPs to the Sites Reservoir.

2.0 Assumptions and Calculations

To perform the calculations requested, assumptions and calculations were made, as described in the following sections.

2.1 Assumptions

- Months for pumping are November through May.
- Pumping costs vary by month as follows:

Month	Cost ($/kilowatt-hour)
November	0.03833
December	0.03982
January	0.03805
February	0.03795
March	0.03605
April	0.03646
May	0.03708
Average	**0.03768**

- Average pumping flows are 2,100 cubic feet per second (cfs) for Funks and 1,000 cfs for TRR. These flows are used to determine pipe friction losses

- Sites reservoir elevation levels:
  - Full = 498 feet
  - Low = 340 feet

2.2 Calculation

The cost of pumping water is determined using following formula:

$/acre-foot = 1.0241 * $/KWh * Head / efficiency

where

$/KWh = $0.03768

Head (feet) = static lift + friction loss

Static lift (range 135-298) + 14 = range 149 - 312 [Funks PGP]

Static lift (range 216-379) + 37 = range 253 – 416 [TRR PGP]

Efficiency = 0.84 [based on manufacturer pump curves for selected pump]

3.0 Results

The purpose of this technical memorandum is to share the cost of pumping water from both PGPs; but the cost will vary depending on the Sites reservoir level. Other variable head losses for the PGPs include: 1) fluctuating Funks and TRR reservoir levels; and 2) variable friction losses resulting from changing flow rates. Although these two variables change the potential pumping head and resulting pumping costs, the variables are very small in comparison to the static lift required; therefore, these small fluctuations are not included in the estimate.

Table 1 shows the costs of pumping an acre-foot for the minimum and maximum Sites Reservoir levels provided in Section 2.1.

Table 1. Minimum and Maximum Reservoir Level Pumping Costs

PGP	Cost ($/acre-foot)	
	Min. Reservoir Elevation = 340 feet	Max. Reservoir Elevation = 498 feet
Funks	$6.84	$14.33
TRR	$11.62	$19.11

When the reservoir level is between the minimum and maximum amounts, the cost to pump water is a linear interpolation between the values shown in table 1. For example, if the reservoir level is at 400 feet, interpolation of the values in Table 1 show a cost of $9.60 per acre-foot for Funks PGP and $14.38 per acre-foot for TRR. Table 2 contains the costs for both PGPs at various incremental reservoir levels.

Table 2. Reservoir Level Pumping Costs

Reservoir Level (feet)	340 (min.)	360	380	400	420	440	460	480	498 (max.)
Funks	$6.84	$7.76	$8.68	$9.60	$10.52	$11.44	$12.36	$13.28	$14.33
TRR	$11.62	$12.54	$13.46	$14.38	$15.30	$16.22	$17.13	$18.05	$19.11

Appendix C.3. Mitigation Cost

C3. Updated Mitigation Cost Estimate 2021

C3.1 Background and Purpose

In October 2016, AECOM, on behalf of the Sites Project Authority (Authority), prepared a technical memorandum (TM) that presented the results of a mitigation measure evaluation and cost estimate that was developed as a planning-level tool for assessing costs associated with implementing select mitigation measures for the Sites Reservoir (Sites Reservoir Feasibility Study Technical Memorandum – Mitigation Measure Evaluation and Cost Estimate 2016). The 2016 evaluation and cost estimate of $500 million dollars (M) were based on the mitigation measures and the project description for the North-of-the-Delta-Offstream Storage Preliminary Administrative Draft Environmental Impact Report (EIR) (DWR 2013). The mitigation measures evaluated were for impacts associated with Sites Reservoir Alternative C.

In October 2019, the Authority pursued a value planning process to determine if further refinements to the Project were warranted. Between October 2019 and April 2020, the Authority considered previous input from state and federal agencies, non-governmental organizations, elected officials, landowners, and local communities, and decided to "right size" the Project to better meet the needs of Sites Storage Partners1, the statewide water supply and the environment. Multiple alternatives were considered during the value planning process that took into consideration the public and agency comments received on the 2017 Draft EIR/Environmental Impact Statement (EIS) (Sites Project Authority 2020).

The value planning process culminated in a *Sites Project Value Planning Alternatives Appraisal Report,* Sites Authority, 2020, April (Value Planning Report) that was adopted by the Authority in April 2020 which included an updated mitigation cost estimate of $540M. In September 2020 the Authority approved to designate Alternative 1, which is based on Value Planning Alternative 7 (VP-7) as the Authority's preferred project alternative.

This memorandum (memo) summarizes the results of ICF International (ICF), HDR Engineering (HDR) and the Sites Project Authority's Environmental Planning and Permitting Manager's (EPP) update of AECOM's 2016 mitigation cost estimate using the Authority's revised preferred project alternative (collectively referred to as the mitigation team).

C3.1.1 Method

The mitigation team performed an evaluation of the cost and magnitude of the mitigation measures for resources that will be affected by project construction, operations, and maintenance. The resources evaluated were the same as those identified in AECOM's 2016 TM estimate, which included mitigation measure evaluation and cost estimate tables prepared in May 2016. The resources evaluated in the mitigation team's updated cost estimate included the following:

- Surface Water Quality,
- Aquatic Resources,
- Botanical Resources,
- Wildlife Habitat,
- Wetlands Habitat,

- Cultural Resources,
- Land Use,
- Paleontology, and
- Air Quality.

The mitigation measure evaluation and cost estimating process were built on the October 2016 TM and incorporated all applicable mitigation measures for these resources based on engineering, design, and planning work on the preferred alternative prior to April 15, of 2021. Assumptions used in the revised cost estimate were based on the following:

- Effects requiring mitigation were taken from the April/May 2021 Administrative Draft Revised Environmental Impact Report /Supplemental Environmental Impact Statement (REIR/SEIS)
- Outreach to experts in mitigation banking for current pricing of mitigation (banks, easements, etc.)
- Assumed presence of all listed and rare species with a moderate or greater potential to occur as defined in the 2021 Administrative Draft REIR/SEIS due to lack of access for species and vegetation surveys
- Assumed mitigation ratio of 2:1 for permanent effects and 1:1 ratio for temporary effects
- Use of the median per-acre costs estimates for specific mitigation (species, vegetation, agriculture, etc.)
- Credit stacking where practicable (e.g., raptor foraging habitat and rare plants stacked with annual grasslands)
- Cultural resources costs that were developed & reviewed by resource specialists using current requirements and anticipated project effects
- Agricultural land cost based on preliminary outreach to Sites real estate team and 2019 land prices
- Exclusion of costs that were not exclusively mitigation (land acquisition costs, easements, right of entry fees, etc.)
- Costs represented by 2019 dollars

C3.1.2 Revised Estimate

The results of the 2021 update are an increase in the anticipated mitigation costs of approximately $22.5M in 2019 dollars (Table C3-1). It is important to note that this estimate is a planning-level estimation and would be modified by changes in land costs, permit terms, the results of future surveys to determine presence/absence of listed and rare surveys and escalation of all related mitigation costs. However, it is a still conservative estimate and very likely an overestimate of the final costs due to the lack of access to the vast majority of the project area necessitating the assumed presence of state and federally listed and rare species and special aquatic sites that are could occur within the project footprint.

TABLE 1: RESULTS OF 2021 MITIGATION COST ESTIMATE UPDATE AS COMPARED TO THE 2020 VALUE PLANNING UPDATE.

Resource	February 2020 Value Planning Estimate	June 2021 Planning Level Cost in 2019 Dollars
Aquatic Resources	$56,000,000	$56,000,000
Sensitive Natural Communities and Wetland & Non-Wetland Waters Resources	$174,800,000	$333,412,500
Terrestrial Wildlife Resources/Wildlife Habitat	$53,000,000	$109,215,500
Surface Water Quality	$200,000	$200,000
Agriculture & Forestry	$31,000,000	$46,059,000
Cultural & Paleontological Resources	$35,000,000	$13,840,300
Air Quality	$200,000	$3,750,000
Riverine-Based Species and Habitats (operations)	$150,000,000	N/A*
Contingencies and Forward Escalation	$40,000,000	N/A
Total	**$540,000,000**	**$562,477,300**

C3.2 References

North-of-the-Delta-Offstream Storage Preliminary Administrative Draft Environmental Impact Report (EIR) (DWR 2013) *Sites Project Value Planning Alternatives Appraisal Report,* Sites Authority, 2020, April.

Sites Reservoir Feasibility Study Technical Memorandum – Mitigation Measure Evaluation and Cost Estimate, Sites Project Authority, 2016.

Appendix D. Environmental Feasibility

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Appendix D. Environmental Feasibility

Appendix D.1 Summary of Significant Impacts and Mitigation Measures

Appendix D.2 Permits, Approvals, Reviews, and Consultation Requirements

Appendix D.1 Summary of Significant Impacts and Mitigation Measures

TABLE D-1. SUMMARY OF SIGNIFICANT IMPACTS BEFORE AND AFTER IMPLEMENTATION MITIGATION MEASURES

Impact	CEQA/NEPA Finding				Mitigation Measure	CEQA/NEPA Finding with Mitigation			
	No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3		No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3
Surface Water Quality									
Impact WQ-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality during construction									
Operation	NI/NE	S/SA	S/SA	S/SA	**WQ-1.1**: Methylmercury Management	NI/NE	SU/SA	SU/SA	SU/SA
Impact WQ-2: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality during operation									
Operation	NI/NE	S/SA	S/SA	S/SA	**WQ-1.1**: Methylmercury Management **WQ-2.1**: Prevent Metals Impacts in Stone Corral Creek Associated with Sites Reservoir Discharge **WQ-2.2**: Prevent Net Detrimental Material and Pesticide Effects Associated with Moving Colusa Basin Drain Water Through the Yolo Bypass	NI/NE	**SU**/SA	**SU**/SA	**SU**/SA
Vegetation and Wetland Resources									
Impact VEG-1: Substantial adverse effect (i.e., loss or removal), either directly or through habitat modifications, on plant species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service									
Construction	NI/NE	S/SA	S/SA	S/SA	**VEG-1.1**: Conduct Appropriately Timed Surveys for Special-Status Plant Species Prior to Construction Activities **VEG-1.2**: Establish Activity Exclusion Zones Around Special-Status Plants in Temporary Impact Areas and Compensate for Permanent Impacts on Special-Status Plants	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Operation	NI/NE	S/SA	S/SA	S/SA	**VEG-1.3**: Establish Activity Exclusion Zones Around Special-Status Plants Prior to Vegetation Maintenance Activities	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact VEG-2: Substantial adverse effect (i.e., loss or removal) on any riparian habitat or other sensitive natural community									
Construction	NI/NE	S/SA	S/SA	S/SA	**VEG-2.1**: Conduct Surveys for Sensitive Natural Communities and Oak Woodlands in the Project Area Prior to Construction Activities **VEG-2.2**: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities	NI/NE	**SU**/SA	**SU**/SA	**SU**/SA
Operation	NI/NE	S/SA	S/SA	S/SA	**VEG-2.3:** Establish Activity Exclusion Zones Around Sensitive Natural Communities Prior to Vegetation Maintenance Activities	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact VEG-3: Substantial adverse effect (i.e., loss or removal) on state or federally protected wetlands									
Construction	NI/NE	S/SA	S/SA	S/SA	**VEG-3.1:** Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities **VEG-3.2**: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands **VEG-3.3:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Operation	NI/NE	S/SA	S/SA	S/SA	**VEG-3.4:** Establish Activity Exclusion Zones Around Wetlands and Non-Wetland Waters in Vegetation Maintenance Areas	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact VEG-4: Conflict with any local policies or ordinances protecting vegetation resources (including wetlands and non-wetland waters), such as a tree preservation policy or ordinance									
Construction	NI/NE	S/SA	S/SA	S/SA	**VEG-1.2**: Establish Activity Exclusion Zones Around Special-Status Plants in Temporary Impact Areas and Compensate for Permanent Impacts on Special-Status Plants **VEG-2.1**: Conduct Surveys for Sensitive Natural Communities and Oak Woodlands in the Project Area Prior to Construction Activities **VEG-2.2**: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities **VEG-3.1:** Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities **VEG-3.2**: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands **VEG-3.3:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters**VEG-4-1:** Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction **VEG-4-2:** Compensate for Adverse Effects on Oak Woodlands	NI/NE	**SU**/SA	**SU**/SA	**SU**/SA
Operation	NI/NE	S/SA	S/SA	S/SA	**VEG-4.3:** Establish Activity Exclusion Zones Around Blue Oak Woodlands in Vegetation Maintenance Areas	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact VEG-5: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan									
Construction	NI/NE	S/SA	S/SA	S/SA	**VEG-2.1**: Conduct Surveys for Sensitive Natural Communities and Oak Woodlands in the Project Area Prior to Construction Activities **VEG-2.2:** Avoid and Compensate for Adverse Effects on Sensitive Natural Communities **VEG-3.1:** Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities **VEG-3.2**: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands **VEG-3.3:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters **VEG-4-1:** Avoid and Minimize Potential Adverse Effects on Oak Woodlands **VEG-4.2** Compensate for Adverse Effects on Oak Woodlands	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE

Impact	CEQA/NEPA Finding				Mitigation Measure	CEQA/NEPA Finding with Mitigation			
	No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3		No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3
Wildlife Resources									
Impact WILD-1: Substantial adverse effect (i.e., loss or removal), either directly or through habitat modifications, on wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.									
Construction	NI/NE	S/SA	S/SA	S/SA	**WILD-1.1:** Assess Habitat Suitability and Survey Suitable Habitat for Vernal Pool Branchiopods **WILD-1.2:** Avoid and Minimize Potential Effects on Vernal Pool Branchiopods and Western Spadefoot **WILD-1.3:** Compensate for Impacts on Occupied Vernal Pool Branchiopod Habitat **WILD-1.6:** Conduct Surveys for Suitable Valley Elderberry Longhorn Beetle Habitat **WILD-1.7:** Fence Elderberry Shrubs to be Protected **WILD-1.8:** Transplant Permanently Affected Elderberry Shrubs and Compensate for Loss of Valley Elderberry Longhorn Beetle and its Habitat **WILD-1.10:** Assess Habitat Suitability and Survey for Presence of Monarch Butterfly Nectar and Larval Host Plants **WILD-1.11:** Compensate for Loss of Monarch Butterfly Nectar and Larval Host Plants **WILD-1.12:** Assess Habitat Suitability and Survey for Presence of Crotch Bumble Bee and Western Bumble Bee Food Plants **WILD-1.13:** Compensate for Loss of Crotch Bumble Bee and Western Bumble Bee Habitat **WILD-1.14:** Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle **WILD-1.17:** Implement California Red-legged Frog Protective Measures **WILD-1.18:** Compensate for Permanent and Temporary Losses of Occupied California Red-legged Frog Aquatic and Upland Habitats **WILD-1.19**: Conduct Preconstruction Surveys for Western Pond Turtle and Monitor Initial In-Water Work **WILD-1.20**: Implement Protective Measures for Giant Gartersnake **WILD-1.21:** Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats **WILD-1.22:** Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds **WILD-1.23:** Conduct Preconstruction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found **WILD-1.24:** Conduct Surveys for Western Burrowing Owl Prior to Construction and Implement Avoidance and Minimization Measures if Found **WILD-1.25:** Restore Temporarily Disturbed Habitat and Compensate for the Permanent Loss of Occupied Burrowing Owl Habitat **WILD-1.28:** Conduct Focused Surveys for Golden Eagle and Bald Eagle and Implement Protective Measures if Found **WILD-1.29**: Compensate for the loss of Eagle Nest Trees **WILD-1.30:** Conduct Focused Surveys for Nesting Swainson's Hawk and White-tailed Kite Prior to Construction and Implement Protective Measures during Construction **WILD-1.31:** Compensate for the Permanent Loss of Foraging Habitat for Swainson's Hawk and White-tailed kite **WILD-1.32:** Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Building/Structure Demolition **WILD-1.33:** Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Tree Trimming and Removal **WILD-1.34:** Compensate for Permanent Impacts on Occupied Roosting Habitat **WILD-1.35:** Implement Protective Measures to Avoid and Minimize Potential Impacts on American Badger **VEG-2.2:** Avoid and Compensate for Adverse Effects on Sensitive Natural Communities **VEG-3.1:** Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities **VEG-3.2:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands **VEG-3.3:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters **VEG-4.1:** Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction **VEG-4.2:** Compensate for Adverse Effects on Oak Woodlands **AG-1.1**: Purchase Agricultural Conservation Easements to Preserve Regional Important Farmland ***Alternative 2*** - same as for Alternative 1, plus: **WILD-1.4**: Evaluate and Survey Potential Habitat for Antioch Dunes Anthicid and Sacramento Anthicid Beetles and Implement Protective Measures	NI/NE	**SU**/SA (golden eagle) LTSM/NE (other species)	**SU**/SA (golden eagle) LTSM/NE (other species)	**SU**/SA (golden eagle) LTSM/NE (other species)

Impact	CEQA/NEPA Finding				Mitigation Measure	CEQA/NEPA Finding with Mitigation			
	No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3		No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3
					WILD-1.5: Compensate for the Loss of Occupied Antioch Dunes Anthicid and Sacramento Anthicid Beetle Habitat				
Operation	NI/NE	S/SA	S/SA	S/SA	**WILD-1.9:** Protect Special-status Invertebrates and their Host and Food Plants from Herbicide and Pesticide Use **WILD-1.25:** Protect Special-status Wildlife from Rodenticide Use	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact WILD-2: Substantial interference with the movement of a native resident or migratory or wildlife species or with established native resident or migratory wildlife corridors, or impediment of the use of native wildlife nursery sites									
Construction and Operation	NI/NE	S/SA	S/SA	S/SA	Same as for **Impact WILD-1**	NI/NE	**SU**/SA	**SU**/SA	**SU**/SA
Impact WILD-3: Conflict with any local policies or ordinances protecting wildlife resources									
Construction and Operation	NI/NE	S/SA	S/SA	S/SA	Same as for **Impact WILD-1** and **Wild-2**	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact WILD-4: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan									
Construction and Operation	NI/NE	S/SA	S/SA	S/SA	Same as for **Impact WILD-1**	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Aquatic Biological Resources									
Impact FISH-1: Construction effects on fish and aquatic biological resources									
Construction	NI/NE	S/SA	S/SA	S/SA	**VEG-1.1**: Conduct Appropriately Timed Surveys for Special-Status Plant Species Prior to Construction Activities **VEG-1.2**: Establish Activity Exclusion Zones Around Special-Status Plants in Temporary Impact Areas and Compensate for Permanent Impacts on Special-Status Plants **VEG-3.2:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands **VEG-3.3:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact Fish-2: Operations effects on winter-run Chinook Salmon									
Operation	NI/NE	S/SA	S/SA	S/SA	**Fish-2.1**: Wilkins Slough Flow Protection Criteria	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact Fish-4: Operations Effects on fall-run/late fall-run Chinook salmon									
Operation	NI/NE	S/SA	S/SA	S/SA	Same as for **Impact Fish-2**	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact Fish-5: Operations effects on Central Valley steelhead									
Operation	NI/NE	S/SA	S/SA	S/SA	Same as for **Impact Fish-2**	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact Fish-8: Operations effects on delta smelt									
Operation	NI/NE	S/SA	S/SA	S/SA	**Fish-8.1**: Prevent Detrimental Dissolved Oxygen and Water Temperature Effects to Fish Associated with Moving Colusa Basin Drain Water Through the Yolo Bypass **WQ-2.2**: Prevent Net Detrimental Material and Pesticide Effects Associated with Moving Colusa Basin Drain Water Through the Yolo Bypass	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Impact Fish-9: Operations effects on longfin smelt									
Operation	NI/NE	S/AE	S/AE	S/AE	**FISH-9.1**: Tidal Habitat Restoration for Longfin Smelt	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Geology and Soils									
Impact GEO-7: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature									
Construction	NI/NE	S/SA	S/SA	S/SA	**GEO-7.1**: Retain a Qualified Paleontological Resource Specialist Prior to the Start of Construction **GEO-7.2**: Consultation with the Paleontological Resource Specialist Prior to and during Project Construction **GEO-7.3**: Prepare and Implement a Paleontological Resources Monitoring and Mitigation Plan **GEO-7.4**: Conduct Monitoring during Project Construction and Prepare Monthly Reports **GEO-7.5**: Ensure Implementation of the Paleontological Resources Monitoring and Mitigation Plan	NI/NE	**SU**/SA	LTSM/NE	**SU**/SA
Land Use									
Impact LAND-1: Physical division of an established community									
Construction and Operation	NI/NE	LTS/NE	S/SA	LTS/NE	No feasible mitigation measures identified for Alternative 2	NI/NE	LTS/NE	**SU/**SA	LTS/NE
Agriculture and Forestry Resources									
Impact AG-1: Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use.									
Operation	NI/NE	S	S	S	**AG-1.1**: Purchase Agricultural Conservation Easements to Preserve Regional Important Farmland	NI/NE	**SU**	**SU**	**SU**
Impact AG-2: Conflict with existing zoning for agricultural use or a Williamson Act contract									
Construction and Operation	NI/NE	S/SA	S/SA	S/SA	**AG-1.1**: Purchase Agricultural Conservation Easements to Preserve Regional Important Farmland **AG-2.1**: Minimize impacts on Williamson Act-Contracted Lands, Comply with Government Code Sections 51290–51293, and Coordinate with Landowners and Agricultural Operators	NI/NE	**SU**/SA	**SU**/SA	**SU**/SA
Impact AG-3: Conversion of Prime Farmland, Farmland of Statewide Importance, or Unique Farmland, as designated under the federal Farmland Protection Policy Act, to nonagricultural use									
Operation	NI/NE	SA	SA	SA	Same as for **Impact AG-1**	NI/NE	SA	SA	SA

Impact	CEQA/NEPA Finding				Mitigation Measure	CEQA/NEPA Finding with Mitigation			
	No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3		No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3
Navigation, Transportation, and Traffic									
Impact TRA-5: Substantially affect school bus travel									
Operation	NI/NE	LTS/NE	S/SA	LTS/NE	No feasible mitigation measures identified under Alternative 2	NI/NE	LTS/NE	**SU**/SA	LTS/NE
Air Quality									
Impact AQ-1: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard during construction, or conflict with or obstruct implementation of the applicable air quality plan									
Construction	NI/NE	S	S	S	**AQ-1.1:** Zero Emission and/or Near Zero Emission vehicles and off-road equipment **AQ-1.2:** Offset Construction and Operation-Generated Criteria Pollutants in CCAPCD, GCAPCD, and YSAQMD	NI/NE	**SU**	**SU**	**SU**
Impact AQ-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard during operation, or conflict with or obstruct implementation of the applicable air quality plan									
Operation	NI/NE	S	S	S	**AQ-2.1:** Recreational Boat Emissions Minimization Plan **AQ-2.2:** Offset Operation-Generated Criteria Pollutants in CCAPCD and GCAPCD	NI/NE	**SU**	**SU**	**SU**
Impact AQ-4b: Expose sensitive receptors to substantial pollutant concentrations—localized criteria pollutant emissions									
Construction	NI/NE	S/SA	S/SA	S/SA	No feasible mitigation measures identified	NI/NE	**SU/**SA	**SU/**SA	**SU/**SA
Greenhouse Gas Emissions									
Impact GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment or conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases									
Construction and Operation	NI/NE	S/AE	S/AE	S/AE	**GHG-1.1**: Achieve Net-Zero Emissions by Developing a GHG Reduction Plan	NI/NE	LTSM/NE	LTSM/NE	LTSM/NE
Cultural Resources									
Impact CUL-1: Cause a substantial adverse change in the significance of a historical resource pursuant to California Code of Regulations Section 15064.5									
Construction	NI/NE	S/SA	S/SA	S/SA	**CUL-1.1:** Identify Significant Built Resources **CUL-1.2**: Avoid Significant Built Resources **CUL-1.3**: Protect Significant Built Resources **CUL-1.4**: Significant Built Resources Treatment Plan	NI/NE	**SU**/SA	**SU**/SA	**SU/**SA
Impact CUL-2: Cause a substantial adverse change in the significance of an archaeological resource pursuant to California Code of Regulations Section 15064.5									
Construction and Operation	NI/NE	S/SA	S/SA	S/SA	**CUL-2.1:** Identify Significant Archaeological Resources **CUL-2.2**: Avoid Significant Archaeological Resources **CUL-2.3**: Protect Significant Archaeological Resources **CUL-2.4**: Significant Archaeological Resources Treatment Plan	NI/NE	**SU**/SA	**SU**/SA	**SU**/SA
Impact CUL-3: Disturb any human remains, including those interred outside of formal cemeteries									
Construction and Operation	NI/NE	S/SA	S/SA	S/SA	**CUL-3.1:** Cemetery Relocation Plan **CUL-3.2:** Avoid, Protect, and Treat Human Burials	NI/NE	**SU**/SA	**SU**/SA	**SU**/SA
Tribal Cultural Resources									
Impact TCR-1: Substantial adverse change in the significance of a tribal cultural resource that is listed or eligible for listing in the California Register of Historical Resources or other local register or that the lead agency has determined to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1.									
Construction	NI/NE	S	S	S	**TCR-1.1**: Implement mitigation measures recommended in Public Resources Code Section 21084.3 to avoid damaging effects on tribal cultural resources **TCR-1.2**: Tribal monitoring **TCR-1.3**: Implement agreed-upon protocol for the treatment of human remains and cultural items. **CUL-2.1:** Identify Significant Archaeological Resources **CUL-2.2**: Avoid Significant Archaeological Resources **CUL-2.3**: Protect Significant Archaeological Resources **CUL-2.4**: Significant Archaeological Resources Treatment Plan **CUL-3.1:** Cemetery Relocation Plan **CUL-3.2:** Avoid, Protect, and Treat Human Burials	NI/NE	**SU**	**SU**	**SU**
Operation	NI/NE	S	S	S	**TCR-1.1**: Implement mitigation measures recommended in Public Resources Code Section 21084.3 to avoid damaging effects on tribal cultural resources **TCR-1.2**: Tribal monitoring **TCR-1.3**: Implement agreed-upon protocol for the treatment of human remains and cultural items. **Fish-2.1**: Wilkins Slough Flow Protection Criteria **CUL-2.1:** Identify Significant Archaeological Resources **CUL-2.2**: Avoid Significant Archaeological Resources **CUL-2.3**: Protect Significant Archaeological Resources **CUL-2.4**: Significant Archaeological Resources Treatment Plan **CUL-3.1:** Cemetery Relocation Plan	NI/NE	**SU**	**SU**	**SU**

Impact	CEQA/NEPA Finding				Mitigation Measure	CEQA/NEPA Finding with Mitigation			
	No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3		No Project/ No Action	Proposed Project/ Alternative 1	Alternative 2	Alternative 3
					CUL-3.2: Avoid, Protect, and Treat Human Burials				
Visual Resources									
Impact VIS-1: Substantially degrade the existing visual character or quality of public views of the site and its surroundings									
Construction	NI/NE	S/SA	S/SA	S/SA	No feasible mitigation measures identified	NI/NE	**SU**/SA	**SU**/SA	**SU**/SA
Indian Trust Assets									
Effect ITA-1: Affect current activities within an ITA									
Operation	NE	SA	SA	SA	**Fish-2.1**: Wilkins Slough Flow Protection Criteria	NE	NE	NE	NE
Environmental Justice and Socioeconomics									
Effect EJ-1: Disproportionate and Adverse Effects on Minority Populations									
Construction and Operation	NI/NE	SA	SA	SA	**AQ-1.1:** Zero Emission and/or Near Zero Emission vehicles and off-road equipment **AQ-1.2:** Offset Construction and Operation-Generated Criteria Pollutants in CCAPCD, GCAPCD, and YSAQMD **AQ-2.1:** Recreational Boat Emissions Minimization Plan **AQ-2.2:** Offset Operation-Generated Criteria Pollutants in CCAPCD and GCAPCD No feasible mitigation measures identified	SA	SA	SA	SA
Effect EJ-2: Disproportionate and Adverse Effects on Low-Income Populations									
Construction and Operation	NI/NE	SA	SA	SA	**AQ-1.1:** Zero Emission and/or Near Zero Emission vehicles and off-road equipment **AQ-1.2:** Offset Construction and Operation-Generated Criteria Pollutants in CCAPCD, GCAPCD, and YSAQMD **AQ-2.1:** Recreational Boat Emissions Minimization Plan **AQ-2.2:** Offset Operation-Generated Criteria Pollutants in CCAPCD and GCAPCD No feasible mitigation measures identified	SA	SA	SA	SA

Notes:
There are no NEPA conclusions for Impact AG-1, Impact AQ-1, Impact AQ-2, or Impact TCR-1.
There are no CEQA conclusions for Impact AG-3, Impact AQ-3, Impact CC-1, Impact CC-2, Impact ITA-1, Impact EJ-1, Impact EJ-2, Impact SOC-1, Impact SOC-2, Impact SOC-3, or Impact SOC-4.
NI = CEQA determination of no impact
LTS = CEQA determination of less-than-significant impact
LTSM = CEQA determination of less than significant with mitigation
S = CEQA determination of significant impact
SU = CEQA determination of significant and unavoidable
B = NEPA conclusion of beneficial effects
NE = NEPA conclusion of no effect or no adverse effect
AE = NEPA conclusion of adverse effect
SA = NEPA conclusion of substantial adverse effect

Appendix D.2 Permits, Approvals, Reviews, and Consultation Requirements

TABLE D-2. FEDERAL PERMITS, APPROVALS, REVIEWS, AND CONSULTATION REQUIREMENTS

Responsible Agency(ies)	Permit, Approval, Review, or Consultation Requirement	Description	Authority
U. S. Department of the Interior, Bureau of Reclamation	Federal Lead Agency	Prepare the EIS and issue the ROD as the NEPA lead agency within the Department of the Interior and compliance with Federal Water Pollution Control Act (CWA), Sections 303, 401, 402, and 404; Rivers and Harbors Act, Sections 9, 10, 14, and 408; Federal Safe Drinking Water Act; Wild and Scenic Rivers Act; Fish and Wildlife Coordination Act; Marine Mammal Protection Act; Migratory Bird Treaty Act; Federal Clean Air Act; National Historic Preservation Act of 1966, Sections 106 and 110; American Indian Religious Freedom Act; Native American Graves Protection and Repatriation Act; Executive Order 13186 (protection of migratory birds); Executive Order 11990 (protection of wetlands); Executive Order 12898 (environmental justice); Executive Order 11988 (floodplain management); Executive Order 13007 (protection of Indian Sacred Sites on federal land).	1 C.F.R. Section 601.5
USEPA	Review of EIS	USEPA is charged with reviewing and commenting on EISs for major federal actions under NEPA.	Clean Air Act § 309, codified at 42 U.S.C. § 7609
	Review of CWA Section 404 permits	USEPA has the authority to restrict, prohibit, deny, or withdraw the use of an area as a disposal site for dredged or fill material if the discharge will have unacceptable adverse effects on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas.	CWA § 404(c), codified at 33 U.S.C. § 1344(c)
USEPA/USACE	Compliance with CWA Section 404(b)(1) guidelines	Determine compliance that no discharge of dredged or fill material are permitted if a practicable alternative exists that is less damaging to the aquatic environment, it violates other laws, significantly degrades waters of the United States, or does not include practicable steps to minimize adverse impacts on the aquatic ecosystem.	CWA § 404(b)(1), codified at 40 C.F.R. § 230.1
USACE, Sacramento District	Department of the Army CWA Section 404 permit	Permit related to the discharge of dredged or fill material into waters of the United States (including wetlands).	CWA § 404, codified at 33 U.S.C. § 1344
	Department of the Army Rivers and Harbors Act, Section 10 permit	Permit related to construction of any structure in or over navigable waters of the United States, the excavation/dredging or deposition of material in these waters, or any obstruction or alteration in navigable waters.	Rivers and Harbors Act, § 10, codified at 33 U.S.C. § 403
	33 U.S.C. § 408 permission	Permit related to any proposed project that may affect any existing USACE and/or State Plan of Control levee in the Central Valley and Delta.	Rivers and Harbors Act, § 14, codified at 33 U.S.C. § 408

Responsible Agency(ies)	Permit, Approval, Review, or Consultation Requirement	Description	Authority
U.S. Fish and Wildlife Service; National Marine Fisheries Service	Section 7 and Section 10 consultation	Consultation requirement related to determining that any discretionary action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of their critical habitat.	Endangered Species Act § 7, codified at 16 U.S.C. § 1536(a)(2), and implementing regulations; Endangered Species Act Section 10, codified at 16 U.S.C. Section 1539
U.S. Fish and Wildlife Service	Incidental Eagle Take Permit; Nest Take Permit	Permit needed for the take of bald and/or golden eagle and their nests.	16 U.S.C. § 668; 54 C.F.R. § 22.26
The Advisory Council on Historic Preservation; California Office of Historic Preservation	Section 106 consultation	Consultation requirement related to considering the effects of a federal undertaking on historic and cultural resources.	National Historic Preservation Act, codified at 36 C.F.R. § 800, and implementing regulations
U. S. Department of the Interior, Bureau of Indian Affairs	Section 106 consultation	Consultation requirement with federally recognized tribes and protection of Indian Trust Assets.	25 U.S.C. § 1a
U.S. Coast Guard	Private Aids to Navigation Permit	U.S. Coast Guard determination whether proposed activities affect river navigation, warning buoys, and signs alerting boaters in navigable waters.	33 C.F.R. § 2.40
Natural Resources Conservation Service	Determine compliance with the Farmland Protection Policy Act	Departments, agencies, independent commissions, and other units of the federal government shall identify the quantity of farmland actually converted by federal programs, and to identify and take into account the adverse effects of federal programs on the preservation of farmland; consider alternative actions, as appropriate, that could lessen such adverse effects; and assure that such federal programs, to the extent practicable, are compatible with state, unit of local government, and private programs and policies to protect farmland.	7 U.S.C. §§ 4201–4209, 7 U.S.C. § 658
U.S. Department of Energy, WAPA	WAPA accepts requests from electric utilities, firm-power customers, private power developers, and independent power generators to interconnect with its transmission system	WAPA may market and deliver power generated by the Project where it may interconnect to the WAPA transmission system.	Reclamation Project Act of 1939 (43 U.S.C. § 485h(c))

Notes: C.F.R. = Code of Federal Regulations; CWA = Clean Water Act; Delta = Sacramento–San Joaquin Delta; EIS = environmental impact statement; NEPA = National Environmental Policy Act; ROD = Record of Decision; USACE = U.S. Army Corps of Engineers; U.S.C. = U.S. Code; USEPA = U.S. Environmental Protection Agency; WAPA = Western Area Power Administration.

TABLE D-3. STATE PERMITS, APPROVALS, REVIEWS, AND CONSULTATION REQUIREMENTS

Responsible Agency(ies)	Permit, Approval, or Consultation Requirement	Description	Authority
California Water Commission	Approval of WSIP funding	Related to the WSIP, which implements Proposition 1, Chapter 8 and its appropriation for the public benefits of water storage projects	23 California Code Regs., Title 23, Div. 7, Ch. 1
California Department of Fish and Wildlife	Section 2081 Incidental Take Permit	Permit for take of state-listed endangered or threatened species or species proposed for state listing	California Fish and Game Code § 2081
	Lake and Streambed Alteration Agreement	Related to any substantial diversion or obstruction of the natural flow of, or substantial change or use of any material from the bed, channel, or bank of, any river, stream, or lake; crossing of streams, rivers, or lakes (also for reservoirs, which interrupt streams)	California Fish and Game Code § 1602
California Department of Water Resources, Division of Safety of Dams	Approval of plans and specifications for the construction or enlargement of a dam or reservoir	Related to the Department's oversight of the design, construction, and maintenance of jurisdictional dams in California.	California Water Code Div. 3, Parts 1 and 2
State Water Resources Control Board; Central Valley Regional Water Quality Control Board	Water Rights Permit	Related to the diversion and utilization of water from existing streamflow	California Water Code § 5101
	NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities	Related to all construction and land disturbance discharges when clearing, grading, and excavation result in a land disturbance of 1 or more acres. Permittee files a notice of intent to be covered under the statewide general permit.	CWA § 402
	Section 401 Water Quality Certification	State certification that the federal permit for discharge of dredged or fill material to waters of the United States does not violate state water quality standards.	CWA § 401
	Waste Discharge Requirements	Compliance for the discharges to waters of the State	Porter-Cologne Water Quality Control Act §§ 13260–13276
	Section 401 Water Quality Certification	Related to dredged or fill material to waters of the United States	CWA § 401
California Department of Transportation	Encroachment Permit(s)	Related to use of California rights-of-way for installation of pipelines along state freeways and roads	California Streets and Highway Code §§ 660–759.3

Responsible Agency(ies)	Permit, Approval, or Consultation Requirement	Description	Authority
	Transportation Permit(s)	Related to the transport of heavy or oversized loads on state roads during construction	California Vehicle Code, § 35780; California Streets and Highway Code §§ 117, 660–711
California State Lands Commission	Land Use Lease(s)	Related to work in jurisdictional areas (e.g., along the Sacramento River); specifically, placement of fill or structures in navigable waterways or Section 16 or 36 lands	California Public Resources Code §§ 6000 et seq.
Central Valley Flood Protection Board	Encroachment Permit	Related to encroachment onto/through regulated streams and designated floodways. The Central Valley Flood Protection Board is the nonfederal sponsor agency for 33 U.S.C. § 408 coordination with USACE Civil Works Division.	23 California Code Regs. Title 23, Div. 1.
Native American Heritage Commission/Local Tribes	AB 52 Consultation	Related to effects on tribal cultural resources	California Public Resources Code § 21080.3.1
California Public Utilities Commission (CPUC)	Interconnection with PG&E Transmission Lines	The CPUC regulates investor-owned electric and natural gas utilities operating in California. The CPUC may have oversight of a potential interconnection of power facilities to the PG&E transmission system.	California Public Utilities Code

Notes: AB = Assembly Bill; CPUC = California Public Utilities Commission; CWA = Clean Water Act; NAAQS = national ambient air quality standards; PG&E = Pacific Gas and Electric Company; USACE = U.S. Army Corps of Engineers; USEPA = U.S. Environmental Protection Agency; WSIP = Water Storage Investment Program.

TABLE 4. LOCAL PERMITS, APPROVALS, REVIEWS, AND CONSULTATION REQUIREMENTS

Responsible Agency(ies)	Permit, Approval, or Consultation Requirement	Description	Authority
Colusa, Glenn, Tehama, and Yolo Counties, Public Works Departments	Encroachment Permit	Related to use of local jurisdiction's right-of-way to install pipeline across roadways	County ordinances
	Transportation Permit	Related to transport of heavy or oversized loads on county roads	County ordinances
	Building Permit; Street Improvement Permit; Grading Permit	Related to construction activities within the county jurisdiction	Uniform Building Codes, as adopted
Yolo County, Planning Department	Conditional Use Permit	Related to changes to zoning or General Plan designations	County Zoning Code and General Plan
Colusa and Glenn Counties, Planning Departments	Conditional Use Permit, Zoning/General Plan Amendment, Surface Mining and Reclamation Act Permit	Related to changes to zoning or General Plan designations and excavation of borrow material	County Zoning Code and General Plan
Colusa, Glenn, Tehama, and Yolo Counties, Air Pollution Control Districts	Authority to Construct; Permit to Operate	Related to construction or operation of any nonexempt stationary source of air emissions	New Source Review regulations; CAA; GCAPCD Article III, §§ 50–57; CCAPCD Regulation III, Rules 3.1–3.18

Notes: CAA = Clean Air Act; CCAPCD = Colusa County Air Pollution Control District; GCAPCD = Glenn County Air Pollution Control District.

Appendix E. Constructability

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Appendix E.1 Reservoir Constructability Analysis Technical Memorandum

Constructability Analysis Technical Memorandum

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	April 14, 2021
From:	Michael Forrest, P.E., G.E. (AECOM); Dan Hertel (Engineering Solutions)
Quality Review:	Joe Barnes, P.E. (AECOM)
Authority Agent Review:	Henry Luu, P.E. (HDR)
Subject:	Constructability Analysis – Final Task Order No. 2, Task HR53

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Acronyms and Abbreviations

Alt	Alternative
ATF	Federal Bureau of Alcohol, Tobacco, and Firearms
Authority	Sites Project Authority
Cal/OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CCR	California Code of Regulations
cfs	cubic feet per second
CY	cubic yards
DSOD	State of California Department of Water Resources, Division of Safety of Dams
DWR	California Department of Water Resources
ERS	Emergency Release Structure
ft	feet
GCID	Glenn-Colusa Irrigation District
HP-HRS	horsepower-hours
I/O	Inlet/Outlet Works
MAF	million-acre-foot
MSHA	Mine Safety and Health Administration
MUTCD	Manual on Uniform Traffic Control Devices
NMWS	normal maximum reservoir water surface
TCCA	Tehama-Colusa Canal Authority
TM	technical memorandum

Executive Summary

The objective of this TM is to show that the HR facilities of the Sites Reservoir Project can be constructed with existing technology and availability of construction materials, work force and equipment.

Construction Schedule: This study shows that the HR facilities can be constructed by the end of 2029, for a duration of about five years, with commissioning in 2030 (together with the HC facilities). It is noted that the Sites construction schedule reflects a five-year construction duration; however, as discussed in this TM, there are risks that could cause delay of construction completion.

Table ES-1 shows recent precedence for large reservoir projects that have been constructed in California approximately within the duration estimated for Sites. This table is meant to be a rough order of magnitude comparison only.

Table ES-1. Construction Precedence of Recent Large Dams

Project	Reservoir Capacity (MAF)	Embankment Dam Volume (million CY)	Years of Construction
Sites, Colusa and Glen Counties	1.5	18 (2 main dams, & 7 saddle dams)	Est. 2024-2029 (5 years)
Diamond Valley, Riverside County	0.8	110 (3 large dams)	1995-2000 (5 years)
Seven Oaks, San Bernardino County	0.146	38	1993-2000 (7 years)

Availability of Construction Materials: About 85 percent of the earth and rock construction materials to build the dams is available on site. The remaining 15 percent (sand and gravel) would need to be hauled from existing commercial quarries some 35 miles from the project site. It is anticipated that concrete for the I/O works and bridge would be batched on site, and that the concrete aggregate would be imported from the sources located 35 miles from the project site. Aggregate road base would be imported or produced from on-site quarry operations.

Work Force: As discussed in this TM, providing for a sufficient labor force for this project poses a challenge, but is manageable. It is anticipated that much of the labor force would come from the surrounding region, with contractors also bringing some skilled work force from other areas. The surrounding counties, including Sacramento and Yolo Counties, have a regional population of over two million. It may be advantageous to consider project labor agreements with trade unions as a means of accommodating the project labor requirements, as well as avoiding labor disputes. This strategy has been used successfully on other large civil works projects in California, including dam construction.

Equipment Availability: The required equipment consists of standard heavy earthmoving and tunneling equipment. A project of this magnitude would require transporting equipment from across the nation and placing new equipment orders with equipment manufacturers to satisfy the demand. Large contractors would use their own equipment, lease or purchase new equipment.

In summary, although there are risks to the scheduled five-year completion of construction, the HR facilities of the Sites Reservoir Project can be constructed with existing technology and available construction materials, work force and equipment. Conveyance facilities are separately considered in a companion TM for the HC contract.

1.0 Introduction

1.1 Project Overview and Reservoir Alternatives

The Sites Project Authority (Authority) is preparing a feasibility-level evaluation for a 1.5-million-acre-foot (MAF) reservoir as a preferred alternative ("Alternative 1") for the Sites Reservoir Project. The principal storage feature of the Project is Sites Reservoir. Figure 1-1 shows the location of Sites Reservoir, and the various dams, roads, and other features to be constructed to form the reservoir. Sites Reservoir would have a nominal storage capacity of 1.5 MAF. Table 1-1 outlines key aspects of Sites reservoir for the Reservoir Engineering (HR) contract.

Table 1-1. Sites Reservoir

Total Storage Capacity	1.5 MAF
Active Storage Capacity	1.4 MAF
Approximate Inundation Area	13,200 acres
Dam/Saddle Dam Crest Elevation (Without Camber)	517 feet
Normal Maximum Reservoir Water Surface Elevation	498 feet
Minimum Operating Water Elevation	340 feet
Top of Dead Pool Elevation	300 feet
Inlet/Outlet Facilities Conveyance Capacity:	
Tehama-Colusa Canal	2,100 cfs
Glenn-Colusa Irrigation District Canal	1,800 cfs

cfs = cubic feet per second
MAF = million acre feet

The reservoir boundaries and water surface elevations provided in Table 1-1 are based on topographic information provided by the California Department of Water Resources (DWR) for their use on the project. New topographic information will be obtained for the reservoir site in future phases of the project. The information provided in Table 1-1 should be verified when the new surveys are completed.

Sites Reservoir construction would require relocating Sites Lodoga Road prior to the Sites Dam construction. Other new paved or unpaved roads would also be provided to access project facilities from existing roads, and for operation and maintenance access between main dam and saddle dam areas.

In the reservoir area, demolition and removal of the town of Sites and other ranch buildings within the reservoir area would be required, along with the removal of metal fencing, asphalt-concrete paving, overhead utilities, and other buildings. Water wells would be closed, septic tanks would be removed, and proper plugging of existing gas exploration wells would be verified. Trees would be removed within one foot of grade in all areas located below the normal maximum operating water surface (NMWS). Stumps will not be removed.

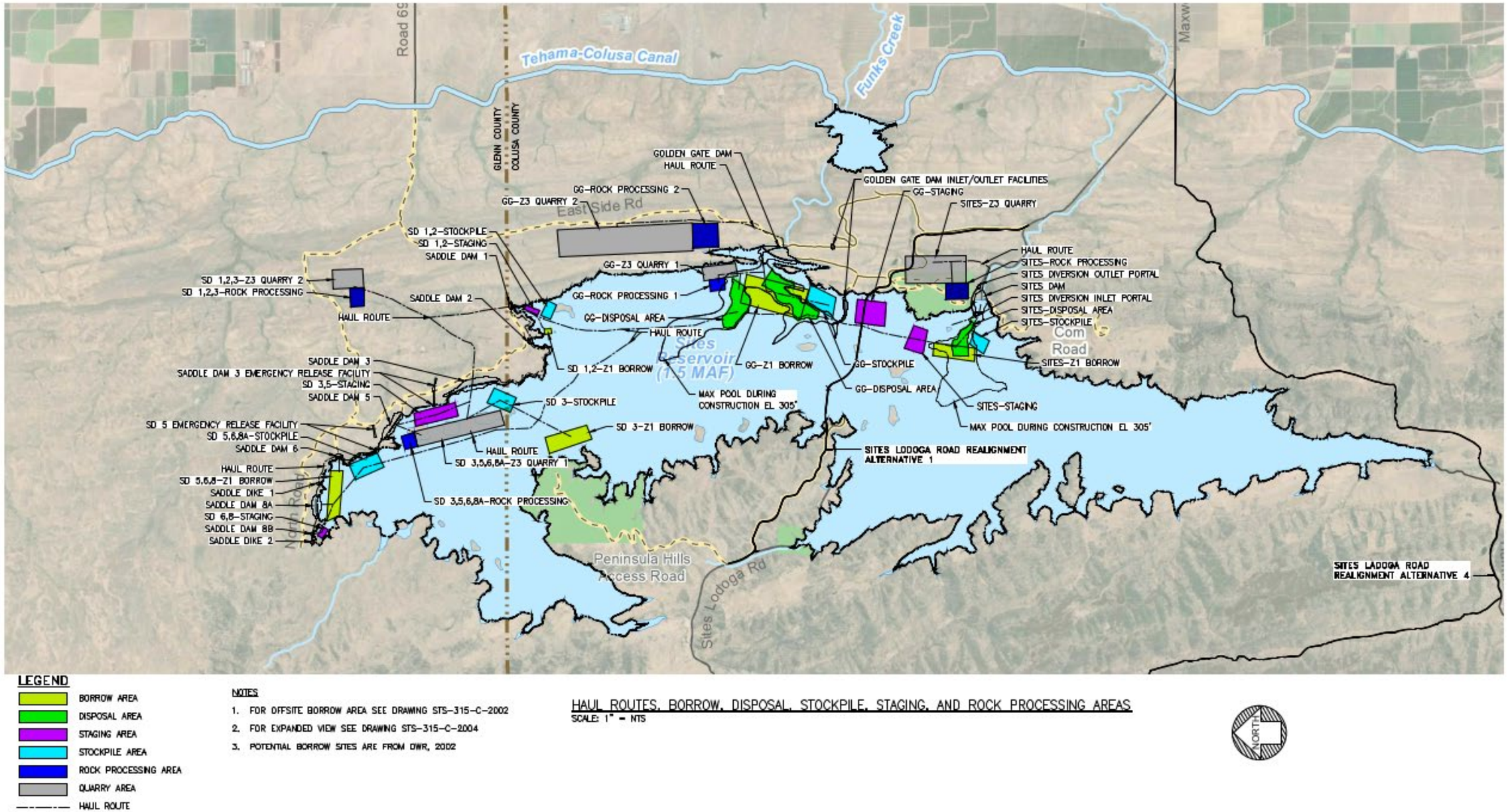


Figure 1-1. Haul Routes, Borrow, Disposal, Stockpile, Staging, and Rock Processing Areas

This technical memorandum (TM) reflects the constructability considerations for the following reservoir (HR) facilities (Figure 1-1). The key dimensions of the facilities are included in Table 1-2.

- Main Dams, Saddle Dams and Dikes, and Reservoir Rim: The Sites Reservoir dams include two main dams, Golden Gate Dam on Funks Creek and Sites Dam on Stone Corral Creek, and saddle dams and dikes on the reservoir rim on tributaries to the Hunters Creek drainage.
- Spillway: This structure is a concrete overflow spillway located at Saddle Dam 8B that would discharge into Hunters Creek to the north.
- Inlet/outlet (I/O) Works: These facilities include a vertical tower with multiple intake levels connected to two inlet/outlet tunnels. These provide for normal reservoir operation and for making the major portion of emergency reservoir releases that will be required by DSOD as part of dam permitting. The tunnels connect to reservoir conveyance pipelines (HC) at the downstream tunnel portal.
- Sites Dam Outlet Works: This outlet works tunnel would be located in the north abutment of Sites Dam; it would be used initially for construction diversion for both main dams and subsequently for stream maintenance and a portion of the emergency reservoir releases to Stone Corral Creek after construction.
- Emergency Release Structures: These structures provide emergency release capacity to supplement the release capacities at the I/O Works and Sites Dam tunnel. They include intakes and tunnels located at Saddle Dams 3 and 5 for Alternative 1 only; they would discharge to Hunter's Creek tributaries on the north side of the reservoir.

Table 1-2. Reservoir Facility Descriptions

Total Storage Capacity	1.5 MAF
Reservoir Elevation at full pool (feet)	498.0
Reservoir Area at full pool (acres)	13,200
Dam / Dike Crest Elevation (feet) (without camber)	517.0
Main Dams	2 main dams – see below
Saddle Dams	7 saddle dams and 2 saddle dikes – see below
Dam / Dike:	Max. Ht. Above Streambed / Crest Length (ft)
Golden Gate Dam	287 / 2,221
Sites Dam	267 / 781
Saddle Dam 1	27 / 318
Saddle Dam 2	57 / 250
Saddle Dam 3	107 / 3,422
Saddle Dam 5	77 / 1,894
Saddle Dam 6	47 / 362
Saddle Dam 8A	82 / 1,300
Saddle Dam 8B	37 / 475
Saddle Dike 1	12 / 122
Saddle Dike 2	12 / 198
Saddle Dike 3	Not required
I/O Tower	Top elev. 558 ft. 258 ft high / 7 elevations to draw water from reservoir

I/O Tunnels	Approx. 3,110 ft long/Dual 23 ft Internal diameter tunnels
Sites Diversion/Outlet Tunnels	Approx. 1,590 ft long/12 ft internal diameter tunnel
Emergency Release System (on north rim)	Two emergency release systems located at Saddle Dams 3 and 5
Spillway	Weir crest length = 85.5 feet, crest elevation = 504 feet

Alt = Alternative
ft = feet
I/O = Inlet/outlet works
MAF = million acre feet

- Creek Diversions during Construction: The Sites Dam outlet works (above) would be used for diversion of flows to Stone Corral Creek during construction. A 4-foot diameter steel pipe encased in reinforced concrete in the foundation of Golden Gate Dam would be used to divert flows to Funks Creek; the steel pipe would be plugged with concrete at the completion of construction.
- Roads: Roads include local roads (recreational use and public access), maintenance roads, and construction access roads.
- Bridges: Two bridges crossing the reservoir (lengths of 1,400 feet and 1,633 feet for the west bridge and east bridge, respectively) with fill prisms, providing an east-west connection from rural communities of Maxwell, Lodoga, and Stonyford for Alternative 1 only.

1.2 Purpose and Scope

The purpose of this TM is to demonstrate that the HR facilities of the Sites Reservoir Project can be constructed with existing technology and available construction materials, work force and equipment, and includes the following:

- Description of County coordination and approval process to demonstrate public acceptance.
- Development of material balance diagram for the dams showing borrow material sources (on- or off-site) and their available volumes, locations of placement within the dams and their required volumes, disposal, and shrink and swell factors.
- Equipment use tables (including schedule and duration of use).
- Construction sequencing plan and construction schedule for the facilities within the HR contract.
- The work force staff and equipment needs estimated over the construction period for facilities within the HR contract.

1.3 Limitations

The scope of work for this TM was restricted to the development of the constructability analysis for the Sites Reservoir under the Reservoir (HR) contract. Conveyance facilities are separately considered in a companion TM for the HC contract.

The information presented in this TM is based on available geotechnical investigation data and topographic contours that originated from California Department of Water Resources (DWR) for their 2003 studies. Updated site-specific topographic maps will need to be prepared for use in preliminary and final phases of design. Our estimate is limited by the quality of the best available information.

AECOM represents that our services were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession, within the limits prescribed by our client.

This TM is intended for the sole use of the Sites Project Authority. The scope of services performed may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

2.0 County Coordination and Approval Process

The central and southern portions of the reservoir and associated facilities are located within Colusa County, including the main dams, I/O Works, and the Sites Lodoga road relocation. The northern portion of the reservoir falls within Glenn Country, including the saddle dams and County roads providing access to the north end of the reservoir. Coordination with both Counties will be required throughout the upcoming design and construction phases of the project. Some project features also fall within Yolo County, but County coordination for these falls within the HC Contract.

To date, Colusa County has been the primary contact for coordination and has been representing Glenn County when necessary. There is no agreement between the Counties regarding representation going forward. For this reason, it should be assumed that coordination will be required with both Counties separately unless the Counties enter into a partnering agreement.

Coordination with the Counties will be needed for the following design and construction activities:

- Establishing design criteria for all public roads to be constructed or upgrades to support project construction and operation.
- Obtaining approval of designs and all required County Permits needed for construction that are the responsibility of the owner.
- Obtaining County permits for installing and abandoning existing and new water wells.
- Obtaining County permits for demolition of structures and management of hazardous waste materials.
- Obtaining County permits for abandoning and demolishing septic tanks and leach fields.
- Obtaining County permits for drilling geotechnical borings and installing groundwater monitoring wells when the work is located within County right-of-way.

There are other potential coordination aspects that may be required, but clarification from the Counties would be needed as indicated below:

- Need for building permits for the construction and removal of temporary office complexes located outside the project limits, including the renovation of existing buildings for that purpose.
- Need for building permits for the operation and maintenance buildings and warehouse.

3.0 Public Interface and Site Safety

3.1 Public Interface

Construction of the Sites Reservoir and its various facilities will involve approximately 6 years of regularly transporting construction equipment and materials on public roadways leading to the site. The anticipated increase in traffic in the rural area of the project warrants special planning. The Authority is taking measures for the appropriate conveyance of construction traffic considering the safety and convenience of the traveling public. Construction access routes to the site have been defined to avoid the community of Maxwell as described below. Narrow, rural public roadways impacted by the project would be reconstructed and widened as a first order of work to accommodate the increase in traffic volume and size.

The portion of Sites Lodoga Road inundated by the reservoir would be realigned with bridges, and a causeway would be constructed across the reservoir and open to traffic prior to closing the existing road. If it is determined that construction should be accelerated, a temporary detour route has been identified that would be constructed to convey public traffic around the construction of the Sites Dam while the dam and realigned Sites Lodoga Road are being constructed. Huffmaster Road is a gravel road that will be realigned, but without the time and construction sequencing sensitivities as Sites Lodoga Road. Each of these realignments will involve minor traffic impacts when the new roadway is conformed (tied-in) to the existing roadway. This minor traffic impact will be managed with single lane traffic control and flaggers during construction hours with all lanes being opened to traffic during the non-construction hours.

Traffic control measures involving public traffic will be per the Manual on Uniform Traffic Control Devices (MUTCD).

3.2 Site Safety

The contractor is responsible for means and methods to complete the work safely and is required to provide for public safety and to provide safe access for inspection and to Authority employees.

California Code of Regulations, Title 8 (CCR Title 8) and California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) would have overall jurisdiction regarding project safety, including tunneling. Mine Safety and Health Administration (MSHA) would have jurisdiction over quarry operations. Federal Bureau of Alcohol, Tobacco, and Firearms (ATF) would have jurisdiction over the handling of explosives related to blasting of excavations, including quarries.

Work around construction equipment requires special precautions and the contractor will be required to provide and maintain equipment as required by CCR Title 8.

There are abandoned gas wells within the reservoir area. Locations are based on current data provided by the California Division of Oil, Gas, and Geothermal Resources (now Geologic Energy Management Division). Early in construction, proper closure of these wells would be verified to insure worker and reservoir safety. List of wells would also be periodically verified as reservoir design continues.

4.0 General Considerations

4.1 Procurement Packages

Procurement packages should divide the work in a manner that considers market conditions, resource availability, and bonding considerations, and is conducive to concurrent construction of dam packages. The construction procurement strategy and program should also recognize the need for participation from large, national and international contractors with adequate resources to complete the anticipated work. The procurement strategy should consider contractor prequalification and proposals as necessary to provide for contracting with constructors who are qualified for the work involved and should anticipate adequate time in the procurement schedule.

For the purposes of this constructability analysis, and considering the site arrangement, contractor resources, and work type, potential contract packages were anticipated as follows:

- Roadway construction contracts as Design-Build Contracts, possibly numerous contracts grouped logically by road type, location, and overall Sites Reservoir program schedule;
- Golden Gate and Sites Dams, including Golden Gate and Sites Bypass Facilities (Funks Creek and Stone Corral Creek);

- Inlet/Outlet Facilities, including the approach channel; and
- Saddle Dams, including Emergency Release Structures and Spillway Structure 8B.

The dams and inlet/outlet facilities would likely be contracted as design-bid-build delivery methods.

4.2 Site Access

Initially, construction efforts will concentrate on providing early access to critical path elements, such as accessing the route for the realigned Sites Lodoga Road across the reservoir including bridge foundation areas from existing roads, and accessing the Inlet-Outlet Facility Portals and the Golden Gate Dam Foundation area. This access would initially be provided via improved existing ”jeep” trails and ranch roads from near Funks Reservoir and from the existing Sites Lodoga Road. This early primary access would involve initial improvements sufficient for limited heavy equipment required for the first excavation stages of construction of these critical elements.

Similarly, access to the northern end of the project would initially be provided on existing roads, including County Road 68, County Road D, and County Road 69, and along existing ranch roads and jeep trails. This would include sufficient improvements to allow heavy equipment to access the Saddle Dams and associated facilities. Early improvement work could include improvements to the existing TCCA and GCID canal bridges or replacement (was assumed in schedule) of these bridges that would allow heavy equipment to reach the site.

Construction of an optional temporary public detour of a portion of the Sites Lodoga Road, connecting to Peterson Road, in order to reroute public traffic from the existing route, would reduce construction schedule risk . This would allow for improved access to the abutments of Sites Dam such that foundation excavation can begin, as well as development of the Sites Diversion portals. This detour route will include a new intersection with Peterson Road, near to or north of the existing intersection of Peterson Road and Sites Lodoga Road.

4.3 Public Access and Traffic Routing

An objective of the traffic handling strategy will be to avoid the comingling traveling public with construction activities and avoid public interface with heavy off-road equipment, and to minimize public interface with other construction equipment required on public roadways. One significant public interface is the delivery of commercial, off-site aggregates to the project. These include dam filter and drain materials, as well as concrete and asphalt aggregates. Haul routes for these materials would include the use of Delevan Road/McDermott Road/Maxwell Sites Road and County Roads 68, D and 69. These routes would need to be improved and maintained sufficiently during the course of construction such that public traffic and gravel trucks can safely use the roadways together. Meeting environmental mitigation measures will be an important consideration in planning and constructing existing County roads to be used to access the north end of the reservoir.

4.4 Weather Considerations

It is anticipated that wet winter weather will slow down some construction activities, with more impact on some items and less on others. The highest impact would be placement of the Zone 1 Core material as this material is fine grained, and sensitive to moisture. Other activities, such as Dam Foundation Excavation, Zone 2 Filters, Drains, and Transition, Zone 3 Rockfill, and Zone 4 Random will be more tolerant to wet weather. However, zoned dam embankments such as those on the Sites Reservoir

project are placed with all zones to a common elevation, meaning that each zone is dependent on adjacent zones for advancement. If Zone 1 Core materials are stopped due to weather, Zones 2, 3, and 4 would be stopped similarly, although a portion of Zone 3 could be placed in the upstream shell zone. There is a potential that DSOD may require a shutdown during wet winter weather.

Wet winter weather can also restrict the construction of the causeway fill prisms or other roadway embankments as the compaction requirements may be unattainable as soils exceed their optimum moisture content for compaction.

The construction schedule included in this report does not attempt to show winter block-out periods, but the overall durations used in the schedule reflect some double shifting during dry periods, particularly of the Zone 1 Clay Core to compensate for winter conditions when this work would be shut down.

Night or second-shift work, as well as Saturday work, would be employed for logistics reasons during summer as well as weather make-up. An example of this would be to place Zone 1 Core material and Zone 2 Filter and Drain materials during day shift, and place Zone 3 Rockfill and Zone 4 Random fill at night. As the dam section changes with height and relative proportion of materials, the strategy would be adjusted.

The Golden Gate and Sites Dam foundations will be slightly weathered to fresh bedrock at the impervious core zone and chimney filter zones. These foundation conditions will have some tolerance to wet weather, such that grout cap and grouting work could continue through the winter, although there would be shutdown periods during storm events. The Saddle Dam core and chimney filter foundations are on moderately weathered bedrock that likely will not be as weather-tolerant as the slightly weathered foundation at Golden Gate and Sites Dams.

Portal Excavation and Tunneling will be somewhat tolerant to inclement weather. The Golden Gate and Sites diversions, including the associated cofferdams, would need to be commissioned during the drier periods to avoid creek flows at that time.

4.5 Environmental Impacts and Impacts On Construction

It is beyond the scope of work for this TM to provide a detailed evaluation of environmental impacts due to construction; this is addressed by others. Project planning will need to consider protection of species, such as nesting birds. A strategy of brush and tree clearing or netting of trees prior to nesting season could be employed to deter nesting birds, which otherwise could impact construction. Giant Garter snake habitat is potentially present and work adjacent to creeks and drains needs to be considered as well.

Dust control measures, similar to those employed on similar civil construction works, would be implemented. These would include gravel plating of haul roads, use of dust suppressants or surfactants on haul roads, water applied to haul roads, spray bars and dust catchment systems on aggregate processing equipment and batch plants, and other measures. Stockpiles and other open sources of fugitive dust would likely require temporary seeding. Air monitoring stations would be utilized.

Dewatering operations may need to employ an on-site treatment facility that will likely include settling basins with treatment for oil/grease, settable solids, pH, and turbidity. It is assumed for this TM that treated water from the settling basins would be used for on-site dust suppression or discharged to Funks or Stone Corral Creek. Final disposition of water from dewatering operations will be developed in agency consultations and through mitigation measures for the project.

Existing asphalt salvaged from roadway construction would be pulverized and utilized in roadway construction. This would be accomplished utilizing rotomills, asphalt reclaimers, as well as asphalt recycling and crushing equipment at salvaged asphalt stockpiles. The processed materials would be used as road base, but would not be used for new asphalt concrete surfacing.

4.6 Site Staging

Staging areas will be required for various activities, including office facilities, field lab facilities, material storage, equipment maintenance, aggregate production and stockpiling. Some staging areas within the reservoir area have been identified, while others likely will need to be identified in areas outside the reservoir. These would include staging for public roadway/bridge construction and downstream portals for the Inlet/Outlet Facilities, Emergency Release Structure (ERS) ERS-1, ERS-2, and the Sites Diversion. Typically, staging areas would be plated with crushed aggregates from commercial sources or processed on-site materials.

Haul routes would be constructed between various elements, including site access points, quarry and borrow areas, and staging areas. Typically, haul routes would be plated for all-weather use. Plating would be with crushed aggregates from commercial sources or processed from on-site materials. Construction-related traffic would use designated routes, both within the project limits and on public roadways. Within the project limits, heavy equipment haul routes would be separate from light equipment and personnel vehicle travel routes as a matter of site safety. All construction contractors will be required to submit and receive approval for all staging and temporary haul routes.

4.7 Geotechnical Construction Considerations

One of the more significant geotechnical challenges will be the production of rockfill from the quarries. The harder fresh sandstone materials desired for rockfill are interbedded with undesirable weathered sandstone and mudstone. These beds are at an inclination of roughly 50 degrees and will need to be excavated and either wasted or used as Zone 4 Random embankment fill, as the rockfill materials are mined. The contractors will need to develop a strategy involving multiple mining faces in order to continuously expose and mine sandstone for rockfill. Drilling and blasting of the mudstone/sandstone interbeds will need to consider preservation of the better sandstone materials.

Dam foundation grouting operations are anticipated that would consist of a two-row grout curtain, with one row of consolidation holes upstream and one row downstream of the curtain holes. The rows would parallel the dam centerline, and be spaced 10 feet apart. In addition, a 40-foot-wide by 3-foot-thick concrete grout cap was included to mitigate surface leakage of grout during grouting of the upper stage.

Each row of consolidation and curtain grout holes would consist of mandatory primary and secondary holes spaced at 10-foot centers. In addition, it was assumed that tertiary holes (between the primary and secondary holes) would be required over half the length of the dam to meet grout closure criteria. Consistent with dam foundation grouting practices, the drilling depth of consolidation holes was estimated to be one-quarter the height of the dam, with a minimum depth of 50 feet. In addition, the drilling depth of curtain holes was estimated to be one-half the height of the dam, with a minimum depth of 100 feet. Water pressure testing will be completed in all grout holes prior to grouting. Additional grout verification holes will be installed as part of accepting the grouting in areas of the foundation. Grouting will begin at the low point of the core trench excavation an proceed up slope up the abutments. Once grouting is proceeding up the abutments, earthwork placement within the core trenches can begin with DSOD approval.

It is anticipated that dewatering will be required in the deeper portions of the dam foundations at the valley bottoms. Dewatering may include a combination of perimeter dewatering wells and sumps within the excavations. Dewatering water would be pumped to upstream basins for later use.

Construction of the causeway across the reservoir will involve large fill prisms constructed on native ground that may involve compressible alluvial material which could limit the location/limits of the prisms or introduce preconsolidation settlement periods into the construction schedule, which are not currently reflected.

4.8 Cost and Schedule Risks

There are a number of risks that could adversely affect cost and schedule and include the following:

- Administrative milestones, permitting, geotechnical investigation, engineering and design, agency (DSOD) approvals, and environmental permitting;
- Real estate acquisition;
- Delays in procurement;
- Protective species work windows or mitigation measures;
- Cultural clearing and accommodation for tribal cemetery and other cultural resources;
- Delays in access or access improvements;
- Insufficient or unqualified labor force due to regional economy, labor disputes, or other factors;
- Unsatisfactory contractor performance, lack of experience or resources;
- Insufficient construction water availability;
- Insufficient availability of off-site materials for filters, drains, transition, and concrete aggregate;
- Unexpected foundation conditions requiring deeper excavations;
- Adverse weather conditions beyond those normally experienced at this site;
- Dam foundation grouting could take longer than anticipated thus delaying embankment construction;
- Unexpected tunneling ground and dewatering conditions;
- Difficulties in developing and processing material from on-site borrow areas and coordination of borrow areas between contractors on different contracts; and
- Unavailability of heavy construction equipment for the project due to other competing large projects in the State or region.

4.9 Site Utilities and Power

Power supply is currently limited at the project. Various project elements will require permanent electric power service brought to the site, but likely would not be of the same capacity or to the same areas in time for construction use. It may be possible for permanent power service to be brought to the site in order to service major facilities, such as aggregate processing equipment or office and shop facilities. However, it is anticipated that generators of various capacities would be needed.

4.10 Construction Water

The project will rely on early development of construction water sources. Water for construction use will be obtained from numerous sources due to the size of the project footprint. Within the 13,200 acre reservoir footprint (Alternative 1), water would be obtained from existing private wells that will be

acquired along with property by the Authority. The Authority should seek to acquire water from nearby local water purveyors (ditches, canals, and wells) and possibly local landowners (wells) for use in the construction of roads. Excavation dewatering operations will also provide a source of construction water.

Construction water uses include moisture conditioning of fill materials, batching concrete, grouting, and dust suppression for haul roads, stockpiles, disposal areas, quarries, and borrow areas. The average volumes of construction water for reservoir construction are estimated to be on the order of 750,000 to 1,000,000 gallons per day.

Water used for construction purposes would also be transferred to the facility footprints from the GCID Main Canal, by trucks and/or temporary pipelines. The pipelines are not expected to be buried except at crossings of heavily trafficked areas, where they may be installed several feet below ground surface.

It is assumed for the purposes of this analysis that more water may be used from existing or new groundwater wells than surface water for the reservoir facilities located within the Antelope Valley. Because the groundwater quality within Antelope Valley is variable, it may not be fully suitable for use in some construction activities (e.g., mixing concrete). Water for grout and concrete will come from wells or the GCID canal meeting potable water standards.

5.0 Site Materials and Use / Material Balance Diagrams

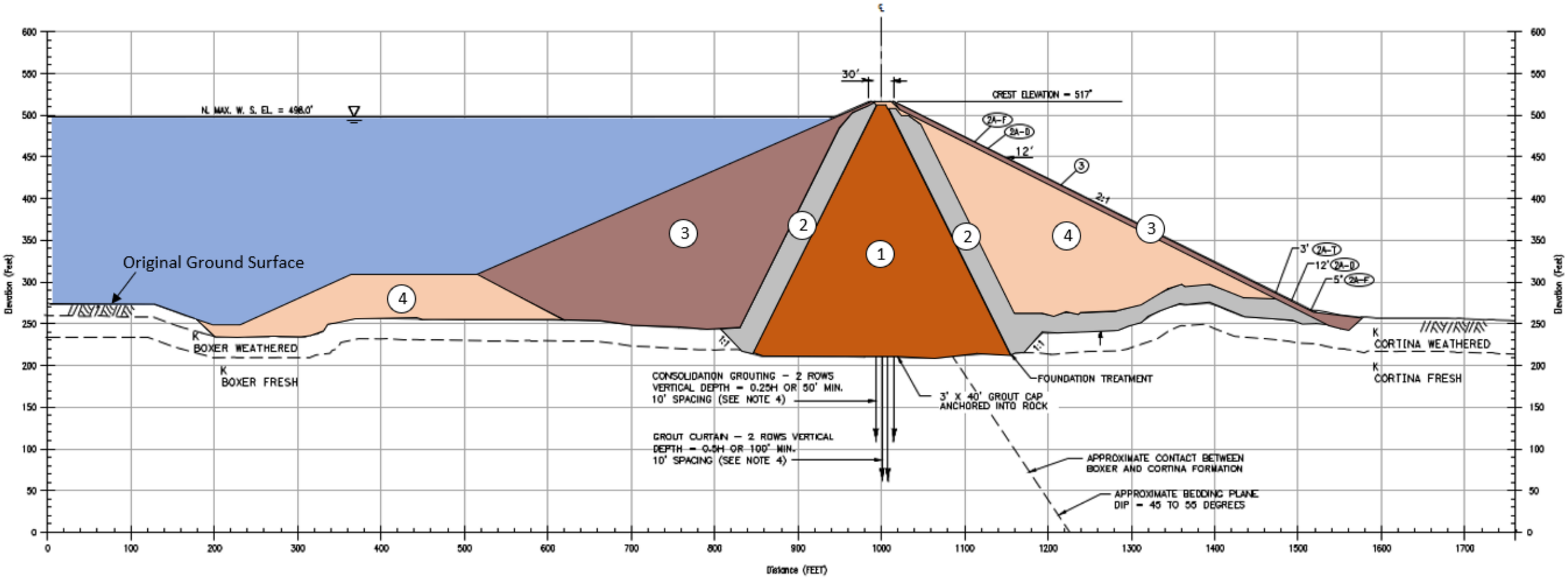
5.1 Dam Section

The proposed dams comprising the Sites Reservoir would be constructed as zoned earth and rockfill embankment dams using four general types of fill materials: Zone 1 impervious core materials that include fine-grained materials; Zone 2 filter, drain, and transition materials; Zone 3 rockfill; Zone 4 random materials; and riprap.

A typical main dam section is provided in Figure 5-1 showing the dam zones. Upstream of the impervious core (Zone 1) material, a 30-foot wide zone of filter and transition materials (Zones 2) are included for compatibility between the core and rockfill shell (Zone 3). Downstream of the core, two 15-foot-wide zones of filter and drain materials (Zone 2) are included for filter compatibility between embankment materials, to provide control of embankment seepage, and to prevent piping of the core material. The downstream embankment section also incorporates a 20-foot-thick blanket of filter, drain, and transition (Zones) to control foundation seepage and to provide for seepage collection at the downstream toe. Shell materials consist of rockfill (Zone 3) upstream and random materials (Zone 4) downstream. A 4-foot-thick zone of riprap is included for upstream slope protection. A 12-foot-wide rockfill material (Zone 3) is included along the downstream slope of the random shell material (Zone 4) for erosion protection. Zone 1, 3, and 4 materials would be obtained from on-site borrow areas and quarries. Zone 2 materials would be imported from off-site commercial sources.

5.2 Borrow Areas and Quarry Sources

It is anticipated that earth and rockfill for the reservoir facilities (approximately 80% of materials required) would come from onsite sources, and aggregate that includes filter, drain, transition materials, and concrete aggregate (approximately 20% of material required) would be obtained from offsite commercial sources (e.g., Orland Sand & Gravel and/or Butte Sand and Gravel). On-site rock quarries were identified from previous work by DWR and appear to be adequate to provide the required quantities of material based on limited available geotechnical data. This will need to be verified through future geotechnical investigations



Zone① Core
Zone② Upstream and Downstream Filter, Drain, and Transition
Zone③ Rockfill and Riprap
Zone④ Random

Figure 5-1. Typical Embankment Section (Golden Gate and Sites Dam)

5.2.1 Onsite Borrow Areas, and Quarries, and Rock Processing

The on-site borrow areas and quarries include alluvial materials for the earthfill portion (Zone 1 core) of the dams and rock quarries for the rockfill portion (Zone 3) of the dams. Approximate locations of the borrow areas and quarries are shown on Figure 1-1. There are four alluvial borrow areas identified within the reservoir, two rock quarries and rock processing areas identified within the reservoir, and three rock quarries and rock processing areas identified outside the reservoir inundation area.

It is assumed all riprap materials and rockfill materials would be sourced from the following quarry locations:

- Saddle Dam Rockfill Quarries: There are two rockfill quarries for Saddle Dams. SD3,5,6,8A-Z3 Quarry 1 located inside the reservoir and SD 1, 2, 3-Z3 Quarry 2 located outside the reservoir. Neither of these are existing quarries, and they would need to be developed by the Contractor.
- Golden Gate Rockfill Quarries: There are two rockfill quarries for Golden Gate Dam. GG-Z3 Quarry 1 located inside the reservoir and GG-Z3 Quarry 2 located outside the reservoir. Neither of these are existing quarries, and they would need to be developed by the Contractor.
- Sites Dam Rockfill Quarry: There is one rockfill quarry for Sites Dam. Sites-Z3 Quarry located outside the reservoir. This is not an existing quarry, and it would need to be developed by the Contractor.

After the completion of project construction, the three quarries outside the inundation area would be decommissioned and regraded, including installing perimeter fences and grading slopes to promote positive drainage from the quarry bottoms. Revegetation would occur at the bottom of the quarries and not along the slopes because of the steepness and substrate (i.e., rock) of the quarry slopes. The three quarries would be visible after project construction.

5.2.2 5.2.2 Offsite Quarries

High quality sand and gravel would be needed for filter, drain, and transition materials in the dam embankments and for concrete structures (e.g., spillway on Saddle Dam 8B, I/O Works). Figure 5-2 shows the general locations of the offsite quarries. The primary sources of aggregate in the region are alluvial deposits associated with historical/abandoned river channels. The contractor(s) would have discretion over the source locations of the aggregate and for the purposes of this analysis it is assumed that all aggregate would come from existing active locations (Email Confirmation from L. Warner-Herson, October 16, 2020). There are several potential offsite sources of aggregate:

- The Willows/Orland Quarries, located in Glenn County, which contain multiple existing active and inactive mining locations, stretched between the towns of Willows and Orland, and are approximately 35 miles north of Sites Reservoir.
- Butte Sand and Gravel, located in Sutter County, which consists of a single mining location, is on SR 20 near the town of Sutter and is approximately 30 miles east of Sites Reservoir.

The Willows/Orland Quarries have sand and gravel mines that are sourcing material from the historical/abandoned channel of Stony Creek, which has an estimated capacity in excess of 160 million cubic yards, DWR (2003). As such, existing active mines in this area could potentially provide a source of aggregates for the project. Aggregate from the Willows/Orland Quarry area has been used by local batch plants for making concrete. Butte Sand and Gravel is a permitted, operating quarry.

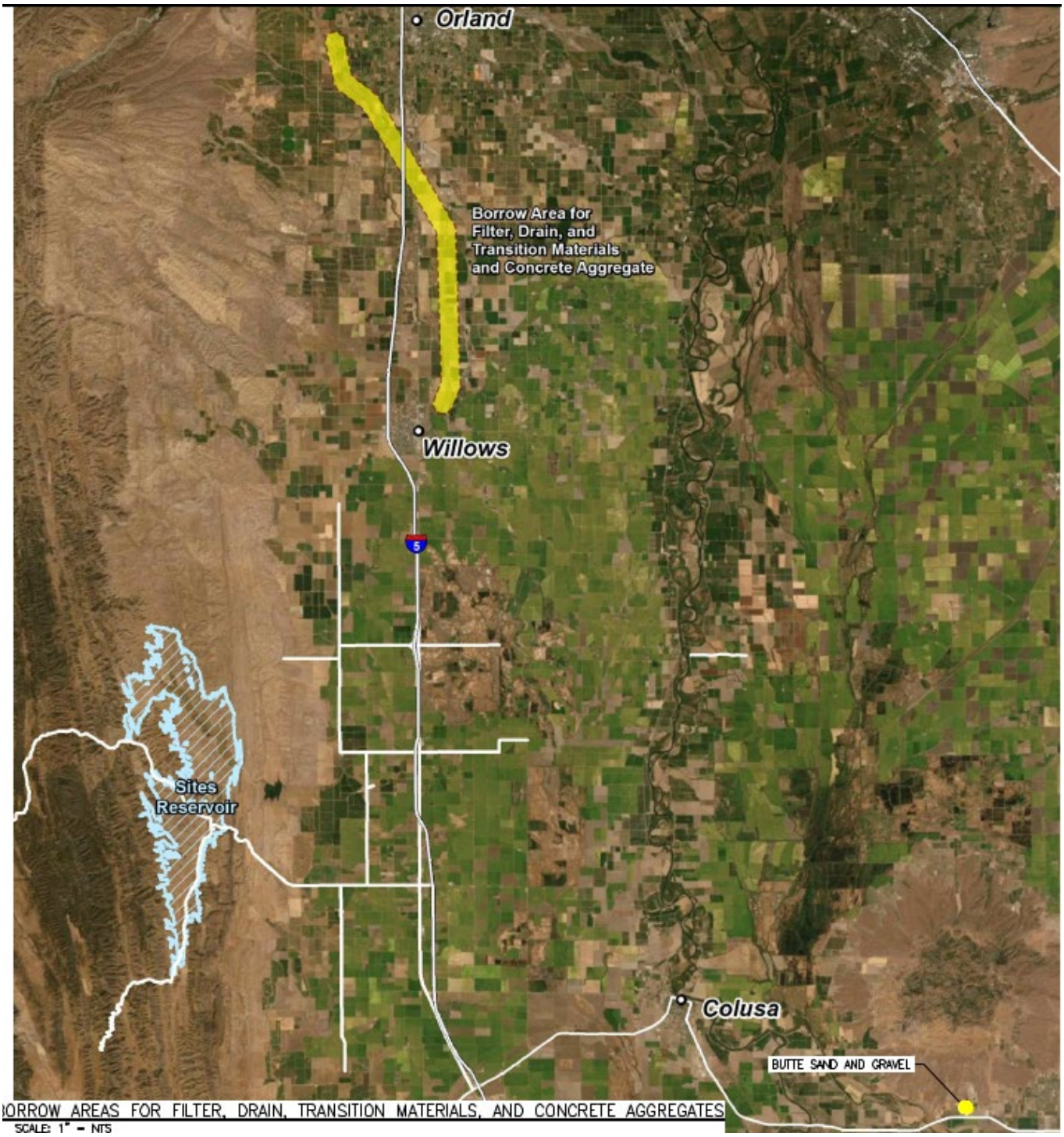


Figure 5-2. Offsite Quarries Location

5.3 Material Balance Diagrams

The material balance diagrams in Appendix A show the flow of materials from source to destination for use in constructability analysis for the dams and cost estimation. They indicate the estimated amount of required earth and rock borrow materials required for the dams, embankment dam quantities,

excavated waste materials to be disposed, and the amount of required imported sand and gravel for the filter, drain and transition zones. Estimates for material bulking and shrink factors are also indicated on the material balance diagrams.

6.0 Construction Sequencing Plan and Construction Schedule

6.1 General Plan and Approach

Initially, construction efforts will concentrate on access to critical elements, such as the realignment of Sites Lodoga Road across the reservoir including bridge foundation areas, the Inlet-Outlet Facilities Portals, and the Golden Gate Dam Foundation area. This access would initially be provided via existing access routes from near Funks Reservoir and from the existing Sites Lodoga Road. This early primary access would involve initial improvements sufficient for limited heavy equipment required for the first stages of construction of these critical elements.

Similarly, access to the northern end of the project would initially be provided on existing roads, including County Road 68, County Road D, and County Road 69. This would include sufficient improvements to allow heavy equipment to access the Saddle Dams and associated facilities. Early improvements could include improvements to the existing canal bridges or replacement of these bridges that would allow heavy equipment to reach the site.

Initial access will allow for setup of staging, stockpile, office, and shop facilities, as well as mobilization of manpower and resources.

6.2 Calendar and Work Hours

A condensed version of a potential construction schedule for the HR facilities is shown in Figure 6-1and is based on the following (refer to Appendix B for the detailed schedules for Alternatives 1 and 2):

- The construction schedule is calculated on 20 working days per month to account for holidays and weather delays.
- Productions and durations are calculated on 10-hour work shifts, accounting for breaks.
- Crews would likely work 6 days per week on critical functions.
- Night or second-shift work generally pertains to tunneling work and various portions of dam foundation excavation and dam embankment. Night or second shifts would be employed for logistics reasons as well as weather make-up. An example of this would be to place Zone 1 Core material and Zone 2 Filter and Drain materials during day shift, and place Zone 3 Rockfill and Zone 4 Random at night. As the dam section changes with height and relative proportion of materials, the strategy would be adjusted.
- The duration of dam embankment construction would be the same for all embankment zone types. General practice would be to use adequate resources to place at least two embankment zone types for each shift. The overall duration is set by the zoned material with the longest duration, typically Zone 1 Core.

Some activities, such as foundation cleaning, grout cap, dental concrete, and grouting are scalable, meaning that the number of crews or shifts will be adjusted by the contractor to meet his schedule on critical activities such as foundation excavation and embankment

Sites Reservoir
Preliminary Construction Schedule
HR Facilities Alt 1 - 1.5 MAF
Roadways, Dams, and I/O Facilities
December 2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		CWC Award of Funds	0 days	Fri 12/1/23	Fri 12/1/23	
2		Determine Engineering Procurement & Delivery Method	120 days	Sat 1/1/22	Thu 6/16/22	
3		Sites Board Approval/NTP for Phase 3	23 days	Wed 6/1/22	Fri 7/1/22	
4		Real Estate Access & Permitting (Geotech & Surveying)	260 days	Mon 7/5/21	Fri 7/1/22	3FF
5		Initial Geotech & Surveying	130 days	Mon 7/4/22	Fri 12/30/22	3,4
6		Final Geotech Investigation	130 days	Mon 1/2/23	Fri 6/30/23	5
7		**Reservoir Facilities**	**1800 days**	**Mon 12/5/22**	**Fri 10/26/29**	
8		**Engineering**	**405 days**	**Mon 12/5/22**	**Fri 6/21/24**	
11		**Administrative and General - Dams and I-O**	**300 days**	**Mon 6/24/24**	**Fri 8/15/25**	
16		**Administrative and General - Roads**	**210 days**	**Fri 9/1/23**	**Fri 6/21/24**	
21		**Roads, Bridges, Access, and Site Development**	**801 days**	**Mon 6/24/24**	**Mon 7/19/27**	
32		**Process and Haul Filter Materials to Project**	**1180 days**	**Mon 1/20/25**	**Fri 7/27/29**	
37		**Golden Gate Dam Construction**	**1195 days**	**Mon 9/23/24**	**Fri 4/20/29**	
60		**Sites Dam Construction**	**956 days**	**Fri 7/11/25**	**Fri 3/9/29**	
90		**Saddle Dams**	**871 days**	**Fri 7/25/25**	**Fri 11/24/28**	
91		**Saddle Dam 3**	**771 days**	**Fri 7/25/25**	**Fri 7/7/28**	
111		**Saddle Dam 5**	**821 days**	**Fri 10/3/25**	**Fri 11/24/28**	
131		**Minor Saddle Dams (SD1,SD2,SD6,SD8A, Dike 1, and Dike**	**711 days**	**Fri 11/14/25**	**Fri 8/4/28**	
151		**Saddle Dam 8B - Spillway**	**257 days**	**Fri 12/26/25**	**Mon 12/21/26**	**132**
163		**Emergency Release Structure No. 1**	**285 days**	**Fri 12/26/25**	**Thu 1/28/27**	
175		**Emergency Release Structure No. 2**	**410 days**	**Fri 3/27/26**	**Thu 10/21/27**	
187		**Inlet Outlet Facilities**	**1015 days**	**Mon 10/27/25**	**Fri 9/14/29**	
207		**Dams and I/O Ready for Commissioning**	0 days	Fri 6/22/29	Fri 6/22/29	21,90,37,60,162,163,175,204
208		Dams and I/O Startup and Commissioning	90 days	Mon 6/25/29	Fri 10/26/29	207
209		Dams and I/O Substantial Completion	0 days	Fri 10/26/29	Fri 10/26/29	208

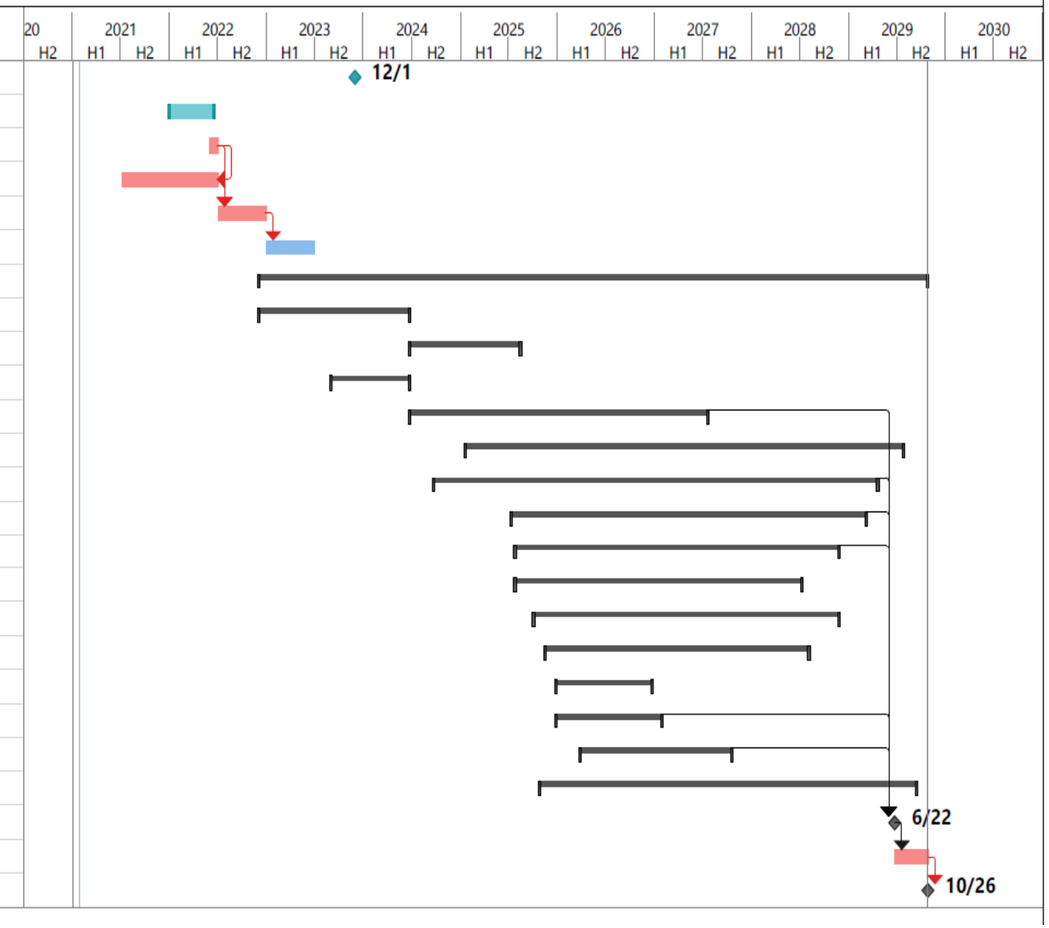


Figure 6-1. Potential Construction Schedule - HR Facilities

(refer to Appendix B for the detailed schedule)

The schedule critical path includes the following elements or activities:

- Real Estate Acquisition
- Permitting
- Engineering studies including geotechnical investigations and reporting
- Engineering
- Procurement and Contractor Mobilization
- Early Site Access and Staging Development
- Inlet-Outlet Facilities

6.3 Procurement and Contract Packaging

The construction schedule includes some assumptions on procurement and contract packaging, such as:

- Roadwork - Most or all roadwork would be contracted as Design-Build, providing for an earlier start on critical roadwork (including bridges) that provides the early access for construction, as well as routing of public traffic in order to avoid conflicts with construction activities.
- Dam Packages:
    - Golden Gate Dam and Sites Dam, including Diversion and Bypass facilities
    - Saddle Dams, including ERS-1 and ERS-2
- Inlet-Outlet Facilities

As stated in Section 4.1, the dams and inlet/outlet facilities would likely be contracted as design-bid-build delivery methods.

6.4 Commissioning and Interface with HC Facilities

Commissioning of the HR facilities relies on several key elements; Roadwork must be substantially completed such that public traffic is routed in its final form across the Sites Lodoga causeway (roadway prisms and bridges), the dam facilities are complete, and the inlet-outlet facilities are complete and operational, and the pumping and conveyance facilities are completed sufficiently to provide sufficient water for operational testing.

This reservoir (HR) facilities schedule must be properly linked to pumping and conveyance (HC) facilities to reflect the above relationships.

Additionally, some access points developed under HR may be needed for tie-in of HC facilities. These logic dependencies should be made once the HC schedule activities are incorporated into the combined construction schedule.

7.0 Work Force Staff and Equipment Needs

7.1 Labor Force, Project Labor Agreements

Providing for a sufficient labor force for a project of this magnitude will pose a challenge, but is manageable. It is anticipated that much of the labor force would come from the surrounding region, with contractors also bringing some skilled work force from other areas. While Colusa County is rural, with a population of about 20,000, the surrounding counties, including Sacramento, Placer and Yolo Counties, the regional population is over two million. It may be advantageous to consider project labor

agreements with trade unions as a means of accommodating the project labor requirements, as well as avoiding labor disputes. A project labor agreement, well in advance of the need for craft labor, would provide for established labor rates, benefits, and work rules, as well as stability of the workforce. Unions and contractors will have advance notice in identifying required craft manpower and training programs. Further, project labor agreements will minimize the risk of labor disputes during the course of the work. This strategy has been used successfully on other major civil works projects in California, including dam construction.

7.2 Equipment and Workforce Use

The estimated Equipment Use Tables are included in Appendix C. The approach to estimating the equipment use, and limitations, includes the following:

- The Equipment Use Tables are intended to inform the project team regarding expected equipment type, hours and horsepower, as well as expected manpower.
- At this point in the project, the design is at feasibility level. Further design development will determine final quantities and other factors will influence the final equipment use.
- Various contractors will approach the work differently from each other, and likely different from our interpretation of equipment use and staffing.
- The Equipment Use Tables are an approximation of the equipment, crews, and production needed to complete the project. This is somewhat dictated by a lack of design details, although some details and quantities have been extrapolated based on best industry practices and expectations.
- Site geologic study and interpretation is incomplete. Future geotechnical work will affect final design and quantities.
- Procurement strategies and outcomes, including contract packages, will have some impact on the use and timing of equipment and crews.
- The Equipment Use tables have been grouped with similar work in one "Package". The Roadways Package under the "General and Indirects" heading would include the General and Indirect costs for all of the Roadways.
- Similarly, in the Equipment Use Tables, data is grouped for multiple features (i.e., Saddle Dams 1, 2, 6, 8A, and 8B). This is the combined total for Saddle Dams 1, 2, 6, 8A, and 8B in Alternative 1.
- Travel Speeds for Vehicles - The average speed for pickup trucks and supervisory vehicles would be about 20 mph, but will vary with individual duties and activities.
- Travel Speeds for off-site Hauling Vehicles - For off-site haul vehicles (Such as those making deliveries to the job) an average of 40 mph was used from their point on origination to the delivery site and return to point of origin.
- Travel Speeds for on-site Hauling Vehicles - We utilize average speeds for hauling calculations. For on-site haul vehicles, such as those used to haul excavated or processed material, we use an average of 15 mph.
- Travel Speeds for Support equipment, such as water trucks and graders, would be about 15 mph. Operational speeds while performing work would be about 3 - 5 mph.
- No off-road, mobile, electric powered equipment is anticipated at this time.
- Electric power generation is included in the Equipment Use Tables as applicable for the various aggregate processing and batch plant needs. It is possible that some of this equipment would use direct line power, if such line power is available to the site on time and is economical.

- Power supply for such facilities as offices, QC labs, and shop facilities will be included in the Equipment Use Tables as diesel generated power. Line power or diesel generated power will not be duplicated in the data.
- It is anticipated that approximately half of the pickup trucks will be gasoline powered, the other half would be diesel powered. All other equipment would be diesel powered.
- Within the Sites Reservoir Inundation Area there are approximately 26 houses, two motor homes, 31 barns, and 49 other structures (combination of sheds, silos, and a pump houses, silos and water towers) that would be demolished once all property owner negotiations are completed. (This information is provided under the Demolition heading in Appendix 2C for Alternative 1.) Limited information is available, as these facilities are on private property and not currently accessible, but estimates can be verified from aerial photography.
- The average workforce and staffing have been evaluated. Workforce and staff will vary during the course of the work as work activities ramp up, peak, and taper off toward completion.
- Regarding staff and workforce commute, it is anticipated that much of the workforce will come from the surrounding area, including the greater Sacramento area. The average daily commute is expected to be approximately 70 miles each way, or about 1.5 hours each way.
- Start and End dates are reflective of the Preliminary Construction Schedule produced as a separate document. The manpower and equipment presented here demonstrates the overall level of effort to complete each task within that time frame. Schedule allowances have been made for ramp-up and resource leveling during that time frame, including allowances for double-shift work as well as multiple crews as needed to maintain the construction schedule.
- On-site batch plants are anticipated for each work package. Each batch plant would likely be capable of producing between 100 and 400 CY per hour. Plants would be large, portable plants, powered by either generator or line power, depending on availability. Generation typically would be approximately 350 HP at each plant. Aggregate for batching concrete would be imported from off-site sources and hauled to the site by conventional highway trucks; belly dump, side dump, or truck and pup, with capacities of between 23 and 25 tons.

The actual daily equipment and workforce use will vary based on what activities are being performed across the project at any given time. For example, drilling and blasting, rock bolting and excavation may not all occur simultaneously during portal excavation for any one of the tunnel portals. During the drill/blast shifts, the equipment necessary for the excavation and rock bolting may sit idle, depending on work room available.

7.3 Estimate of Peak Heavy Equipment Utilization

The Table 7-1 below represents the estimated peak heavy equipment and workforce needs for the project. The ranges listed are indicative of projected resources during peak construction as represented in the construction schedule during a day-shift operation. The actual daily maximums will not necessarily occur every day across all equipment categories, but will rise and fall based on what activities are being performed across the project at any given time. For example, drilling and blasting, rock bolting and excavation may not all occur simultaneously during portal excavation for any one of the tunnel portals. During the drill/blast shifts, the equipment necessary for the excavation and rock bolting may sit idle, depending on work room available. The table does not include light equipment, such as generators, pumps, and light plants.

Table 7-1. Estimate of Peak Heavy Equipment Utilization

[Golden Gate Dam, Sites Dam, and Saddle Dam 5 (Combined Zoned Materials Production & Placement, Borrow Area and Quarry Development, Dam Roads Construction, ERS-1 and I/O Facilities)]

Equipment Category	Function	Number of Equipment Pieces (Range)
Large Bulldozers – CAT D-7 to D-10 or similar	Quarry and borrow excavation, processing, foundation excavation, placement of zoned material in embankments, roadway excavation and embankment	40-60
Large Excavators – CAT 330 to 390, and 5130 or similar, including excavators with hydraulic breakers	Quarry and borrow excavation, processing, foundation excavation, placement of zoned material in embankments, roadway excavation and embankment, riprap placement	30-50
Articulated and Rigid Frame Haul Trucks – 40 Ton to 100 Ton or similar	Hauling of quarry and borrow excavation, processing, foundation excavation, placement of zoned material in embankments, roadway excavation and embankment, riprap placement	100-140
Highway Trucks, Belly or Side Dump	Haul off-site aggregates, Zone 2, roadway aggregates	50-75
Compactors	Compaction of embankments, base, and surface aggregates	25-35
Support Equipment – Graders, Water Wagons, Water Trucks, Maintenance and Mechanics Trucks	Water for compaction, dust control, haul road maintenance, intermediate and final grading	30-70
Roadheaders, Muckers, Track Drills, Bench Drills	Quarry, roadway, and dam foundation drilling and blasting, tunnel construction	25-40
Pickups and Staff Vehicles	Owner & Engineer staff	40-60
Pickups and Crew Trucks	Supervisory personnel, QA/QC including contractor staff, foremen, lead craftsmen	225-300
Personnel		
Contractor Supervisory Staff	Project Managers, Superintendents, Engineers, Schedulers, QA/QC, Safety, Survey, Clerical	150-250
Contractor Craft and Foremen		500-750

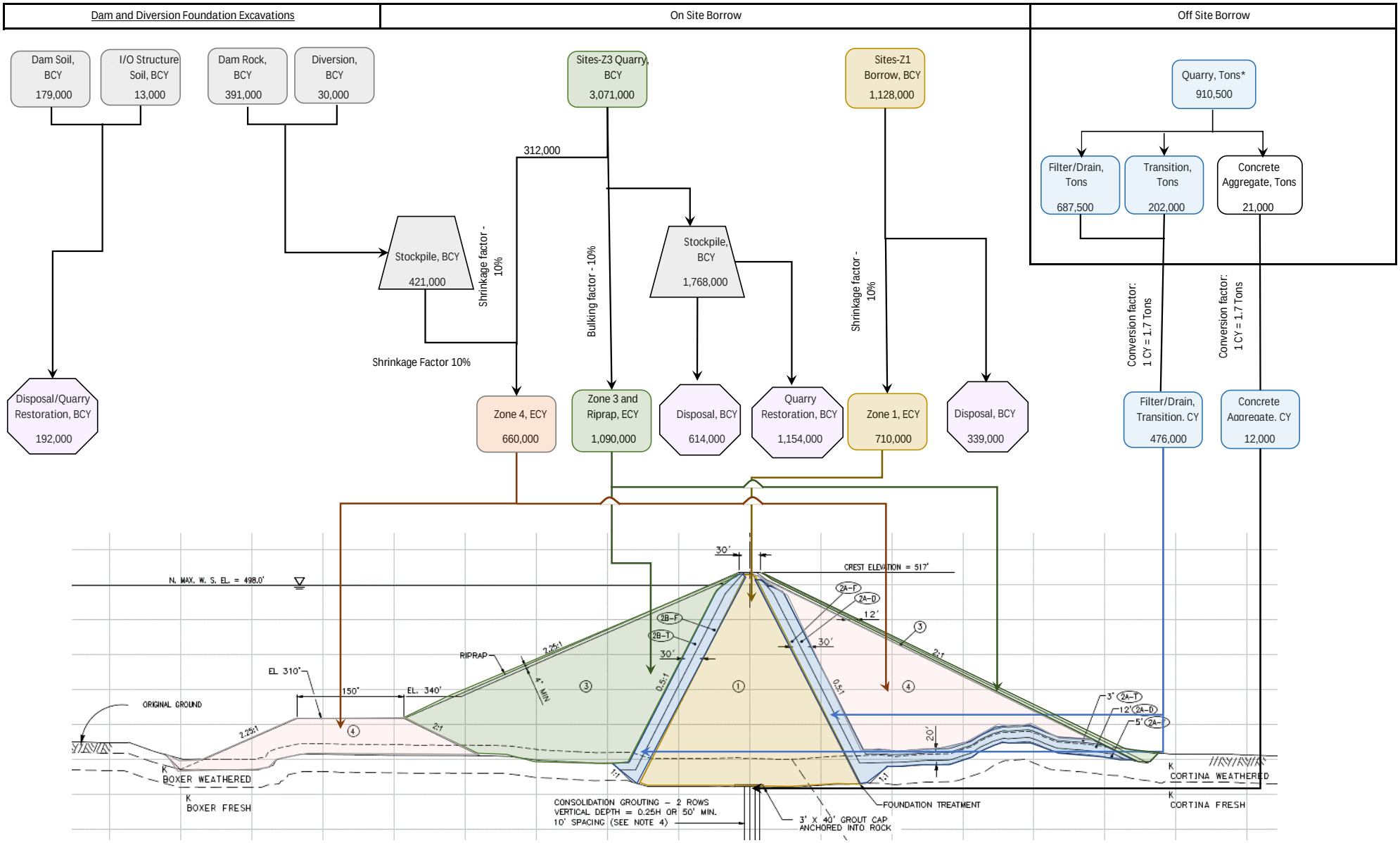
8.0 References

Department of Water Resources (DWR) (2003). Sites Reservoir Engineering Feasibility Study, Golden Gate, Sites, and Saddle Dams. February.

Appendix A
Material Balance Diagrams for Dam Construction

DRAFT - MATERIALS BALANCE
SITES DAM - 1.5 MAF RESERVOIR

Calculated by: RN
Reviewed by: MS
Date: January, 2021

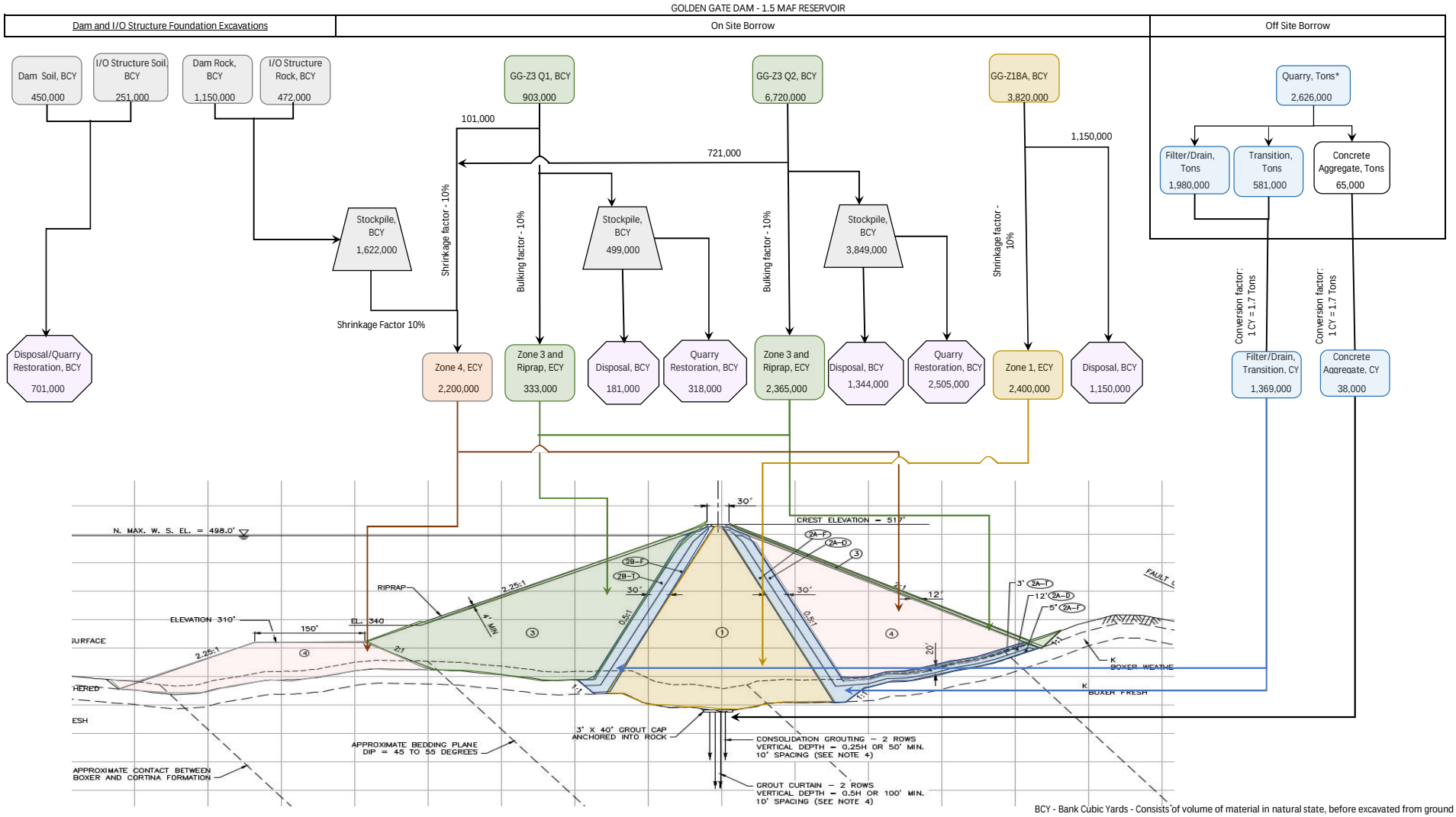


BCY - Bank Cubic Yards - Consists of volume of material in natural state, before excavated from ground
ECY - Embankment Cubic Yards - Consists of in-place embankment volume
Shrinkage/Bulking Factor - Changes in material volumes due to shrinkage/bulking.
* Includes 10% allowance for overbuild/waste.

MBD DIAGRAMS
SITES DAM - 1.5 MAF RESERVOIR (ALTERNATIVE 1)
FIGURE 1

DRAFT - MATERIALS BALANCE
GOLDEN GATE DAM - 1.5 MAF RESERVOIR

Calculated by: RN
Reviewed by: MS
Date: January, 2021



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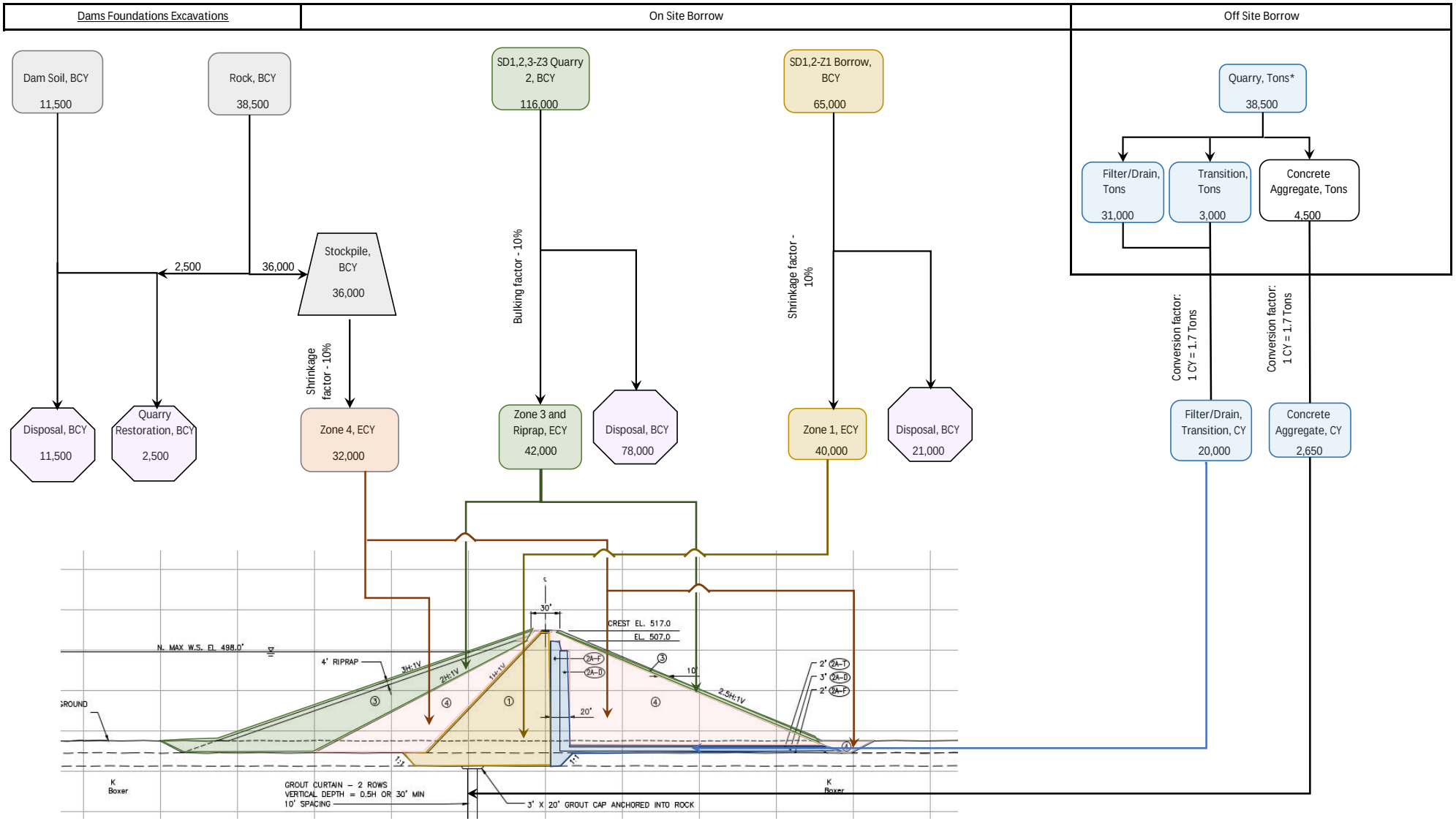
ECY - Embankment Cubic Yards - Consists of in-place embankment volume
Shrinkage/Bulking Factor - Changes in material volumes due to shrinkage/bulking.
* Includes 10% allowance for overbuild/waste.

MBD DIAGRAMS
GOLDEN GATE DAM - 1.5 MAF RESERVOIR (ALTERNATIVE 1)
FIGURE 2

DRAFT - MATERIALS BALANCE
SADDLE DAMS 1 AND 2 - 1.5 MAF RESERVOIR

Calculated by: RN
Reviewed by: MS
Date: January, 2021

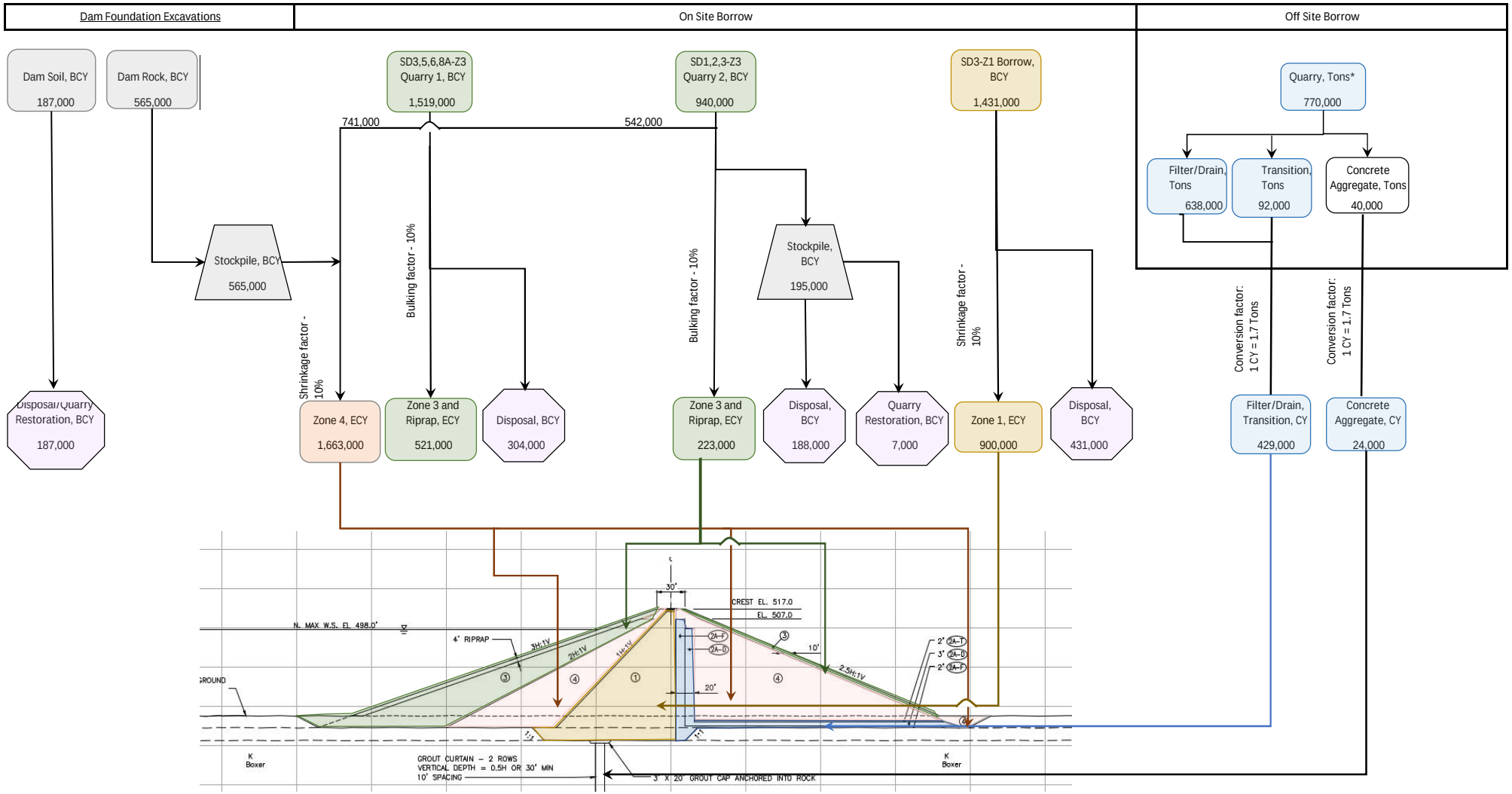


BCY - Bank Cubic Yards - Consists of volume of material in natural state, before excavated from ground
ECY - Embankment Cubic Yards - Consists of in-place embankment volume
Shrinkage/Bulking Factor - Changes in material volumes due to shrinkage/bulking.
* Includes 10% allowance for overbuild/waste.

MBD DIAGRAMS
SADDLE DAMS 1 AND 2 - 1.5 MAF RESERVOIR (ALTERNATIVE 1)
FIGURE 3

DRAFT - MATERIALS BALANCE
SADDLE DAM 3 and ERS 1 - 1.5 MAF RESERVOIR

Calculated by: RN
Reviewed by: MS
Date: January, 2021

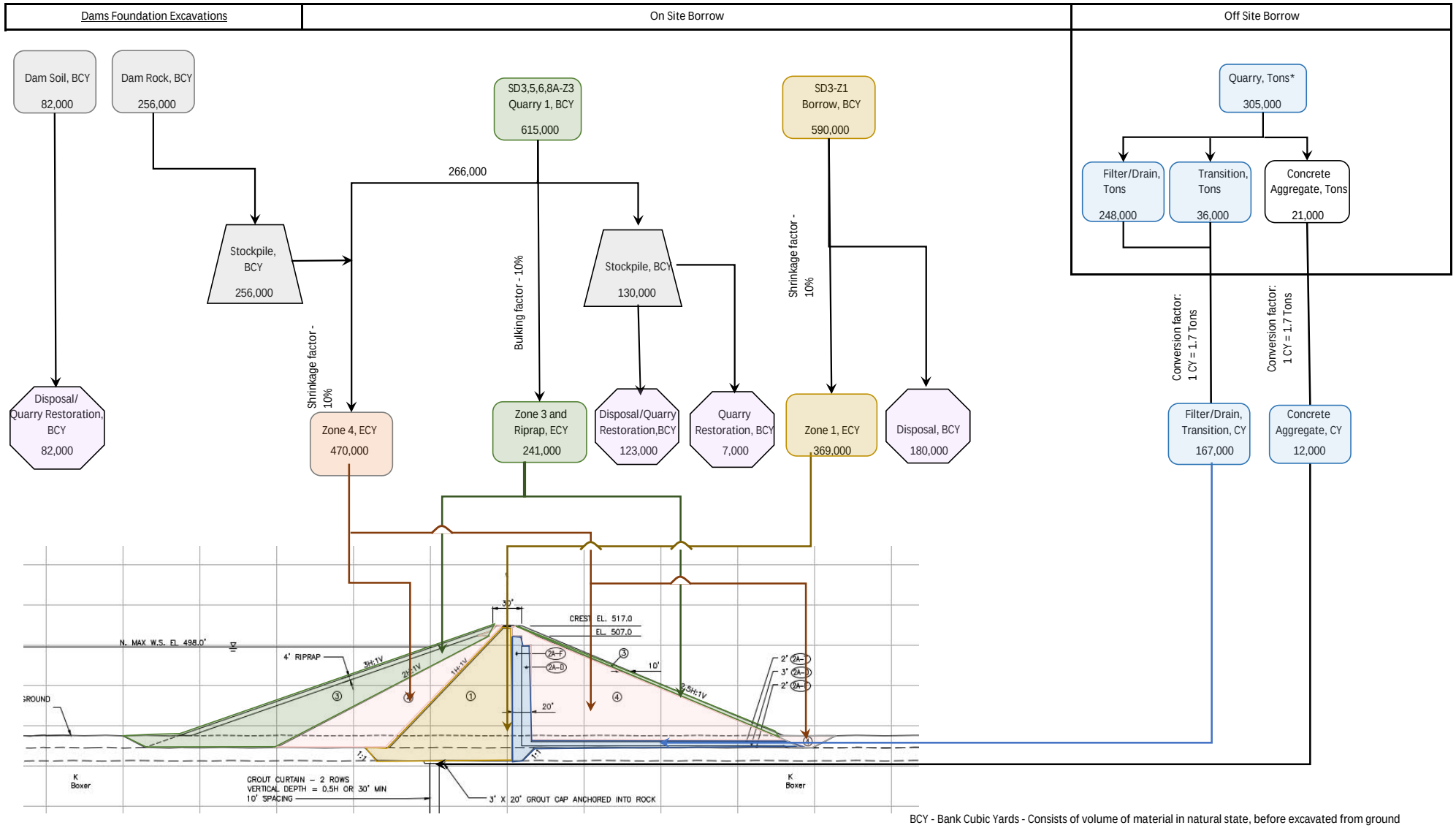


BCY - Bank Cubic Yards - Consists of volume of material in natural state, before excavated from ground
ECY - Embankment Cubic Yards - Consists of in-place embankment volume
Shrinkage/Bulking Factor - Changes in material volumes due to shrinkage/bulking.
* Includes 10% allowance for overbuild/waste.

MBD DIAGRAMS
SADDLE DAM 3 AND ERS-1 - 1.5 MAF RESERVOIR (ALTERNATIVE 1)
FIGURE 4

DRAFT - MATERIALS BALANCE
SADDLE DAM 5 AND ERS 2 - 1.5 MAF RESERVOIR

Calculated by: RN
Reviewed by: MS
Date: January, 2021

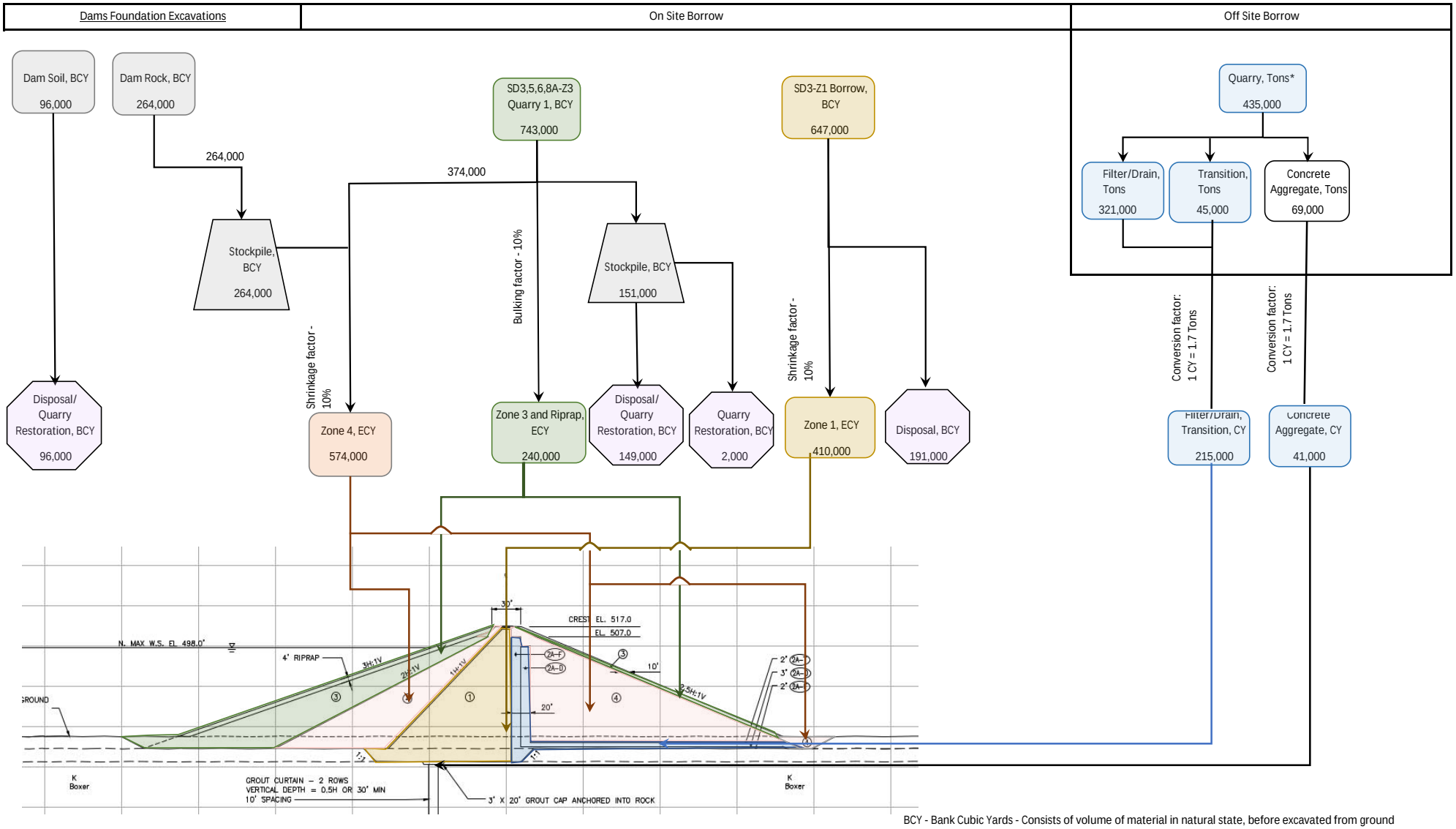


BCY - Bank Cubic Yards - Consists of volume of material in natural state, before excavated from ground
ECY - Embankment Cubic Yards - Consists of in-place embankment volume
Shrinkage/Bulking Factor - Changes in material volumes due to shrinkage/bulking.
* Includes 10% allowance for overbuild/waste.

MBD DIAGRAMS
SADDLE DAM 5 AND ERS 2 - 1.5 MAF RESERVOIR (ALTERNATIVE 1)
FIGURE 5

DRAFT - MATERIALS BALANCE
SADDLE DAM 6, 8A, 8B, SADDLE DIKE 1 AND 2 - 1.5 MAF RESERVOIR

Calculated by: RN
Reviewed by: MS
Date: January, 2021



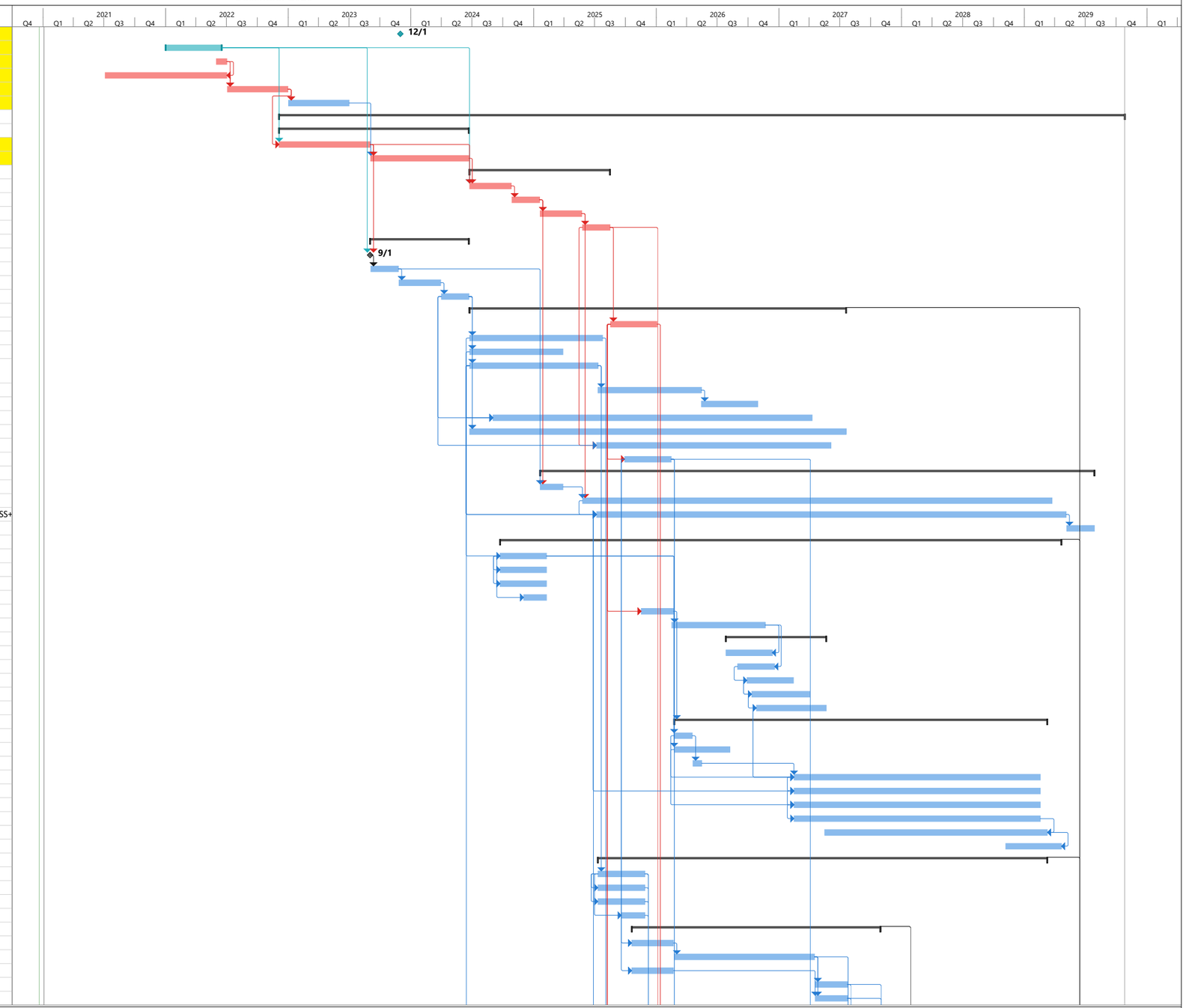
BCY - Bank Cubic Yards - Consists of volume of material in natural state, before excavated from ground
ECY - Embankment Cubic Yards - Consists of in-place embankment volume
Shrinkage/Bulking Factor - Changes in material volumes due to shrinkage/bulking.
* Includes 10% allowance for overbuild/waste.

MBD DIAGRAMS
SADDLE DAM 6, 8A, 8B, SADDLE DIKE 1 AND 2 - 1.5 MAF RESERVOIR (ALTERNATIVE 1)
FIGURE 6

Appendix B
Construction Schedule

Sites Reservoir
Preliminary Construction Schedule
HR Facilities Alt 1 - 1.5 MAF
Roadways, Dams, and I/O Facilities
December 2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		CWC Award of Funds	0 days	Fri 12/1/23	Fri 12/1/23	
2		Determine Engineering Procurement & Delivery Method	120 days	Sat 1/1/22	Thu 6/16/22	
3		Sites Board Approval/NTP for Phase 3	23 days	Wed 6/1/22	Fri 7/1/22	
4		Real Estate Access & Permitting (Geotech & Surveying)	260 days	Mon 7/5/21	Fri 7/1/22	3FF
5		Initial Geotech & Surveying	130 days	Mon 7/4/22	Fri 12/30/22	3,4
6		Final Geotech Investigation	130 days	Mon 1/2/23	Fri 6/30/23	5
7		**Reservoir Facilities**	**1800 days**	**Mon 12/5/22**	**Fri 10/26/29**	
8		**Engineering**	**405 days**	**Mon 12/5/22**	**Fri 6/21/24**	
9		Preliminary Engineering	195 days	Mon 12/5/22	Fri 9/1/23	2,5FS-20 days
10		Final Engineering	210 days	Mon 9/4/23	Fri 6/21/24	6,9
11		**Administrative and General - Dams and I-O**	**300 days**	**Mon 6/24/24**	**Fri 8/15/25**	
12		Bidding and Contract Award - Dams and I-O	90 days	Mon 6/24/24	Fri 10/25/24	2,9,10
13		Notice To Proceed - Dams and I-O	60 days	Mon 10/28/24	Fri 1/17/25	12
14		Early Submittals And Approvals - Dams and I-O	90 days	Mon 1/20/25	Fri 5/23/25	13
15		Mobilization - Dams and I-O	60 days	Mon 5/26/25	Fri 8/15/25	14
16		**Administrative and General - Roads**	**210 days**	**Fri 9/1/23**	**Fri 6/21/24**	
17		Contract Award - Roads - (D-B Contracts)	0 days	Fri 9/1/23	Fri 9/1/23	2,9
18		Notice To Proceed - Roads - Design (D-B Contracts)	60 days	Mon 9/4/23	Fri 11/24/23	17
19		Roads - Intitial Designs, Submittals, and Approvals	90 days	Mon 11/27/23	Fri 3/29/24	18
20		Mobilization - Roads	60 days	Mon 4/1/24	Fri 6/21/24	19
21		**Roads, Bridges, Access, and Site Development**	**801 days**	**Mon 6/24/24**	**Mon 7/19/27**	
22		Early Site Access and Staging Development	100 days	Mon 8/18/25	Fri 1/2/26	15
23		Northern Construction Access Roads (CR 68, CR 69, N. Rd)	284 days	Mon 6/24/24	Thu 7/24/25	20
24		County Roads F, D, McDermott, Delevan	200 days	Mon 6/24/24	Fri 3/28/25	20
25		Southern Construction Access Roads (Maxwell-Sites, Shoo-fly, A-1)	274 days	Mon 6/24/24	Thu 7/10/25	20
26		Ancillary Roads B1, B2, C1, C2, Comm N., Comm South	220 days	Fri 7/11/25	Thu 5/14/26	25
27		Stone Corral Recreation Road to Sites Dam	120 days	Fri 5/15/26	Thu 10/29/26	26
28		Sites Lodoga Road Realignment and Bridge	680 days	Mon 9/2/24	Fri 4/9/27	20SS+30 days,25SS+50 days
29		Huffmaster Road Realignment	801 days	Mon 6/24/24	Mon 7/19/27	20
30		Reservoir Footprint Mitigation Actions	500 days	Mon 7/7/25	Fri 6/4/27	15SS+30 days,20SS+30 days
31		Demolition and Clearing	100 days	Mon 9/29/25	Fri 2/13/26	22SS+30 days
32		**Process and Haul Filter Materials to Project**	**1180 days**	**Mon 1/20/25**	**Fri 7/27/29**	
33		Offsite Quarry Development	50 days	Mon 1/20/25	Fri 3/28/25	13,18
34		Process Filter Materials	1000 days	Mon 5/26/25	Fri 3/23/29	14,33
35		Filter Material Haul to Stockpile	1000 days	Mon 7/7/25	Fri 5/4/29	34SS+30 days,23SS+100 days,25SS+
36		Quarry Reclamation and Restoration	60 days	Mon 5/7/29	Fri 7/27/29	35
37		**Golden Gate Dam Construction**	**1195 days**	**Mon 9/23/24**	**Fri 4/20/29**	
38		Golden Gate Access and Staging	100 days	Mon 9/23/24	Fri 2/7/25	25SS+65 days
39		Erosion and Sediment Control	100 days	Mon 9/23/24	Fri 2/7/25	38SS
40		Clearing / Grubbing Topsoil Salvage from Work Areas	100 days	Mon 9/23/24	Fri 2/7/25	38SS
41		Demolition	50 days	Mon 12/2/24	Fri 2/7/25	38SS+50 days
42		GG Dam - Bypass Pipeline and U/S Cofferdam	70 days	Mon 11/17/25	Fri 2/20/26	22SS+65 days
43		GG Dam - Foundation Excavation (Some Dbl Shift)	200 days	Mon 2/16/26	Fri 11/20/26	31
44		**GG Dam - Foundation Preparation and Grouting**	**215 days**	**Mon 7/27/26**	**Fri 5/21/27**	
45		Foundation Cleaning	100 days	Mon 7/27/26	Fri 12/11/26	43FF+15 days
46		Dental Excavation and Concrete	80 days	Mon 8/31/26	Fri 12/18/26	43FF+20 days
47		Grout Cap	100 days	Mon 9/28/26	Fri 2/12/27	46SS+20 days
48		Consolidation Grouting	125 days	Mon 10/12/26	Fri 4/2/27	47SS+10 days
49		Curtain Grouting	150 days	Mon 10/26/26	Fri 5/21/27	48SS+10 days
50		**GG Dam - Embankment**	**795 days**	**Mon 2/23/26**	**Fri 3/9/29**	**42**
51		Initial Borrow Development (Core Material)	40 days	Mon 2/23/26	Fri 4/17/26	38
52		Initial Quarry Development for Zones 3 and 4	120 days	Mon 2/23/26	Fri 8/7/26	38
53		Borrow Overburden and Waste to Disposal Site	20 days	Mon 4/20/26	Fri 5/15/26	51
54		Place Zone 1 - Core	525 days	Mon 2/15/27	Fri 2/16/29	51SS+20 days,53,49SS+80 days
55		Place Zone 2A & 2B - Filters, Drains and Transitions	525 days	Mon 2/15/27	Fri 2/16/29	54SS,35SS+30 days
56		Place Zone 3 - Rockfill (Some Dbl Shift)	525 days	Mon 2/15/27	Fri 2/16/29	55SS,52SS+40 days
57		Place Zone 4 - Random (Some Dbl Shift)	525 days	Mon 2/15/27	Fri 2/16/29	56SS
58		Place Rip Rap	475 days	Mon 5/17/27	Fri 3/9/29	57FF+15 days
59		**Site Reclamation and Topsoil Replacement**	120 days	Mon 11/6/28	Fri 4/20/29	58FF+30 days
60		**Sites Dam Construction**	**956 days**	**Fri 7/11/25**	**Fri 3/9/29**	
61		Sites Dam Access and Staging	100 days	Fri 7/11/25	Thu 11/27/25	25
62		Erosion and Sediment Control	100 days	Fri 7/11/25	Thu 11/27/25	61SS
63		Clearing / Grubbing Topsoil Salvage from Work Areas	100 days	Fri 7/11/25	Thu 11/27/25	61SS
64		Demolition	50 days	Fri 9/19/25	Thu 11/27/25	61SS+50 days
65		**Sites Diversion Outlet Facility**	**530 days**	**Mon 10/20/25**	**Fri 10/29/27**	
66		Develop Downstream Portal	90 days	Mon 10/20/25	Fri 2/20/26	31SS+15 days
67		Tunnel Excavation and Lining - Double Shift	300 days	Mon 2/23/26	Fri 4/16/27	66
68		Develop Upstream Portal	90 days	Mon 10/20/25	Fri 2/20/26	31SS+15 days
69		Outlet Structure Concrete	70 days	Mon 4/19/27	Fri 7/23/27	67
70		Inlet Structure Concrete	70 days	Mon 4/19/27	Fri 7/23/27	67,68

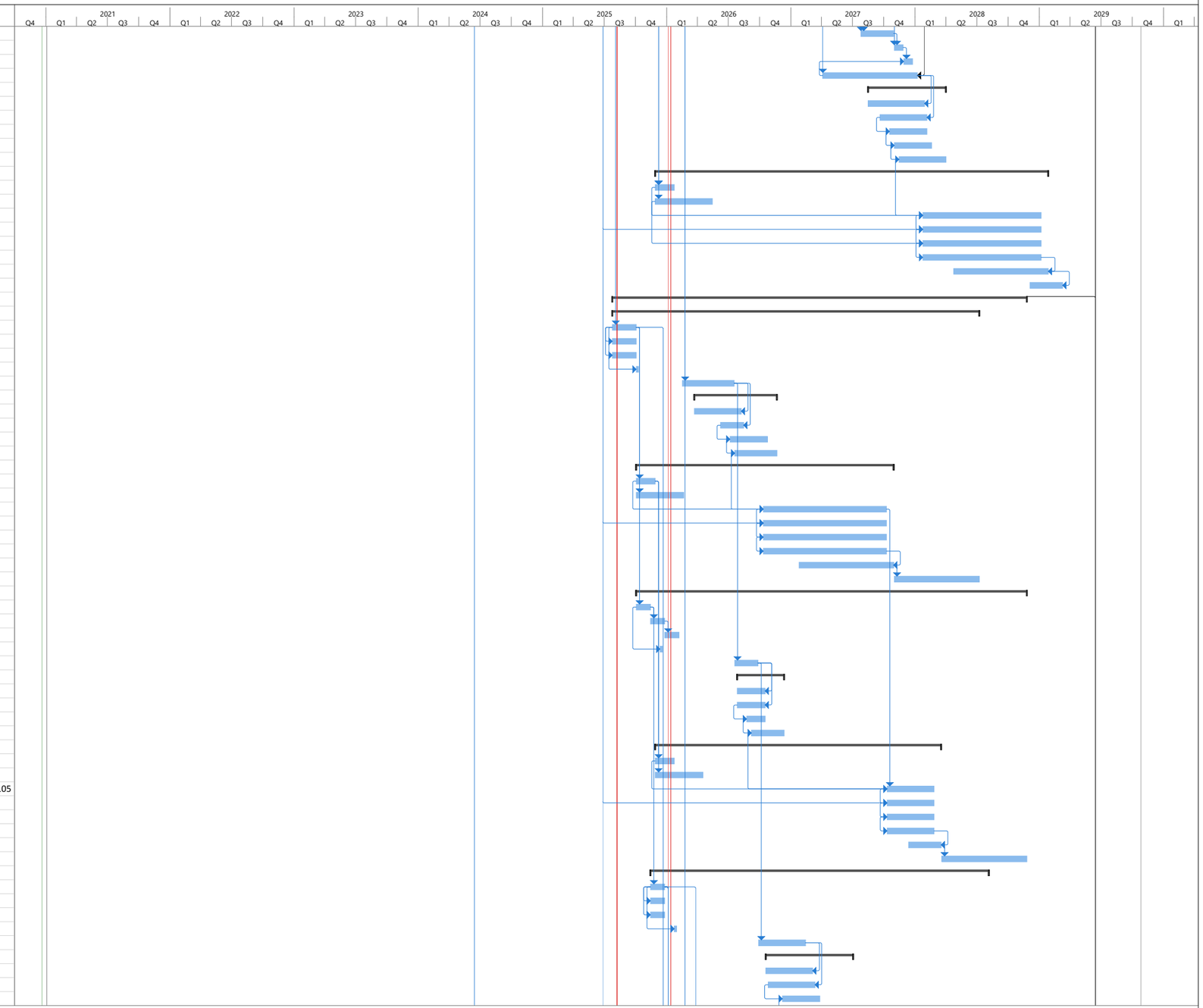


Project: Sites Reservoir
Date: Mon 12/21/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Critical | Critical Split | Progress | Manual Progress

Sites Reservoir
Preliminary Construction Schedule
HR Facilities Alt 1 - 1.5 MAF
Roadways, Dams, and I/O Facilities
December 2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
71		Mechanical	70 days	Mon 7/26/27	Fri 10/29/27	67,69,70
72		**Sites Diversion Completion and Restoration**	20 days	Mon 11/1/27	Fri 11/26/27	69,70,71
73		**Construct Cofferdam to El. 310**	20 days	Mon 11/29/27	Fri 12/24/27	74SS+30 days,72
74		**Sites Dam - Foundation Excavation**	200 days	Mon 4/5/27	Fri 1/7/28	31,65FF+50 days
75		**Sites Dam - Foundation Preparation and Grouting**	**165 days**	**Mon 8/16/27**	**Fri 3/31/28**	
76		Foundation Cleaning	120 days	Mon 8/16/27	Fri 1/28/28	74FF+15 days
77		Dental Excavation and Concrete	100 days	Mon 9/20/27	Fri 2/4/28	74FF+20 days
78		Grout Cap	80 days	Mon 10/18/27	Fri 2/4/28	77SS+20 days
79		Consolidation Grouting	80 days	Mon 11/1/27	Fri 2/18/28	78SS+10 days
80		Curtain Grouting	100 days	Mon 11/15/27	Fri 3/31/28	79SS+10 days
81		**Sites Dam - Embankment**	**826 days**	**Fri 11/28/25**	**Fri 1/26/29**	
82		Initial Borrow Development (Core Material)	40 days	Fri 11/28/25	Thu 1/22/26	61,62,63,64
83		Initial Quarry Development for Zones 3 and 4	120 days	Fri 11/28/25	Thu 5/14/26	61
84		Place Zone 1 - Core	250 days	Mon 1/24/28	Fri 1/5/29	82SS+20 days,80SS+50 days
85		Place Zone 2A & 2B - Filters, Drains and Transitions	250 days	Mon 1/24/28	Fri 1/5/29	84SS,35SS+30 days
86		Place Zone 3 - Rockfill (Some Dbl Shift)	250 days	Mon 1/24/28	Fri 1/5/29	85SS,83SS+40 days
87		Place Zone 4 - Random (Some Dbl Shift)	250 days	Mon 1/24/28	Fri 1/5/29	86SS
88		Place Rip Rap	200 days	Mon 4/24/28	Fri 1/26/29	87FF+15 days
89		**Site Reclamation and Topsoil Replacement**	70 days	Mon 12/4/28	Fri 3/9/29	88FF+30 days
90		**Saddle Dams**	**871 days**	**Fri 7/25/25**	**Fri 11/24/28**	
91		**Saddle Dam 3**	**771 days**	**Fri 7/25/25**	**Fri 7/7/28**	
92		Saddle Dam 3 - Access and Staging	50 days	Fri 7/25/25	Thu 10/2/25	23
93		Erosion and Sediment Control	50 days	Fri 7/25/25	Thu 10/2/25	92SS
94		Clearing / Grubbing Topsoil Salvage from Work Areas	50 days	Fri 7/25/25	Thu 10/2/25	92SS
95		Demolition	5 days	Fri 10/3/25	Thu 10/9/25	92SS+50 days
96		Saddle Dam 3 - Foundation Excavation (Dbl Shift)	110 days	Mon 2/16/26	Fri 7/17/26	31
97		**Saddle Dam 3 - Foundation Preparation and Grouting**	**175 days**	**Mon 3/23/26**	**Fri 11/20/26**	
98		Foundation Cleaning	100 days	Mon 3/23/26	Fri 8/7/26	96FF+15 days
99		Dental Excavation and Concrete	50 days	Mon 6/8/26	Fri 8/14/26	96FF+20 days
100		Grout Cap	80 days	Mon 7/6/26	Fri 10/23/26	99SS+20 days
101		Curtain Grouting	90 days	Mon 7/20/26	Fri 11/20/26	100SS+10 days
102		**Saddle Dam 3 - Embankment**	**541 days**	**Fri 10/3/25**	**Fri 10/29/27**	
103		Initial Borrow Development (Core Material)	40 days	Fri 10/3/25	Thu 11/27/25	92
104		Initial Quarry Development for Zones 3 and 4	100 days	Fri 10/3/25	Thu 2/19/26	92
105		Place Zone 1 - Core	260 days	Mon 10/12/26	Fri 10/8/27	103SS+20 days,101SS+60 days
106		Place Zone 2A & 2B - Filters, Drains and Transitions	260 days	Mon 10/12/26	Fri 10/8/27	105SS,35SS+30 days
107		Place Zone 3 - Rockfill	260 days	Mon 10/12/26	Fri 10/8/27	106SS
108		Place Zone 4 - Random	260 days	Mon 10/12/26	Fri 10/8/27	107SS
109		Place Rip Rap	200 days	Mon 1/25/27	Fri 10/29/27	108FF+15 days
110		**Site Reclamation and Topsoil Replacement**	180 days	Mon 11/1/27	Fri 7/7/28	109
111		**Saddle Dam 5**	**821 days**	**Fri 10/3/25**	**Fri 11/24/28**	
112		Saddle Dam 5 - Access and Staging	30 days	Fri 10/3/25	Thu 11/13/25	92
113		Erosion and Sediment Control	30 days	Fri 11/14/25	Thu 12/25/25	112
114		Clearing / Grubbing Topsoil Salvage from Work Areas	30 days	Fri 12/26/25	Thu 2/5/26	113
115		Demolition	5 days	Fri 12/12/25	Thu 12/18/25	112SS+50 days
116		Saddle Dam 5 - Foundation Excavation	50 days	Mon 7/20/26	Fri 9/25/26	96
117		**Saddle Dam 5 - Foundation Preparation and Grouting**	**100 days**	**Mon 7/27/26**	**Fri 12/11/26**	
118		Foundation Cleaning	60 days	Mon 7/27/26	Fri 10/16/26	116FF+15 days
119		Dental Excavation and Concrete	60 days	Mon 7/27/26	Fri 10/16/26	116FF+15 days
120		Grout Cap	40 days	Mon 8/24/26	Fri 10/16/26	119SS+20 days
121		Curtain Grouting	70 days	Mon 9/7/26	Fri 12/11/26	120SS+10 days
122		**Saddle Dam 5 - Embankment**	**601 days**	**Fri 11/28/25**	**Fri 3/17/28**	
123		Initial Borrow Development (Core Material)	40 days	Fri 11/28/25	Thu 1/22/26	103
124		Initial Quarry Development for Zones 3 and 4	100 days	Fri 11/28/25	Thu 4/16/26	103
125		Place Zone 1 - Core	100 days	Mon 10/11/27	Fri 2/25/28	121SS+60 days,123SS+20 days,105
126		Place Zone 2A & 2B - Filters, Drains and Transitions	100 days	Mon 10/11/27	Fri 2/25/28	125SS,35SS+30 days
127		Place Zone 3 - Rockfill	100 days	Mon 10/11/27	Fri 2/25/28	126SS
128		Place Zone 4 - Random	100 days	Mon 10/11/27	Fri 2/25/28	127SS
129		Place Rip Rap	70 days	Mon 12/13/27	Fri 3/17/28	128FF+15 days
130		**Site Reclamation and Topsoil Replacement**	180 days	Mon 3/20/28	Fri 11/24/28	129
131		**Minor Saddle Dams (SD1,SD2,SD6,SD8A, Dike 1, and Dike 2**	**711 days**	**Fri 11/14/25**	**Fri 8/4/28**	
132		Minor Saddle Dams - Access and Staging	30 days	Fri 11/14/25	Thu 12/25/25	112
133		Erosion and Sediment Control	30 days	Fri 11/14/25	Thu 12/25/25	132SS
134		Clearing / Grubbing Topsoil Salvage from Work Areas	30 days	Fri 11/14/25	Thu 12/25/25	132SS
135		Demolition	5 days	Fri 1/23/26	Thu 1/29/26	132SS+50 days
136		Minor Saddle Dams - Foundation Excavation	100 days	Mon 9/28/26	Fri 2/12/27	116
137		**Minor Saddle Dams - Foundation Preparation and Grout**	**185 days**	**Mon 10/19/26**	**Fri 7/2/27**	
138		Foundation Cleaning	100 days	Mon 10/19/26	Fri 3/5/27	136FF+15 days
139		Dental Excavation and Concrete	100 days	Mon 10/26/26	Fri 3/12/27	136FF+20 days
140		Grout Cap	80 days	Mon 12/7/26	Fri 3/26/27	139SS+30 days

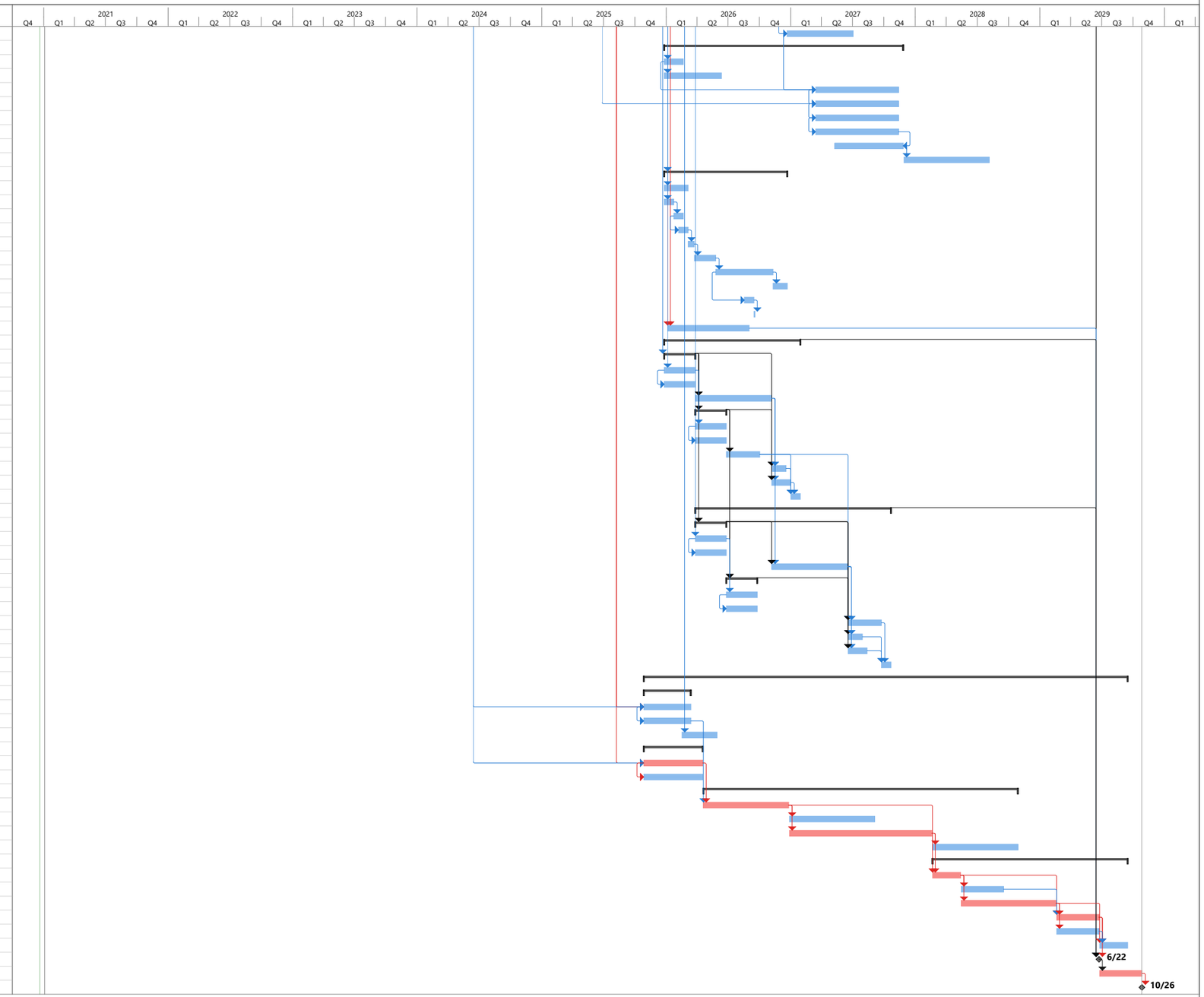


Project: Sites Reservoir
Date: Mon 12/21/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Critical | Critical Split | Progress | Manual Progress

Sites Reservoir
Preliminary Construction Schedule
HR Facilities Alt 1 - 1.5 MAF
Roadways, Dams, and I/O Facilities
December 2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
141		Curtain Grouting	140 days	Mon 12/21/26	Fri 7/2/27	140SS+10 days
142		**Minor Saddle Dams - Embankment**	**501 days**	**Fri 12/26/25**	**Fri 11/26/27**	
143		Initial Borrow Development (Core Material)	40 days	Fri 12/26/25	Thu 2/19/26	132
144		Initial Quarry Development for Zones 3 and 4	120 days	Fri 12/26/25	Thu 6/11/26	132
145		Place Zone 1 - Core	175 days	Mon 3/15/27	Fri 11/12/27	141SS+60 days,143SS+20 days
146		Place Zone 2A & 2B - Filters, Drains and Transitions	175 days	Mon 3/15/27	Fri 11/12/27	145SS,35SS+30 days
147		Place Zone 3 - Rockfill	175 days	Mon 3/15/27	Fri 11/12/27	146SS
148		Place Zone 4 - Random	175 days	Mon 3/15/27	Fri 11/12/27	147SS
149		Place Rip Rap	145 days	Mon 5/10/27	Fri 11/26/27	148FF+10 days
150		**Site Reclamation and Topsoil Replacement**	180 days	Mon 11/29/27	Fri 8/4/28	149
151		**Saddle Dam 8B - Spillway**	**257 days**	**Fri 12/26/25**	**Mon 12/21/26**	**132**
152		Batch Plant Setup and Operational	50 days	Fri 12/26/25	Thu 3/5/26	132
153		SD 8B - Foundation Excavation	20 days	Fri 12/26/25	Thu 1/22/26	132
154		SD 8B - Foundation Cleaning	20 days	Fri 1/23/26	Thu 2/19/26	153
155		SD 8B - Dental Excavation and Concrete	20 days	Fri 2/6/26	Thu 3/5/26	154SS+10 days
156		SD 8B - Grout Cap	12 days	Fri 3/6/26	Mon 3/23/26	155
157		SD 8B - Foundation Grouting	45 days	Tue 3/24/26	Mon 5/25/26	156
158		SD 8B - Mass Concrete	120 days	Tue 5/26/26	Mon 11/9/26	157
159		SD 8B - Bridge	30 days	Tue 11/10/26	Mon 12/21/26	158
160		SD 8B - Clay Backfill	20 days	Tue 8/18/26	Mon 9/14/26	158SS+60 days
161		SD 8B - Riprap and Drain Gravel	3 days	Tue 9/15/26	Thu 9/17/26	160
162		**Rim Grouting**	171 days	Mon 1/5/26	Mon 8/31/26	15,22
163		**Emergency Release Structure No. 1**	**285 days**	**Fri 12/26/25**	**Thu 1/28/27**	
164		**Develop Downstream Portal**	**65 days**	**Fri 12/26/25**	**Thu 3/26/26**	**92**
165		Portal Excavation	65 days	Fri 12/26/25	Thu 3/26/26	132
166		Rock Bolting	65 days	Fri 12/26/25	Thu 3/26/26	165SS
167		Tunnel Excavation and Lining (Dbl Shift)	160 days	Fri 3/27/26	Thu 11/5/26	164
168		**Develop Upstream Portal**	**65 days**	**Fri 3/27/26**	**Thu 6/25/26**	**164**
169		Portal Excavation	65 days	Fri 3/27/26	Thu 6/25/26	165
170		Rock Bolting	65 days	Fri 3/27/26	Thu 6/25/26	169SS
171		Outlet Structure Concrete	70 days	Fri 6/26/26	Thu 10/1/26	168
172		Install 10-Ft Cut and Cover Pipe	30 days	Fri 11/6/26	Thu 12/17/26	164,167
173		Inlet Structure Concrete	40 days	Fri 11/6/26	Thu 12/31/26	167,168
174		ERS - 1 Completion and Restoration	20 days	Fri 1/1/27	Thu 1/28/27	171,172,173
175		**Emergency Release Structure No. 2**	**410 days**	**Fri 3/27/26**	**Thu 10/21/27**	
176		**Develop Downstream Portal**	**65 days**	**Fri 3/27/26**	**Thu 6/25/26**	**164**
177		Portal Excavation	65 days	Fri 3/27/26	Thu 6/25/26	132
178		Rock Bolting	65 days	Fri 3/27/26	Thu 6/25/26	177SS
179		Tunnel Excavation and Lining (Dbl Shift)	160 days	Fri 11/6/26	Thu 6/17/27	176,167
180		**Develop Upstream Portal**	**65 days**	**Fri 6/26/26**	**Thu 9/24/26**	**176,168**
181		Portal Excavation	65 days	Fri 6/26/26	Thu 9/24/26	177
182		Rock Bolting	65 days	Fri 6/26/26	Thu 9/24/26	181SS
183		Outlet Structure Concrete	70 days	Fri 6/18/27	Thu 9/23/27	171,176,179
184		Install 10-Ft Cut and Cover Pipe	30 days	Fri 6/18/27	Thu 7/29/27	176,179
185		Inlet Structure Concrete	40 days	Fri 6/18/27	Thu 8/12/27	179,180
186		ERS - 2 Completion and Restoration	20 days	Fri 9/24/27	Thu 10/21/27	183,184,185
187		**Inlet Outlet Facilities**	**1015 days**	**Mon 10/27/25**	**Fri 9/14/29**	
188		**Develop Downstream Portal**	**100 days**	**Mon 10/27/25**	**Fri 3/13/26**	
189		Portal Excavation	100 days	Mon 10/27/25	Fri 3/13/26	22SS+50 days,25SS+50 days
190		Rock Bolting	100 days	Mon 10/27/25	Fri 3/13/26	189SS
191		**Intake Channel Excavation**	75 days	Mon 2/16/26	Fri 5/29/26	31
192		**Develop Upstream Portal**	**125 days**	**Mon 10/27/25**	**Fri 4/17/26**	
193		Portal Excavation	125 days	Mon 10/27/25	Fri 4/17/26	22SS+50 days,25SS+50 days
194		Rock Bolting	125 days	Mon 10/27/25	Fri 4/17/26	193SS
195		**Tunnels Excavation and Lining (Double Shift)**	**660 days**	**Mon 4/20/26**	**Fri 10/27/28**	
196		North Tunnel Excavation - Two Headings, Double Shift	180 days	Mon 4/20/26	Fri 12/25/26	190,193
197		North Tunnel Lining	180 days	Mon 12/28/26	Fri 9/3/27	196
198		South Tunnel Excvation - Double Shift	300 days	Mon 12/28/26	Fri 2/18/28	196
199		South Tunnel Lining	180 days	Mon 2/21/28	Fri 10/27/28	198
200		**Intake and Outlet Structures**	**410 days**	**Mon 2/21/28**	**Fri 9/14/29**	
201		Intake Structure Foundation	60 days	Mon 2/21/28	Fri 5/12/28	196,198
202		Tunnel Bifurcation	90 days	Mon 5/15/28	Fri 9/15/28	201
203		Intake Structure Concrete	200 days	Mon 5/15/28	Fri 2/16/29	201
204		Intake Structure Gates and Mechanical	90 days	Mon 2/19/29	Fri 6/22/29	203,202,201
205		Tower Access Bridge	90 days	Mon 2/19/29	Fri 6/22/29	203
206		I/O Completion and Restoration	60 days	Mon 6/25/29	Fri 9/14/29	203,204,205
207		**Dams and I/O Ready for Commissioning**	0 days	Fri 6/22/29	Fri 6/22/29	21,90,37,60,162,163,175,204
208		Dams and I/O Startup and Commissioning	90 days	Mon 6/25/29	Fri 10/26/29	207
209		Dams and I/O Substantial Completion	0 days	Fri 10/26/29	Fri 10/26/29	208



Project: Sites Reservoir
Date: Mon 12/21/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Critical | Critical Split | Progress | Manual Progress

Appendix C
Equipment and Workforce Use Tables

Sites Reservoir
Constructability Analysis Technical Memorandum
Alt 1 - 1.5 MAF Dams, Roadways, and I-O Facilities
Equipment Use Tables for Air Quality Analysis
December, 2020

Notes:

- The AQ Tables are intended to inform the project team regarding expected equipment type, hours and horsepower, as well as expected manpower.
- At this point in the project, the design is at feasibility level. Further design development will determine final quantities and other factors will influence the final equipment use.
- Various contractors will approach the work differently from each other, and likely different from our interpretation of equipment use and staffing.
- The AQ Tables are an approximation of the equipment, crews, and production needed to complete the project. This is somewhat dictated by a lack of design details, although some details and quantities have been extrapolated based on best industry practices and expectations.
- Site geologic study and interpretation is incomplete. Future geotechnical work will effect final design and quantities.
- Procurement strategies and outcomes, including contract packages, will have some impact on the use and timing of equipment and crews.
- The AQ tables have been grouped with similar work in one "Package". The Roadways Package under the "General and Indirects" heading would include the General and Indirect costs for all of the Roadways.
- Similarly, in the AQ Tables, data is grouped for multiple features (i.e. Saddle Dams 1, 2, 6, 8A, and 8B). This is the combined total for Saddle Dams 1, 2, 6, 8A, and 8B in Alternative 1.
- Travel Speeds for Vehicles - The average speed for pickup trucks and supervisory vehicles would be about 20 mph, but will vary with individual duties and activities.
- Travel Speeds for off-site Hauling Vehicles - For off-site haul vehicles (Such as those making deliveries to the job) an average of 40 mph was used from their point on origination to the delivery site and return to point of origin.
- Travel Speeds for on-site Hauling Vehicles - We utilize average speeds for hauling calculations. For on-site haul vehicles, such as those used to haul excavated or processed material, we use an average of 15 mph.
- Travel Speeds for Support equipment, such as water trucks and graders, would be about 15 mph. Operational speeds while performing work would be about 3 - 5 mph.
- No off-road, mobile, electric powered equipment is anticipated at this time.
- Electric power generation is included in the AQ Tables as applicable for the various aggregate processing and batch plant needs. It is possible that some of this equipment would use direct line power, if such line power is available to the site on time and is economical.
- Power supply for such facilities as offices, QC labs, and shop facilities will be included in the Final AQ Tables as diesel generated power. Line power or diesel generated power will not be duplicated in the data.
- It is anticipated that approximately half of the pickup trucks will be gasoline powered, the other half would be diesel powered. All other equipment would be diesel powered.
- Within the Sites Reservoir Inundation Area there are approximately 240 houses, 295 barns, and 450 other structures (combination of sheds, silos, and a pump houses) that would be demolished once all property owner negotiations are completed. This information is provided under the Demolition heading in Appendix 2C for Alternative 1. It will be the same for Alternative 2. Limited information is available, as these facilities are on private property and not currently accessible.
- The average workforce and staffing have been evaluated. Workforce and staff will vary during the course of the work as work activities ramp up, peak, and taper off toward completion.
- Regarding staff and workforce commute, it is anticipated that much of the workforce will come from the surrounding area, including the greater Sacramento area. The average daily commute is expected to be approximately 70 miles each way, or about 1.5 hours each way.
- Start and End dates are reflective of the Preliminary Construction Schedule produced as a separate document. The manpower and equipment presented here demonstrates the overall level of effort to complete each task within that time frame. Schedule allowances have been made for ramp-up and resource leveling during that time frame, including allowances for double-shift work as well as multiple crews as needed to maintain the construction schedule.
- For on-site batched concrete, HP-HRS and Manhours have been calculated on a cubic yard basis, using a 50 CY / hour capacity batch plant, operating at 40 % utilization. Component values for the concrete, such as aggregate and cement, have been added to values for batching. The total values for HP-HRs and Manhours are included in activities requiring batched concrete.
- Columns and Rows in this spreadsheet can be expanded and contracted by clicking on the "+" (Expand) and "-" (Contract) signs at the spreadsheet margins. The spreadhsheet is 4000 lines of detail and these functions will facilitate the user's navigation.

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

Abbreviations	Description
WBS	Work Breakdown Structure
MO	Calendar Month
HR	Work Hour
Day	Work Day of 10 Hours
Week	Work Week of 5 - 10 hour shifts
Shift	A Single Shift of 10 work hours
LS	Lump Sum
CY	Cubic Yard - typically references concrete
BCY	Bank Cubic Yard - references excavation quantities
ECY	Embanked Cubic Yard - references embankment or fill quantities
SY	Square Yard
AC	Acre
LF or FT	Linear Foot
AF or AC-FT	Acre - Foot
Ton or TN	US Ton
HP	Horse Power
HP-HR	1 Horsepower X 1 Hour
KW	Kilowatt
LBS	Pounds

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
Project Site Staffing and Support Facilities										
	Daily Staff and Work Force Personnel Trips									**Average**
	Owners and Engineers Contract Management Staff					4/1/2024	11/23/2029			**88**
	Golden Gate and Sites Reservoir Package					5/26/2025	4/20/2029			**230**
	Saddle Dams Package					5/26/2025	11/24/2028			**188**
	Inlet Outlet Facilities Package					5/26/2025	9/14/2029			**139**
	Roadways Package					4/1/2024	7/19/2027			**202**
	Owners and Engineers Contract Management Staff									
	Owner and Engineer's Project Management Staff		VARIABLE		1,200			61,130,000	372,000	**31**
	Management Night Shift Staff							12,320,000	72,000	**9**
	Owner's Quality Control-Quality Assurance Program		VARIABLE		1,200			71,980,000	408,000	**34**
	QC Night Shift Staff							18,480,000	112,000	**14**
	Golden Gate and Sites Dams Package General and Management Staff					5/26/2025	4/20/2029			
	Demolition	1	LS	300	33			972,833	4,333	**13**
	Erosion and Sediment Control	1	LS	250	28			378,472	3,889	**14**
	Clearing and Grubbing	80	ACRE	180	20			693,700	1,600	**8**
	Setup Water Supply for Dust Control and Compaction	1	LS	300	33			622,833	4,000	**12**
	Reservoir Clearing	1,050	ACRE	2100	233			4,287,500	28,000	**12**
	Mobilization	1	LS	500	56			1,636,667	9,444	**17**
	Project Management Staff		VARIABLE		800			44,677,500	235,000	**33**
	Management Night Shift Staff							5,775,000	36,000	**6**
	Contractor Quality Control Program		VARIABLE		800			18,816,000	104,000	**13**
	QC Night Shift Staff							4,620,000	30,000	**5**
	Contractor's Safety Program		VARIABLE		800			15,400,000	96,000	**12**
	Safety Night Shift Staff							1,155,000	12,000	**4**
	Contractor's Environmental Program		VARIABLE		800			6,160,000	42,400	**5**
	Contractor's Shop and Yard Support Facilities		VARIABLE		800			11,700,000	32,000	**4**
	Construction Surveying		VARIABLE		700			10,780,000	56,000	**8**
	Saddle Dams Package General and Management Staff					5/26/2025	11/24/2028			
	Demolition	1	LS		11			324,278	1,444	**13**
	Erosion and Sediment Control	1	LS	350	39			529,861	5,444	**14**
	Clearing and Grubbing	154	ACRE	3	57			1,978,330	4,563	**8**
	Setup Water Supply for Dust Control and Compaction	1	LS		44			830,444	5,333	**12**
	Reservoir Clearing	-	ACRE	5	-			-	-	
	Mobilization	1	LS		56			2,081,111	10,556	**19**
	Project Management Staff		VARIABLE		700			31,365,000	166,000	**27**
	Management Night Shift Staff							2,887,500	20,000	**4**
	Contractor Quality Control Program		VARIABLE		700			12,388,000	70,000	**10**
	QC Night Shift Staff							7,700,000	45,000	**9**
	Contractor's Safety Program		VARIABLE		700			7,700,000	47,000	**7**
	Safety Night Shift Staff							2,887,500	20,000	**4**
	Contractor's Environmental Program		VARIABLE		700			5,390,000	37,100	**5**
	Contractor's Shop and Yard Support Facilities		VARIABLE		700			7,542,500	21,000	**3**
	Construction Surveying		VARIABLE		600			9,240,000	48,000	**8**

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
	Inlet - Outlet Facilities Package General and Management Staff					5/26/2025	9/14/2029			
	Demolition	1	LS	20	2			31,789	156	**7**
	Erosion and Sediment Control	1	LS	80	9			121,111	1,244	**14**
	Clearing and Grubbing	22	ACRE	3	8			282,619	652	**8**
	Setup Water Supply for Dust Control and Compaction	1	LS	250	28			519,028	3,333	**12**
	Reservoir Clearing	-	ACRE	5	-			-	-	
	Mobilization	1	LS	300	33			1,248,667	6,333	**19**
	Project Management Staff		VARIABLE		800			29,632,500	153,000	**22**
	Management Night Shift Staff							8,085,000	54,000	**9**
	Contractor Quality Control Program		VARIABLE		800			9,308,000	48,000	**6**
	QC Night Shift Staff							3,465,000	24,000	**4**
	Contractor's Safety Program		VARIABLE		800			4,620,000	32,000	**6**
	SafetyNight Shift Staff							1,155,000	12,000	**4**
	Contractor's Environmental Program		VARIABLE		800			4,620,000	26,400	**3**
	Contractor's Shop and Yard Support Facilities		VARIABLE		800			8,620,000	24,000	**3**
	Construction Surveying		VARIABLE		800			10,780,000	56,000	**7**
	Roadways Package General and Management Staff					4/1/2024	7/19/2027			
	Demolition	1	LS	100	11			324,278	1,444	**13**
	Erosion and Sediment Control	1	LS	600	67			908,333	9,333	**14**
	Clearing and Grubbing	461	ACRE	770	86			6,073,161	13,689	**16**
	Setup Water Supply for Dust Control and Compaction	1	LS	400	44			830,444	5,333	**12**
	Reservoir Clearing	-	ACRE	5	-			-	-	
	Mobilization	1	LS	400	44			1,664,889	8,444	**19**
	Project Management Staff		VARIABLE		800			46,320,000	264,000	**33**
	Management Night Shift Staff							-	-	**0**
	Contractor Quality Control Program		VARIABLE		800			13,392,000	80,000	**10**
	QC Night Shift Staff							-	-	**0**
	Contractor's Safety Program		VARIABLE		800			9,240,000	64,000	**10**
	Safety Night Shift Staff							-	-	**0**
	Contractor's Environmental Program		VARIABLE		800			9,240,000	60,800	**7**
	Contractor's Shop and Yard Support Facilities		VARIABLE		800			12,500,000	40,000	**5**
	Construction Surveying		VARIABLE		800			16,940,000	88,000	**11**

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
	Dams										
	WBS Item	**Description**	**Quantity**	**Measure**	**Production Hours**	**Production Shifts**	**Start Date**	**End Date**	**Total HP-HRS**	**Total Manhours**	**Personnel**
	Golden Gate Dam										
Golden Gate Da											
	20.03-1	**Process and Haul Filter Materials to Project**									
	20.03-1.01	**Golden Gate**	**2,560,800**	**Tons**							
	20.03-1.01.01	Process and Stockpile on Project - Zone 2A - Filter	726,000	Tons	2678	298	5/26/2025	5/4/2029	149,639,796	335,895	**32**
	20.03-1.01.02	Process and Stockpile on Project - Zone 2A - Drain	803,000	Tons	2962	329	5/26/2025	5/4/2029			
	20.03-1.01.03	Process and Stockpile on Project - Zone 2A - Transition	107,800	Tons	398	44	5/26/2025	5/4/2029			
	20.03-1.01.04	Process and Stockpile on Project - Zone 2B - Filter	451,000	Tons	1664	185	5/26/2025	5/4/2029			
	20.03-1.01.05	Process and Stockpile on Project - Zone 2B - Transition	473,000	Tons	1745	194	5/26/2025	5/4/2029			
	21.01-2	**Foundation Preparation and Grouting**									
	21.01-2.01	**Foundation Excavation**									
	21.01-2.01.01	Topsoil Salvage	125,000	BCY	207	23	9/23/2024	2/7/2025	1,629,250	3,219	**14**
	21.01-2.01.02	Dam Foundation Excavation - Common	325,000	BCY	537	60	2/16/2026	11/20/2026	4,236,046	8,358	**14**
	21.01-2.01.03	Dam Foundation Rock Exc - Rippable Rock	991,000	BCY	1638	182	2/16/2026	11/20/2026	13,484,522	27,311	**15**
	21.01-2.01.04	Dam Foundation Rock Ex - Drill and Shoot	159,000	BCY	398	44	2/16/2026	11/20/2026	4,095,159	10,566	**24**
	21.01-2.02	**Foundation Preparation and Grouting**	217,000	SY							
		(Includes Initial and Final Cleaning under Core and Cleaning under Shell)									
	21.01-2.02.01	Foundation Preparation - Beneath Core	65,000	SY	650	72	7/27/2026	12/11/2026			
	21.01-2.02.01.a	Initial Foundation Cleaning - Core	65,000	SY	650	72	7/27/2026	12/11/2026	671,668	6,503	**9**
	21.01-2.02.01.b	Final Foundation Cleaning - Core	65,000	SY	650	72	7/27/2026	12/11/2026	671,668	6,503	**9**
	21.01-2.02.01.c	Dental Excavation	3,700	BCY	361	40	7/27/2026	12/18/2026	453,113	2,814	**7**
	21.01-2.02.01.d	Dental Concrete	3,700	CY	336	37	7/27/2026	12/18/2026	1,004,719	4,830	**13**
	21.01-2.02.01.e	Grout Cap with Anchors	9,900	CY	450	50	9/28/2026	2/12/2027	2,484,550	14,920	**30**
	21.01-2.02.01.f	Curtain Grouting	96,100	LF	1602	178	10/26/2026	5/21/2027	6,746,200	30,260	**17**
	21.01-2.02.01.g	Consolidation Grouting	40,000	LF	1000	111	10/12/2026	4/2/2027	3,008,334	13,337	**12**
	21.01-2.02.01.h	Type III Cement	4,800	Tons	2602	289	11/30/2026	7/9/2027	1,402,190	14,458	**5**
	21.01-2.02.02	Foundation Preparation - Beneath Shell	152,000	SY	190	21	10/12/2026	5/21/2027	314,769	1,272	**6**
	21.01-2.02.03	Foundation Drainage									
	21.01-2.02.03.a	Furnish and Install Foundation Drain Pipe	500	LF	30	3	7/27/2026	12/11/2026	20,017	168	**5**
	21.01-2.02.03.b	Furnish and Install Foundation Drain Manholes	3	EA	30	3	7/27/2026	12/11/2026	20,017	168	**5**
	21.01-2.02.03.c	Seepage Partition Walls	700	CY	350	39	7/27/2026	12/11/2026	463,985	3,783	**10**
	21.01-3	**Embankment**									
	21.01-3.01	**Develop Borrow Areas**	1	LS							
	21.01-3.01.01	Z1 Strip/Overburden/Waste to Stockpile	1,150,000	BCY	1045	116	2/23/2026	4/17/2026	6,477,755	9,295	**8**
	21.01-3.01.02	Z3 Strip/Overburden/Waste to Stockpile-Q1	499,000	BCY	907	101	2/23/2026	8/7/2026	4,223,358	11,096	**11**
	21.01-3.01.03	Z3 Strip/Overburden/Waste to Stockpile-Q2	3,849,000	BCY	6123	680	2/23/2026	8/7/2026	38,914,268	74,844	**11**
	21.01-3.01.04	Z4 Strip/Overburden/Waste to Stockpile	0	BCY							
	21.01-3.02	**Restore Borrow Areas**									
	21.01-3.02.01	Replace Overburden from Stockpile	2,199,200	ECY	3635	404	11/6/2028	4/20/2029	4,236,046	8,358	**14**
	21.01-3.02.02	Topsoil Replacement	125,000	ECY	207	23	11/6/2028	4/20/2029	1,463,960	2,759	**12**
	21.01-3.03	**Furnish and Install Zone 1 - Core**	2,400,000	ECY	3879	431	2/15/2027	2/16/2029	36,947,613	68,960	**16**
Golden Gate Dam											

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
Golden Gate Dam											
	21.01-3.04	**Furnish and Install Zone 2A - Filter**	726,000	Tons	1034	115	2/15/2027	2/16/2029	15,611,628	44,594	**11**
	21.01-3.05	**Furnish and Install Zone 2A - Drain**	803,000	Tons	1144	127	2/15/2027	2/16/2029			
	21.01-3.06	**Furnish and Install Zone 2B - Filter**	107,800	Tons	154	17	2/15/2027	2/16/2029			
	21.01-3.07	**Furnish and Install Zone 2A - Transition**	451,000	Tons	643	71	2/15/2027	2/16/2029			
	21.01-3.08	**Furnish and Install Zone 2B - Transition**	473,000	Tons	674	75	2/15/2027	2/16/2029			
	21.01-3.09	**Furnish and Install Zone 3 - Rockfill**	2,600,000	ECY	4727	525	2/15/2027	2/16/2029	92,320,800	188,224	**39**
	21.01-3.10	**Furnish and Install Zone 4 - Random**	2,200,000	ECY	4000	444	2/15/2027	2/16/2029	30,440,003	57,781	**13**
	21.01-3.11	**Furnish and Install Riprap**	98,000	ECY	255	28	5/17/2027	3/9/2029	1,360,127	3,679	**13**
	21.01-3.12	**Production and Placement of Dam Crest Gravel**	1,300	CY	9	1	3/9/2029	3/10/2029	55,730	160	**16**

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
		Sites Dam									
Sites Dam	**20.03-1**	**Process and Haul Filter Materials to Project**									
	20.03-2.02	**Sites Dam**	**889,900**	**Tons**	**3283**	**365**					**32**
	20.03-2.02.01	Process and Stockpile on Project - Zone 2A - Filter	242,000	Tons	893	99	5/26/2025	5/4/2029			
	20.03-2.02.02	Process and Stockpile on Project - Zone 2A - Drain	297,000	Tons	1096	122	5/26/2025	5/4/2029	52,001,116	116,728	
	20.03-2.02.03	Process and Stockpile on Project - Zone 2A - Transition	42,900	Tons	158	18	5/26/2025	5/4/2029			
	20.03-2.02.04	Process and Stockpile on Project - Zone 2B - Filter	148,500	Tons	548	61	5/26/2025	5/4/2029			
	20.03-2.02.05	Process and Stockpile on Project - Zone 2B - Transition	159,500	Tons	588	65	5/26/2025	5/4/2029			
	22.01-3	**Foundation Preparation and Grouting**									
	22.01-3.01	**Foundation Excavation**									
	22.01-3.01.01	Topsoil Salvage	58,000	BCY	94	10	7/11/2025	11/27/2025	739,176	1,467	**14**
	22.01-3.01.02	Dam Foundation Excavation - Common	121,000	BCY	196	22	5/3/2027	2/4/2028	1,542,069	3,050	**14**
	22.01-3.01.03	Dam Foundation Rock Exc - Rippable Rock	344,000	BCY	625	69	5/3/2027	2/4/2028	4,932,061	9,730	**14**
	22.01-3.01.04	Dam Foundation Rock Ex - Drill and Shoot	47,000	BCY	118	13	5/3/2027	2/4/2028	1,210,524	2,866	**22**
	22.01-3.02	**Foundation Preparation and Grouting**									
		(Includes Initial and Final Cleaning)									
	22.01-3.02.01	Foundation Preparation - Beneath Core	20,000	SY							
	22.01-3.02.01.a	Initial Foundation Cleaning - Core	20,000	SY	200	22	9/13/2027	4/28/2028	206,668	2,003	**9**
	22.01-3.02.01.b	Final Foundation Cleaning - Core	20,000	SY	200	22	9/13/2027	4/28/2028	206,668	2,003	**9**
	22.01-3.02.01.c	Dental Excavation	800	BCY	107	12	10/18/2027	3/3/2028	111,094	715	**6**
	22.01-3.02.01.d	Dental Concrete	800	CY	80	9	10/18/2027	3/3/2028	242,057	1,173	**13**
	22.01-3.02.01.e	Grout Cap with Anchors	3,500	CY	159	18	11/15/2027	3/3/2028	878,379	5,277	**30**
	22.01-3.02.01.f	Curtain Grouting	31,800	LF	795	88	12/13/2027	4/28/2028	2,391,627	10,602	**12**
	22.01-3.02.01.g	Consolidation Grouting	13,900	LF	348	39	11/29/2027	3/17/2028	1,046,902	4,642	**12**
	22.01-3.02.01.h	Type III Cement	1,600	Tons	1143	127	11/29/2027	4/28/2028	615,950	6,350	**5**
	22.01-3.02.02	Foundation Preparation - Beneath Shell	69,100	SY	86	10	9/13/2027	4/28/2028	141,465	576	**6**
	22.01-3.02.03	Foundation Drainage									
	22.01-3.02.03.a	Furnish and Install Foundation Drain Pipe	500	LF	30	3	9/13/2027	4/28/2028	20,017	180	**6**
	22.01-3.02.03.b	Furnish and Install Foundation Drain Manholes	1	EA	30	3	9/13/2027	4/28/2028	20,017	180	**6**
	22.01-3.02.03.c	Seepage Partition Walls	0								
	22.01-4	**Embankment**									
	22.01-4.01	**Develop Borrow Areas**	1	LS							
	22.01-4.01.01	Z1 Strip/Overburden/Waste to Stockpile	339,000	BCY	308	34	11/28/2025	1/22/2026	1,909,531	2,742	**8**
	22.01-4.01.02	Z3 Strip/Overburden/Waste to Stockpile	1,768,000	BCY	2857	317	11/28/2025	5/14/2026	18,063,367	34,925	**11**
	22.01-4.01.03	Z4 Strip/Overburden/Waste to Stockpile	0	BCY	0	0			0	0	
	22.01-4.02	**Restore Borrow Areas**		BCY			5/7/2029	9/7/2029			
	22.01-4.02.01	Replace Overburden from Stockpile	842,800		1393	155	1/1/2029	4/6/2029	10,985,040	21,672	**14**
	22.01-4.02.02	Topsoil Replacement	58,000		96	11	1/1/2029	4/6/2029	679,281	2,759	**12**
	22.01-4.03	**Furnish and Install Zone 1 - Core**	710,000	ECY	1147	127	2/21/2028	2/2/2029	10,930,339	20,400	**16**
	22.01-4.04	**Furnish and Install Zone 2A - Filter**	242,000	Tons	345	38	2/21/2028	2/2/2029			**11**
	22.01-4.05	**Load, Haul and Place - Zone 2A - Drain**	297,000	Tons	423	47	2/21/2028	2/2/2029			
	22.01-4.06	**Load, Haul and Place - Zone 2A - Transition**	42,900	Tons	61	7	2/21/2028	2/2/2029	5,425,178	15,499	
	22.01-4.07	**Load, Haul and Place - Zone 2B - Filter**	148,500	Tons	212	24	2/21/2028	2/2/2029			
	22.01-4.08	**Load, Haul and Place - Zone 2B - Transition**	159,500	Tons	227	25	2/21/2028	2/2/2029			
	22.01-4.09	**Furnish and Install Zone 3 - Rockfill**	1,050,000	ECY	1909	212	2/21/2028	2/2/2029	36,490,071	74,075	**38**
	22.01-4.10	**Furnish and Install Zone 4 - Random**	660,000	ECY	1200	133	2/21/2028	2/2/2029	9,132,002	17,338	**13**
	22.01-4.11	**Furnish and Install Riprap**	40,000	ECY	104	12	5/22/2028	2/23/2029	555,156	1,504	**13**
	22.01-4.12	**Production and Placement of Dam Crest Gravel**	450	CY	3	0	2/24/2029	2/25/2029	18,577	53	**16**

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
		Saddle Dam 3									
Sac	**20.03-3**	**Process and Haul Filter Materials to Project**									
	20.03-3.02	**Saddle Dam 3**	**730,400**		**2694**	**299**					**32**
	20.03-3.02.01	Process and Stockpile on Project - Zone 2A - Filter	319,000	Tons	1177	131	5/26/2025	5/4/2029			
	20.03-3.02.02	Process and Stockpile on Project - Zone 2A - Drain	319,000	Tons	1177	131	5/26/2025	5/4/2029	149,639,796	335,895	
	20.03-3.02.03	Process and Stockpile on Project - Zone 2A - Transition	92,400	Tons	341	38	5/26/2025	5/4/2029			
	20.03-3.02.04	Process and Stockpile on Project - Zone 2B - Filter	0	Tons	0	0	5/26/2025	5/4/2029			
	20.03-3.02.05	Process and Stockpile on Project - Zone 2B - Transition	0	Tons	0	0	5/26/2025	5/4/2029			
	23.01-2	**Foundation Preparation and Grouting**									
	23.01-2.01	**Foundation Excavation**									
	23.01-2.01.01	Topsoil Salvage	106,000	BCY	171	19	7/25/2025	10/2/2025	1,350,902	2,672	**14**
	23.01-2.01.02	Dam Foundation Excavation - Common	81,000	BCY	131	15	2/16/2026	7/17/2026	1,032,294	2,042	**14**
	23.01-2.01.03	Dam Foundation Rock Exc - Rippable Rock	565,000	BCY	913	101	2/16/2026	7/17/2026	7,517,105	15,224	**15**
	23.01-2.01.04	Dam Foundation Rock Ex - Drill and Shoot	0	BCY					0	0	
Saddle Dam 3	**23.01-2.02**	**Foundation Preparation and Grouting**	0	0							
	23.01-2.02.01	Foundation Preparation - Beneath Core	48,000	SY							
	23.01-2.02.01.a	Initial Foundation Cleaning - Core	48,000	SY	480	53	3/23/2026	8/7/2026	496,001	4,802	**9**
	23.01-2.02.01.b	Final Foundation Cleaning - Core	48,000	SY	480	53	3/23/2026	8/7/2026	496,001	4,802	**9**
	23.01-2.02.01.c	Dental Excavation	2,300	BCY	329	37	6/8/2026	8/14/2026	411,994	2,561	**7**
	23.01-2.02.01.d	Dental Concrete	2,300	CY	329	37	6/8/2026	8/14/2026	729,101	3,669	**10**
	23.01-2.02.01.e	Grout Cap with Anchors	7,600	CY	345	38	7/6/2026	10/23/2026	1,907,333	11,456	**30**
	23.01-2.02.01.f	Curtain Grouting	36,700	LF	918	102	7/20/2026	11/20/2026	2,761,650	12,240	**12**
	23.01-2.02.01.g	Consolidation Grouting	0	LF	0	0			0	0	
	23.01-2.02.01.h	Type III Cement	1,300	Tons	918	102	7/20/2026	11/20/2026	494,700	5,100	**5**
	23.01-2.02.01.i	Backfill Concrete	6,400	CY	183	20	6/8/2026	8/14/2026	1,466,009	7,968	**39**
	23.01-2.02.02	Foundation Preparation - Beneath Shell	172,000	SY	215	24	3/23/2026	8/7/2026	356,187	1,434	**6**
Saddle Dam 3	23.01-2.02.03	Foundation Drainage									
	23.01-2.02.03.a	Furnish and Install Foundation Drain Pipe	1,000	LF	30	3	3/23/2026	8/7/2026	20,017	180	**6**
	23.01-2.02.03.b	Furnish and Install Foundation Drain Manholes	3	EA	30	3	3/23/2026	8/7/2026	20,017	180	**6**
	23.01-2.02.03.c	Seepage Partition Walls	600	CY	300	33	3/23/2026	8/7/2026	377,701	3,149	**9**
	23.01-3	**Embankment**									
	23.01-3.01	**Develop Borrow Areas**	1	LS							
	23.01-3.01.01	Z1 Strip/Overburden/Waste to Stockpile	431,000	BCY	392	44	10/3/2025	11/27/2025	2,427,752	3,486	**8**
	23.01-3.01.02	Z3 Strip/Overburden/Waste to Stockpile, Q1	304,000	BCY	737	82	10/3/2025	2/19/2026	3,430,598	9,009	**11**
	23.01-3.01.03	Z3 Strip/Overburden/Waste to Stockpile, Q2	195,000	BCY	473	53	10/3/2025	3/19/2026	2,200,551	5,783	**11**
	23.01-3.01.04	Z4 Strip/Overburden/Waste to Stockpile	0	0					0	0	
	23.01-3.02	**Restore Borrow Areas**	0	0			10/25/2027	6/30/2028			
	23.01-3.02.01	Replace Overburden from Stockpile	372,000	ECY	615	68	11/1/2027	7/7/2028	4,848,645	9,573	**14**
	23.01-3.02.02	Topsoil Replacement	106,000	ECY	175	19	11/1/2027	7/7/2028	1,241,440	2,759	**12**
	23.01-3.03	**Furnish and Install Zone 1 - Core**	900,000	ECY	1455	162	10/12/2026	10/8/2027	13,855,357	25,865	**16**
	23.01-3.04	**Load, Haul and Place - Zone 2A - Filter**	319,000	Tons	454	50	10/12/2026	10/8/2027			**11**
	23.01-3.05	**Load, Haul and Place - Zone 2A - Drain**	319,000	Tons	454	50	10/12/2026	10/8/2027			
Saddle Dam 3	**23.01-3.06**	**Load, Haul and Place - Zone 2A - Transition**	92,400	Tons	132	15	10/12/2026	10/8/2027	4,452,805	12,725	
	23.01-3.07	**Load, Haul and Place - Zone 2B - Filter**	0	Tons	0	0					
	23.01-3.08	**Load, Haul and Place - Zone 2B - Transition**	0	Tons	0	0					
	23.01-3.09	**Furnish and Install Zone 3 - Rockfill**	610,000	ECY	1109	123	10/12/2026	10/8/2027	21,198,998	43,038	**38**
	23.01-3.10	**Furnish and Install Zone 4 - Random**	1,663,000	ECY	3024	336	10/12/2026	10/8/2027	23,009,877	43,679	**13**
	23.01-3.11	**Furnish and Install Riprap**	130,000	ECY	236	26	1/25/2027	10/29/2027	1,798,731	3,418	**13**
	23.01-3.12	**Production and Placement of Dam Crest Gravel**	1,900	CY	13	1			80,499	231	**16**

Sites Reservoir
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Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
		Saddle Dam 5									
Saddle Dan	**20.03-4**	**Process and Haul Filter Materials to Project**									
	20.03-4.02	**Saddle Dam 5**	**283,800**	**Tons**	**1047**	**116**					**32**
	20.03-4.02.01	Process and Stockpile on Project - Zone 2A - Filter	121,000	Tons	446	50	5/26/2025	5/4/2029			
	20.03-4.02.02	Process and Stockpile on Project - Zone 2A - Drain	126,500	Tons	467	52	5/26/2025	5/4/2029	16,583,797	37,230	
	20.03-4.02.03	Process and Stockpile on Project - Zone 2A - Transition	36,300	Tons	134	15	5/26/2025	5/4/2029			
	20.03-4.02.04	Process and Stockpile on Project - Zone 2B - Filter	0	Tons	0	0					
	20.03-4.02.05	Process and Stockpile on Project - Zone 2B - Transition	0	Tons	0	0					
	23.02-2	**Foundation Preparation and Grouting**									
	23.02-2.01	**Foundation Excavation**									
	23.02-2.01.01	Topsoil Salvage	58,000	CY	94	10	12/26/2025	2/5/2026	739,176	1,467	**14**
	23.02-2.01.02	Dam Foundation Excavation - Common	24,000	CY	39	4	7/20/2026	9/25/2026	305,870	613	**14**
	23.02-2.01.03	Dam Foundation Rock Exc - Rippable Rock	256,000	CY	465	52	7/20/2026	9/25/2026	3,831,730	7,766	**15**
	23.02-2.01.04	Dam Foundation Rock Ex - Drill and Shoot	0	CY					0	0	
Saddle Dam 5	**23.02-2.02**	**Foundation Preparation and Grouting**									
	23.02-2.02.01	**Foundation Preparation - Beneath Core**	23,000	SY							
	23.02-2.02.01.a	Initial Foundation Cleaning - Core	23,000	SY	230	26	7/27/2026	10/16/2026	214,669	1,791	**7**
	23.02-2.02.01.b	Final Foundation Cleaning - Core	23,000	SY	230	26	7/27/2026	10/16/2026	214,669	1,791	**7**
	23.02-2.02.01.c	Dental Excavation	1,300	CY	186	21	7/27/2026	10/16/2026	232,870	1,449	**7**
	23.02-2.02.01.d	Dental Concrete	1,300	CY	186	21	7/27/2026	10/16/2026	412,102	2,074	**10**
	23.02-2.02.01.e	Grout Cap with Anchors	4,200	CY	191	21	8/24/2026	10/16/2026	1,054,171	6,334	**30**
	23.02-2.02.01.f	Curtain Grouting	14,600	LF	365	41	9/7/2026	12/11/2026	1,098,043	4,870	**12**
	23.02-2.02.01.g	Consolidation Grouting	0	LF	0				0	0	
	23.02-2.02.01.h	Type III Cement	520	Tons	365	41	3/1/2027	6/4/2027	196,696	2,029	**5**
	23.02-2.02.01.i	Backfill Concrete	0	CY	0	0			0	0	
	23.02-2.02.02	**Foundation Preparation - Beneath Shell**	73,000	SY	91	10	7/27/2026	10/16/2026	151,174	612	**6**
	23.02-2.02.03	**Foundation Drainage**					7/27/2026	10/16/2026			
	23.02-2.02.03.a	Furnish and Install Foundation Drain Pipe	300	LF	10	1	7/27/2026	10/16/2026	6,005	60	**6**
	23.02-2.02.03.b	Furnish and Install Foundation Drain Manholes	2	EA	20	2	7/27/2026	10/16/2026	12,010	120	**6**
	23.02-2.02.03.c	Seepage Partition Walls	0	0					0	0	
Saddle Dam 5	**23.02-3**	**Embankment**									
	23.02-3.01	**Develop Borrow Areas**	1	LS							
	23.02-3.01.01	Z1 Strip/Overburden/Waste to Stockpile	180,000	CY	164	18	11/28/2025	1/22/2026	1,013,910	1,456	**8**
	23.02-3.01.02	Z3 Strip/Overburden/Waste to Stockpile, Q1	130,000	CY	315	35	11/28/2025	1/22/2026	1,467,034	3,858	**11**
	23.02-3.01.03	Z3 Strip/Overburden/Waste to Stockpile, Q2	0	CY	0	0			0	0	
	23.02-3.01.04	Z4 Strip/Overburden/Waste to Stockpile	0	CY					0	0	
	23.02-3.02	**Restore Borrow Areas**									
	23.02-3.02.01	**Replace Overburden from Stockpile**	124,000	ECY	205	23	8/4/2028	4/12/2029	1,616,219	3,191	**14**
	23.02-3.02.02	**Topsoil Replacement**	58,000	ECY	96	11	8/4/2028	4/12/2029	679,281	2,759	**12**
		Includes moisture conditioning in Borrow Area	0	0							
	23.02-3.03	**Furnish and Install Zone 1 - Core**	369,000	ECY	596	66	10/11/2027	2/25/2028	5,680,700	10,607	**16**
											11
	23.02-3.04	**Load, Haul and Place - Zone 2A - Filter**	121,000	Tons	172	19	10/11/2027	2/25/2028			
	23.02-3.05	**Load, Haul and Place - Zone 2A - Drain**	126,500	Tons	180	20	10/11/2027	2/25/2028	1,730,160	4,948	
	23.02-3.06	**Load, Haul and Place - Zone 2A - Transition**	36,300	Tons	52	6	10/11/2027	2/25/2028			
	23.02-3.07	**Load, Haul and Place - Zone 2B - Filter**	0	Tons	0	0					
	23.02-3.08	**Load, Haul and Place - Zone 2B - Transition**	0	Tons	0	0					
	23.02-3.09	**Furnish and Install Zone 3 - Rockfill**	190,000	CY	345	38	10/11/2027	2/25/2028	6,602,972	13,408	**38**
	23.02-3.10	**Furnish and Install Zone 4 - Random**	470,000	CY	855	95	10/11/2027	2/25/2028	6,503,095	12,346	**13**
	23.02-3.11	**Furnish and Install Riprap**	47,000	CY	85	9	12/13/2027	3/17/2028	650,312	1,235	**13**
	23.01-3.12	**Production and Placement of Dam Crest Gravel**	1,100	CY	7	1	3/18/2028	3/19/2029	43,346	124	**16**

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
		Saddle Dams 1, 2, 6, 8A, 8B									
Saddle Dams 1, 2, 6, 8	**20.03-5**	**Process and Haul Filter Materials to Project**									
	20.03-4.03	**Saddle Dams 1, 2, 6, 8**	**399,806**	**Tons**	**1475**	**164**					**32**
	20.03-4.03.01	Process and Stockpile on Project - Zone 2A - Filter	173,800	Tons	641	71	5/26/2025	5/4/2029	23,362,581	52,443	
	20.03-4.03.02	Process and Stockpile on Project - Zone 2A - Drain	177,606	Tons	655	73	5/26/2025	5/4/2029			
	20.03-4.03.03	Process and Stockpile on Project - Zone 2A - Transition	48,400	Tons	179	20	5/26/2025	5/4/2029			
	20.03-4.03.04	Process and Stockpile on Project - Zone 2B - Filter	0	Tons	0	0					
	20.03-4.03.05	Process and Stockpile on Project - Zone 2B - Transition	0	Tons	0	0					
	23.03-2	**Foundation Preparation and Grouting**									
	23.03-2.01	**Foundation Excavation**									
	23.03-2.01.01	Topsoil Salvage	74,000	CY	120	13	11/14/2025	12/25/2025	943,085	3,122	**23**
	23.03-2.01.02	Dam Foundation Excavation - Common	33,500	CY	54	6	9/28/2026	2/12/2027	426,942	851	**14**
	23.03-2.01.03	Dam Foundation Rock Exc - Rippable Rock	302,500	CY	550	61	9/28/2026	2/12/2027	4,527,727	9,176	**15**
	23.03-2.01.04	Dam Foundation Rock Ex - Drill and Shoot	0	CY					0	0	
	23.03-2.02	**Foundation Preparation and Grouting**									
	23.03-2.02.01	**Foundation Preparation - Beneath Core**	16,400	SY							
	23.03-2.02.01.a	Initial Foundation Cleaning - Core	16,400	SY	164	18	10/19/2026	3/5/2027	141,223	1,095	**6**
	23.03-2.02.01.b	Final Foundation Cleaning - Core	16,400	SY	164	18	10/19/2026	3/5/2027	141,223	1,095	**6**
	23.03-2.02.01.c	Dental Excavation	1,500	CY	214	24	10/26/2026	3/12/2027	268,695	1,673	**7**
	23.03-2.02.01.d	Dental Concrete	1,500	CY	214	24	10/26/2026	3/12/2027	475,501	2,394	**10**
	23.03-2.02.01.e	Grout Cap	4,900	CY	223	25	12/7/2026	3/26/2027	1,230,083	7,391	**30**
	23.03-2.02.01.f	Curtain Grouting	16,200	LF	405	45	12/21/2026	7/2/2027	1,218,375	5,400	**12**
	23.03-2.02.01.g	Consolidation Grouting	0	0	0				0	0	
	23.03-2.02.01.h	Type III Cement	571	Tons	405	45	12/21/2026	7/2/2027	218,250	2,250	**5**
	23.03-2.02.01.i	Backfill Concrete	2,200	CY	314	35	10/26/2026	3/12/2027	830,102	6,652	**19**
	23.03-2.02.02	**Foundation Preparation - Beneath Shell**	38,400	SY	48	5	10/19/2026	3/5/2027	79,521	324	**6**
	23.03-2.02.03	**Foundation Drainage**									
	23.03-2.02.03.a	Furnish and Install Foundation Drain Pipe	1,200	LF	40	4	10/19/2026	3/5/2027	26,690	240	**6**
	23.03-2.02.03.b	Furnish and Install Foundation Drain Manholes	4	EA	40	4	10/19/2026	3/5/2027	26,690	240	**6**
	23.03-2.02.03.c	Seepage Partition Walls	0	LF					0	0	
Saddle Dams 1, 2, 6, 8	**23.03-3**	**Embankment**									
	23.03-3.01	**Develop Borrow Areas**	1	LS							
	23.03-3.01.01	Z1 Strip/Overburden/Waste to Stockpile	212,000	CY	153	17	12/26/2025	2/19/2026	949,902	1,366	**8**
	23.03-3.01.02	Z3 Strip/Overburden/Waste to Stockpile, Q1	174,000	CY	281	31	12/26/2025	6/11/2026	1,309,046	3,441	**11**
	23.03-3.01.03	Z3 Strip/Overburden/Waste to Stockpile, Q2	0	CY	0	0			0	0	
	23.03-3.01.04	Z4 Strip/Overburden/Waste to Stockpile	0	CY							
	23.03-3.02	**Restore Borrow Areas**									
	23.03-3.02.01	**Replace Overburden from Stockpile**	154,400	ECY	255	28	11/29/2027	8/4/2028	2,012,449	3,975	**14**
	23.03-3.02.02	**Topsoil Replacement**	58,000	ECY	96	11	11/29/2027	8/4/2028	679,281	2,759	**12**
	23.03-3.03	**Furnish and Install Zone 1 - Core**	369,000	CY	596	66	3/15/2027	11/12/2027	5,680,700	10,607	**16**

Sites Reservoir
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Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
Saddle Dams 1, 2, 6, 8											
	23.03-3.04	**Load, Haul and Place - Zone 2A - Filter**	173,800	Tons	248	28	3/15/2027	11/12/2027			**11**
	23.03-3.05	**Load, Haul and Place - Zone 2A - Drain**	177,606	Tons	253	28	3/15/2027	11/12/2027			
	23.03-3.06	**Load, Haul and Place - Zone 2A - Transition**	48,400	Tons	69	8	3/15/2027	11/12/2027	2,437,375	6,963	
	23.03-3.07	**Load, Haul and Place - Zone 2B - Filter**	0	Tons	0	0					
	23.03-3.08	**Load, Haul and Place - Zone 2B - Transition**	0	Tons	0	0					
	23.03-3.09	**Furnish and Install Zone 3 - Rockfill**	224,000	CY	373	41	3/15/2027	11/12/2027	7,784,556	15,809	**38**
	23.03-3.10	**Furnish and Install Zone 4 - Random**	606,000	CY	1102	122	3/15/2027	11/12/2027	8,384,840	15,920	**13**
	23.03-3.11	**Furnish and Install Riprap**	55,000	CY	100	11	5/10/2027	11/26/2027	761,003	1,451	**13**
	23.03-4	**Saddle Dam 8**									
	23.03-4.01	**Mass Concrete**	19,500	CY	1200	133	5/26/2026	11/9/2026	6,798,000	36,933	**28**
	23.03-4.03	**Clay Backfill**	20,000	CY	100	11	8/18/2026	9/14/2026	611,116	1,729	**15**
	23.03-4.04	**Riprap and Drain**	1	LS	20	2	9/15/2026	9/17/2026	25,224	92	**4**
	23.03-4.05	**Production and Placement of Dam Crest Gravel**	800	CY	5	1	9/18/2026	9/18/2026	30,961	89	**16**
	23.03-4.06	**Rim Grouting**	51,300	LF	1283	143	12/21/2026	7/2/2027	3,859,693	17,110	**12**

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
	Inlet-Outlet and ERS Facilities										
ERS-1 Facilities	**23.01-4**	**ERS-1 Facilities**									
	23.01-4.01	Upstream Portal Excavation and Rock Bolts	27,500	CY	79	9	3/27/2026	6/25/2026	361,996	1,317	15
	23.01-4.02	Upstream Portal Backfill	24,800	CY	99	11	1/2/2027	1/15/2027	376,035	1,540	14
	23.01-4.03	Inlet and Valve Structures	2,200	CY	489	54	6/26/2026	12/31/2026	1,781,820	11,812	11
	23.01-4.04	Downstream Portal Excavation and Rock Bolts	35,100	CY	100	11	12/26/2025	3/26/2026	596,444	2,111	19
	23.01-4.05	Downstream Portal Backfill	37,900	CY	152	17	12/18/2026	1/8/2027	577,347	2,364	14
	23.01-4.06	Tunnel Excavation and Initial Support (Double Shift)	828	LF	1,035	115	3/27/2026	11/5/2026	3,072,800	14,950	13
	23.01-4.07	Tunnel Concrete Lining	828	LF	331	37	3/27/2026	11/5/2026	1,151,713	6,941	19
	23.01-4.08	10-Ft Steel Pipe Cut and Cover Section	388	LF	13	14	11/6/2026	12/17/2026	407,839	2,167	15
	23.01-4.09	Mechanical, Valves, Trashrack, and Metals	1	LS	30	33	1/1/2027	1/28/2027	708,167	3,333	10
	23.01-4.10	Riprap Discharge Channel	5,000	CY	33	4	1/1/2027	1/28/2027	125,803	330	9
ERS-2 Facilities	**23.02-4**	**ERS-2 Facilities**									
	23.02-4.01	Upstream Portal Excavation and Rock Bolts	27,215	CY	78	9	7/15/2027	10/13/2027	465,227	1,647	19
	23.02-4.02	Upstream Portal Backfill	24,500	CY	98	11	8/13/2027	9/1/2027	372,237	1,524	14
	23.02-4.03	Inlet and Valve Structures	2,200	CY	489	54	6/18/2027	9/23/2027	1,781,820	11,812	7
	23.02-4.04	Downstream Portal Excavation and Rock Bolts	31,867	CY	91	10	6/26/2026	9/24/2026	542,764	1,921	19
	23.02-4.05	Downstream Portal Backfill	34,400	CY	138	15	7/30/2027	8/20/2027	524,170	2,147	14
	23.02-4.06	Tunnel Excavation and Initial Support (Double Shift)	832	LF	1,040	116	11/6/2026	6/17/2027	3,087,644	15,022	13
	23.02-4.07	Tunnel Concrete Lining	832	LF	333	37	11/6/2026	6/17/2027	1,155,540	6,970	19
	23.02-4.08	10-Ft Steel Pipe Cut and Cover Section	400	LF	133	15	6/18/2027	7/29/2027	417,251	2,217	15
	23.02-4.09	Mechanical, Valves, Trashrack, and Metals	1	LS	300	33	9/24/2027	10/21/2027	708,167	3,333	10
	23.02-4.10	Riprap Discharge Channel	4,200	CY	28	3	9/24/2027	10/21/2027	106,742	280	9
Golden Gate	**21.01-4**	**Golden Gate Dam Bypass Pipeline Facilities**									
	21.01-4.01	Upstream Cofferdam	150,000	CY	600	67	11/17/2025	2/20/2026	2,507,000	7,333	11
	21.01-4.02	Install 48-Inch Steel Pipe and Encasement	2,100	LF	525	58	11/17/2025	2/20/2026	2,987,875	14,458	2
	21.01-4.03	Riprap Discharge Channel	75	CY	1	0	11/17/2025	2/20/2026	3,812	10	9
Sites Dam Diversion Facilities	**22.01-2**	**Sites Dam Diversion Facilities**									
	22.01-2.01	Upstream Cofferdam	160,000	CY	640	71	11/29/2027	12/24/2027	2,674,133	7,822	11
	22.01-2.02	Upstream Portal Excavation and Rock Bolts	15,800	CY	45	5	10/20/2025	2/20/2026	268,400	950	19
	22.01-2.03	Upstream Portal Backfill	24,500	CY	98	11	7/24/2027	8/15/2027	372,237	1,524	14
	22.01-2.04	Inlet and Valve Structures	2,200	CY	489	54	4/19/2027	7/23/2027	1,781,820	11,812	7
	22.01-2.05	Downstream Portal Excavation and Rock Bolts	12,500	CY	36	4	10/20/2025	2/20/2026	214,720	760	19
	22.01-2.06	Downstream Portal Backfill	34,400	CY	138	15	7/24/2027	8/20/2027	524,170	2,147	14
	22.01-2.07	Tunnel Excavation and Initial Support (Double Shift)	1,590	LF	1,988	221	2/23/2026	4/16/2027	5,902,151	28,716	13
	22.01-2.08	Tunnel Concrete and Steel Lining	1,590	LF	636	71	2/23/2026	4/16/2027	2,215,280	13,347	19
	22.01-2.09	Mechanical, Valves, Trashrack, and Metals	1	LS	450	50	7/26/2027	10/29/2027	1,062,250	5,000	10
	22.01-2.10	Riprap Discharge Channel	75	CY	1	0	7/26/2027	10/29/2027	3,812	10	9

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

	WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
Main Inlet/Outlet Facilites	**25.01**	**Main Inlet/Outlet Facilites**									
	25.01-1	**Downstream Portal and Intake Channel Excavation and Rock B**	63,000	CY	140	16	10/27/2025	3/13/2026	1,048,331	3,938	**25**
	25.01-2	**Upstream Portal and Intake Channel Excavation and Rock Bolts**	475,000	CY	1,060	118	10/27/2025	4/17/2026	7,195,076	27,358	**23**
	25.01-3	**Tunnel Excavation and Lining**									
	25.01-3.01	**Tunnel Excavation and Initial Support (Double Shift)**	6,220	LF	12,440	1,382	4/20/2026	10/27/2028	36,932,978	179,689	**13**
	25.01-3.02	**Tunnel Concrete Lining (Double Shift)**	6,220	LF	2,073	230	4/20/2026	10/27/2028	18,750,340	91,543	**40**
	25.01-4	**Intake and Outlet Structures**									
	25.01-4.01	**Concrete Piling Foundation**	480	LF	160	18	2/21/2028	5/12/2028	676,889	2,502	**14**
	25.01-4.02	**Multi-Level Inlet/Outlet Tower Cast In Place Concrete**	20,015	CY	2,502	278	5/15/2028	2/16/2029	10,856,820	79,952	**14**
	25.01-4.03	**Access Bridge**	1	LS	600	67	2/19/2029	6/22/2029	1,563,133	9,320	**14**
	25.01-4.04	**Gates, Mechanical, and Appurtenances**	1	LS	600	67	6/25/2029	9/14/2029	1,416,333	6,667	**10**
	25.01-4.05	**Trash Racks, Miscellaneous Metals and Equipment**	1	LS	350	39	6/25/2029	9/14/2029	826,194	3,889	**10**

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
Roadways										
26.01	**Early Site Access and Staging Development**					8/18/25	1/2/2026			
26.01-1	**Grading and Drainage**	1	Allowance	1,000	111			8,388,889	27,778	**25**
26.01-2	**Production and Placement of Subbase and Base Course**	30,000	TN	200	22			1,476,444	4,889	**22**
26.03	**Northern Construction Access Roads (CR 68, CR 69, N. Rd)**					6/24/2024	7/24/2025			
26.03-1	**Grading and Drainage**	636,200	CY	1,060	118			8,892,222	29,444	**25**
26.03-2	**Production and Placement of Subbase and Base Course**	108,000	CY	720	80			5,315,200	17,600	**22**
26.03-3	**Asphalt, Signage, Finishes**	26,720	TN	178	20			1,248,967	4,944	**25**
26.04	**County Roads F, D, McDermott, Delevan Rd**					6/24/2024	3/28/2025			
	Grading and Drainage	55,700	CY	159	18			1,333,833	4,417	**25**
	Production and Placement of Subbase and Base Course	37,400	CY	249	28			1,755,173	5,257	**19**
	Asphalt, Signage, Finishes	25,110	TN	167	19			1,542,894	5,567	**30**
26.05	**Southern Construction Access Roads (Maxwell-Sites, A-1)**					6/24/2024	7/10/2025			
	Grading and Drainage	703,600	CY	1,173	130			9,840,167	32,583	**25**
	Production and Placement of Subbase and Base Course	32,300	CY	215	24			1,515,511	4,539	**19**
	Asphalt, Signage, Finishes	-	TN	-	-			-	-	
26.06	**Ancillary Roads B1, B2, C1, C2, Comm N., Comm South**					7/11/2025	5/14/2026			
	Grading and Drainage	969,200	CY	1,615	179			13,548,056	44,861	**25**
	Production and Placement of Subbase and Base Course	35,400	CY	236	26			1,663,538	4,982	**19**
	Asphalt, Signage, Finishes	5,800	TN	39	4			360,317	1,300	**30**
26.07	**Sites Lodoga Road Realignment and Bridge**					9/2/2024	4/9/2027			
	Grading and Drainage	2,601,000	CY	4,335	482			36,365,833	120,417	**25**
	Production and Placement of Subbase and Base Course	51,600	CY	344	38			2,424,818	7,262	**19**
	Asphalt, Signage, Finishes	34,420	TN	229	25			2,115,706	7,633	**30**
	Bridge Construction	1	LS	6,000	667			51,589,322	269,318	**48**
	Cast in Place Concrete Super-Structure	57000	CY	3,500	389					
26.08	**Huffmaster Road Realignment East**					6/24/2024	7/19/2027			
	Grading and Drainage	5,200,000	CY	4,333	481			59,959,091	197,392	14
	Production and Placement of Subbase and Base Course	84,000	CY	560	62			3,947,378	11,822	19
	Asphalt, Signage, Finishes	56,640	TN	378	42			3,492,300	12,600	30
26.09	**Recreation Roads**					5/15/2026	7/30/2027			
	Grading and Drainage	1,019,400	CY	1,699	189			13,446,641	39,643	21
	Production and Placement of Subbase and Base Course	58,720	CY	391	43			2,756,116	8,254	19
	Asphalt, Signage, Finishes	39,480	TN	263	29			2,429,828	8,767	30
26.10	**Sites Lodoga Rd Detour/Shoo-Fly**					6/24/2024	7/10/2025			
	Grading and Drainage	1,968,000	CY	1,640	182			22,693,956	74,711	14
	Production and Placement of Subbase and Base Course	20,000	CY	133	15			937,502	2,808	19
	Asphalt, Signage, Finishes	7,800	TN	52	6			480,422	1,733	30

Sites Reservoir
Alt 1 - 1.5 MAF HR Facilities
Equipment AQ Tables

WBS Item	Description	Quantity	Measure	Production Hours	Production Shifts	Start Date	End Date	Total HP-HRS	Total Manhours	Personnel
On - Site Concrete Batching Model										
	NOTE:Batching crew hours and horsepower are in each activity requiring batched concrete									
	Concrete Aggregate and Cementitious Materials	HP-Hr/Ton	Man-Hr/Ton							
	Produce and Truck to Batchplant	58.4	0.1							
	Cement or Flyash (To Site)	175.3	0.4							
				Limited Plant Productin Basis						
		Plant Capacity Production Basis								
				40%	Production					
	PER BATCH PLANT			200	CY / Day					
		Quantity		HP-HRS	HP-HRS/CY	Man Hours	MH/CY			
	Batching / Hauling									
	Concrete Batch Plant	1		800	4	10	0.05			
	Laborer	1		0	0	10	0.05			
	CAT 980 Loader	1		1628	8.14	10	0.05			
	Silos	2		120	0.6	0	0			
	Pigs	2		120	0.6	0	0			
	Concrete Mixer Trucks	3		5640	28.2	30	0.15			
			Total	8308		60				
				Batch	42		0.3			
				Aggregate	100		0.3			
				Cement	50		0.2			
				Totals:	192	HP-HR/CY	0.80	MH/CY		

Appendix E.2 Final Conveyance Constructability Technical Memorandum

Final HC Constructability Technical Memorandum

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	April 19, 2021
From:	Jeff Smith, P.E. (Jacobs), Isabell Barrios (Jacobs), Brian Martinez, P.E (Geosyntec), Derek Morly, P.E. (Geosyntec), Larry Fishman, P.E. (Vanderweil)
Quality Review by:	Peter Rude, P.E.(Jacobs)
Authority Agent Review by:	Henry Luu, P.E. (HDR)
Subject:	Constructability Analysis for Conveyance Facilities Task Order No. 2

1.0 Executive Summary

The purpose of this exercise was to investigate and confirm the Sites Conveyance Facilities (HC facilities) can be constructed given the complexity, schedule, as well as the availability of materials and labor.

1.1 Schedule

The construction schedule to have the HC facilities complete by end of 2028 is reasonable, but will require careful planning to ensure long-lead time equipment is specified and ordered early. This equipment includes the pumps, generator turbines, and switchgear for substations. The timing of completing work at existing facilities such as installing new pumps at the Red Bluff Pumping Plant, dredging of the Funks Reservoir and tying into the GCID Main Canal will be performed over several seasons given the short duration when these facilities may be taken out of service.

1.2 Construction materials

Construction materials are primarily composed of earthwork and concrete, both of which are readily available in the timeframe allowed for the quantity required. Earthwork may require moving excavated spoils for reuse on other project features such as the large reservoirs and for construction of the TRR East. However, there should be sufficient spoils material available given the large volume generated from the pipelines construction.

1.3 Workforce

Providing for a sufficient labor force for this project poses a challenge, but is manageable. It is anticipated that much of the labor force would come from the surrounding region, with contractors also bringing some skilled work force from other areas. The surrounding counties, including Placer, Sacramento and Yolo Counties, have a regional population of over two million. It may be advantageous to consider project labor agreements with trade unions as a means of accommodating the project labor requirements, as well as avoiding labor disputes. This strategy has been used successfully on other large civil works projects in California.

1.4 Equipment Availability

The required equipment consists of standard heavy earthmoving and excavation equipment. Although the quantity of equipment may be large, especially for reservoir construction, this type of equipment is commonly found in the region and elsewhere. Large contractors would use their own equipment, lease or purchase new equipment.

1.5 Summary

In summary, although there are risks to the scheduled four-year completion of construction, the HC facilities of the Sites Reservoir Project can be constructed with existing technology and available construction materials, work force and equipment.

2.0 Introduction

The Sites Reservoir Project (Project) consists of a large reservoir, ancillary roads, and conveyance facilities near Maxwell, California. The Site Joint Power Authority (Authority) decided to segregate the design of these facilities into two segments. The first, Segment H Reservoir (HR), includes design of the reservoir features (including several dams and inlet/outlet (I/O) tunnels at Golden Gate Dam) and relocation of roads displaced by the reservoir. The second segment, Segment H Conveyance (HC), includes improvements to: the two existing diversion canals from the Sacramento River to the project area (Tehama-Colusa Canal [TCC] and Glenn-Colusa Irrigation District [GCID] Main Canal); regulating reservoirs (existing Funks Reservoir and a new Terminal Regulating Reservoir); two pumping generating plants (PGP) and their respective substations; electrical interconnection transmission lines; large-diameter pipelines from each PGP to Sites Reservoir; and a large-diameter pipeline to convey water from the TCC to the Colusa Basin Drain (CBD) or Sacramento River near Dunnigan, California.

This technical memorandum addresses the constructability of the Conveyance HC segment. Detailed descriptions of each facility are provided in the next section. An overall site plan of the project area is provided on Figure 1.

2.1 General Description of Facilities

Following is a list of the individual new facilities and existing facilities associated with only the Conveyance portion of the Sites Project that require improvements:

- Improvements to the Tehama-Colusa Canal Authority (TCCA) Red Bluff Pumping Plant on the Sacramento River
- GCID canal improvements upstream of the Terminal Regulating Reservoir (TRR)
- TRR-East Alternative
- TRR-West Alternative
- TRR PGP with respective substation
- TRR pipelines
- Funks Reservoir – sediment removal
- Funks PGP with respective substation
- Funks pipelines
- Western Area Power Administration (WAPA) or Pacific Gas and Electric (PG&E) substation/switchyard
- Power transmission lines
- Dunnigan Pipeline (Alternatives 1 and 2)

- Administration and operations building
- Maintenance and storage building
- Access roads

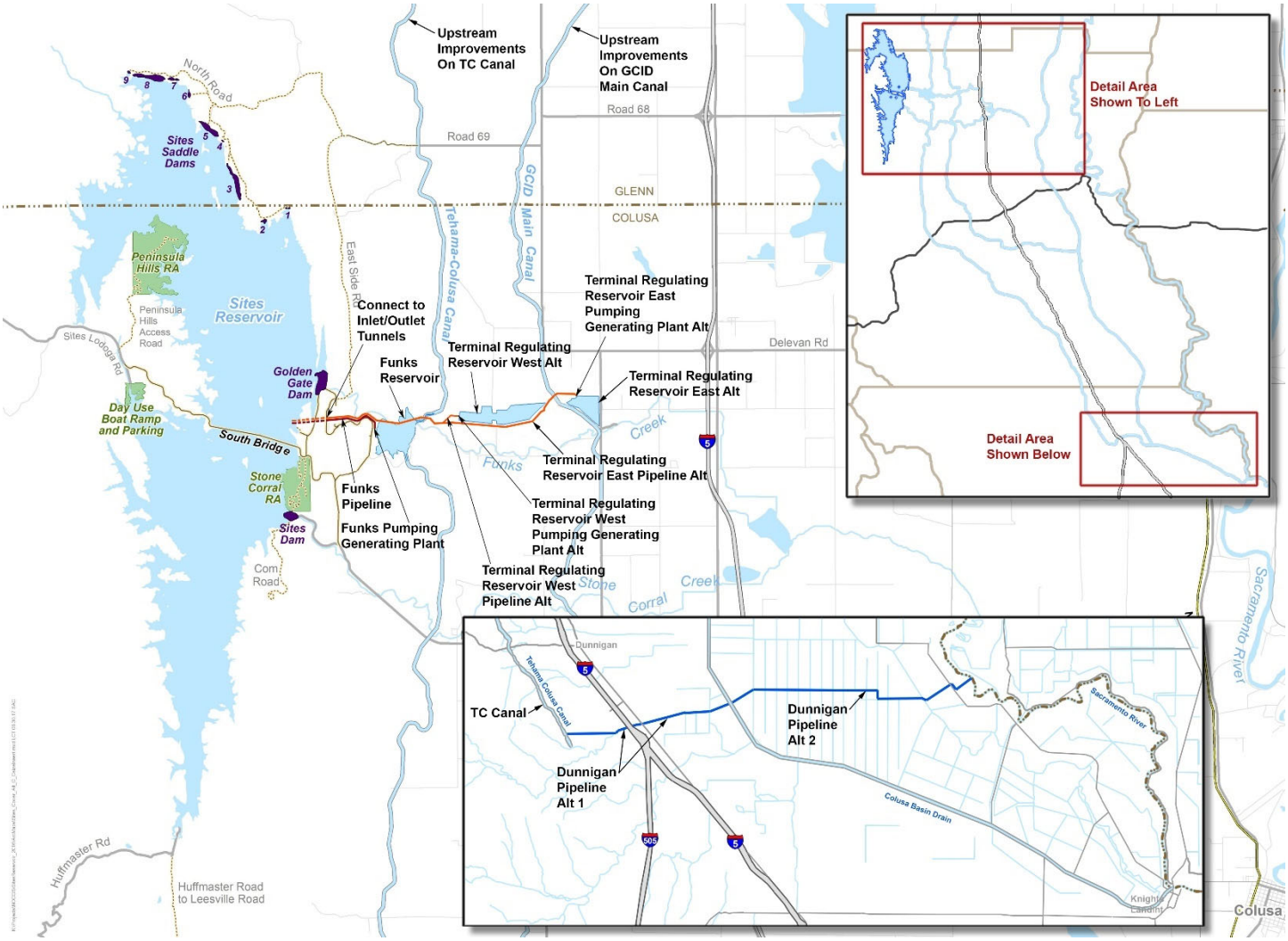


Figure 1: Project Area Site Plan

2.1.1 Improvements to the TCCA Red Bluff Pumping Plant

The Red Bluff Diversion is located on the Sacramento River in Red Bluff, California. The facility includes a 2,500 cubic feet per second (cfs) capacity, 1,180-foot-long fish screen structure, forebay, pumping plant (current capacity 2,000 cfs), electrical switchyard, and a 660-foot-long access bridge, canal, and siphon under Red Bank Creek, to deliver water from the Sacramento River into the TCC and Corning Canal. This facility was constructed and put into operation in October 2012. The pumping plant was designed to accommodate the Sites Project. The plant includes space to add two additional 250 cfs 600-horsepower pumping units, bringing the total pumping capacity to 2,500 cfs.

2.1.2 GCID Main Canal Improvements

The GCID Main Canal delivers water from the Sacramento River to water users along its route, from its diversion point approximately 5 miles northwest of Hamilton City to southeast of the City of Williams. The canal is a 65-mile-long, unlined, earthen channel, with capacity varying from 3,000 cfs at the upstream end to 300 cfs

at the southern terminus. Water conveyed by the canal is pumped by the Hamilton City Main Pump Station into the GCID Main Canal.

Improvements to the GCID Main Canal will include a new 3,000 cfs headworks structure just downstream of the Hamilton City Diversion, two new siphon structures (Willow Creek and Walker Creek), modifications to a railroad siphon at Willows, canal earthwork, and some canal bank gravel road improvements. The need for replacing the siphons and railroad crossing will be determined after a canal hydraulic model and condition assessment are completed, which is anticipated to be in Spring 2021.

2.1.3 TRR

This is a new reservoir that will be hydraulically connected to the GCID Main Canal, about 3 miles east of Funks Reservoir and just upstream of the Funks Creek Siphon at milepost 41.3 on the GCID Main Canal. The footprint of the TRR will be approximately 130 acres, with a storage volume of approximately 600 acre-feet. The TRR will also include gates to control water flow in and out of the GCID Main Canal. There are two alternative locations for the TRR: one on the eastern side of the GCID Main Canal (TRR-East) and one on the western side of the GCID Main Canal (TRR-West).

2.1.4 TRR PGP

This is a PGP that will be used to pump water from the TRR to the Sites Reservoir. This facility will also include hydroelectric turbines to generate electricity when flow is released from Sites Reservoir to the TRR and GCID Main Canal. As part of this PGP facility, there will also be an energy-dissipation facility to allow releases back to the TRR as backup to the hydroelectric turbine facilities. The pumping plant will have a capacity of 1,800 cfs; the generating plant will have a capacity of 1,000 cfs.

2.1.5 TRR Pipelines

These are two, parallel, 12-foot-diameter pipelines used to convey water between the TRR PGP and the Sites Reservoir. These pipelines will connect from the piping manifold at TRR PGP to the downstream side of the two proposed 23-foot-diameter tunnels connected to the Site Reservoir I/O structure. The approximate length of these pipelines for TRR-East is 4.4 miles (23,200 feet) each. The approximate length of these pipelines for TRR-West is 2.5 miles(13,000 feet) each. Just downstream of the piping manifold that connects the TRR pipelines with the two I/O tunnels, there is a 24-inch-diameter Environmental Water Pipeline that is approximately 2,550 feet long and discharges into Funks Creek. This pipeline is not to be used for construction purposes, but is a long-term solution to provide water to Funks Creek just downstream of the proposed Golden Gate Dam.

2.1.6 Funks Reservoir

The U.S. Bureau of Reclamation (Reclamation) constructed the Funks Reservoir in the mid-1970s, with the intent of providing operational flexibility for the TCC. There are check structures on the TCC just upstream and downstream of the reservoir. The TCC is located about 1 mile east of the proposed Sites Reservoir. At the time of construction, the reservoir had a useable capacity of 1,170 acre-feet between operating levels of 199.5 and 205.2 feet elevation, and 1,080 acre-feet of inactive storage below elevation 199.5 feet, for a total capacity of 2,250 acre-feet. However, the addition of sediment from Funks Creek and the TCC have likely reduced the total storage volume. Additionally, a cofferdam will be constructed within Funks Reservoir to facilitate construction of the TRR pipelines. The resulting storage volume reductions will be offset by sediment removal and excavation where storage capacity can be regained. The spillway has a capacity of 2,500 cfs. The Project will remove accumulated sediment to recapture the design storage volume.

2.1.7 Funks PGP

This is a PGP that will be used to pump water from Funks Reservoir to the Sites Reservoir. This facility will also include hydroelectric turbines to generate electricity when flow is released from Sites Reservoir to Funks Reservoir and, ultimately, to the TCC. Part of this PGP facility will be an energy-dissipation facility that will

allow releases back to Funks Reservoir as backup to the hydroelectric turbine facilities. The pumping plant will have a capacity of 2,100 cfs; the generating plant will have a capacity of 2,000 cfs.

2.1.8 Funks Pipelines

These are 2 parallel, 12-foot-diameter pipelines used to convey water between the Funks PGP and the Sites Reservoir. These pipelines will connect from the piping manifold at Funks PGP to the downstream side of the 2 proposed, 23-foot-diameter, tunnels connected to the Site Reservoir I/O structure. The approximate lengths of these pipelines are 1 mile (5,200 feet) each.

2.1.9 Dunnigan Pipeline

The Dunnigan pipeline consists of either a 9-foot-diameter or 10.5-foot-diameter pipeline that will be used to release water from the TCC to the Sacramento River. The concept is to release flow from Sites Reservoir to Funks Reservoir, where the flow will then go south about 40 miles to near the end of the TCC. At this point, flow will be diverted into the Dunnigan pipeline, where flow will head either to the CBD, which flows to Sacramento River, or directly to the Sacramento River. If the pipeline discharges directly into the Sacramento River, then a portion of the water will also be diverted and discharged in the CBD. Alternative 1 consists of a 9-foot-diameter pipeline that is about 4 miles (20,900 feet) long and discharges into the CBD. Alternative 2 consists of a 10.5-foot-diameter pipeline that is about 9.4 miles (49,500 feet) long and discharges directly into the Sacramento River.

2.1.10 Electrical Transmission Lines and Substations

Electrical transmission lines will be required to connect the existing WAPA or PG&E 230 kV transmission lines to the TRR PGP and the Funks PGP. There are 230 kilovolt (kV) electrical transmission lines running near the proposed project area. Specifically, the WAPA transmission lines run very close to Funks Reservoir in a north-south direction, with a parallel 230 kV line owned by PG&E a few miles east of the WAPA transmission lines. It is anticipated that one of these transmission lines will be connected to provide power for the Project, and receive generated electrical power from the hydroelectric turbines. Substations will be needed to provide power to and receive power from both the TRR and Funks PGP's.

2.1.11 Administration and Operations Building

At this time, staffing requirements for operating and maintaining the Sites facilities have not been defined, but an administration and operations building is provided, based on a drawing obtained from Reclamation. This building is anticipated to be next to the Funks PGP.

2.1.12 Maintenance and Storage Building

A building will be required to provide maintenance and storage associated with the Project. A drawing from Reclamation of the building was used in the feasibility design. This building is anticipated to be next to the Funks PGP.

2.1.13 Access Roads

Access to the proposed TRR-East site would likely be from McDermott Road, which lies adjacent to the proposed reservoir. Access to the Funks complex (PGP and reservoir) is currently accomplished using the operations and maintenance road, along the TCC. Access to the proposed TRR-West site would come off the Access to the Funks complex. A new access road will be required that allows larger equipment and year-round access. It is also anticipated that roads will be constructed within the TRR-East or TRR-West and Funks Pipeline easements, not only to provide access to the pipelines and electrical power transmission lines, but also to act as a secondary access road to the project facilities. Access roads are more fully described in Section 4 and in Appendix A.

2.2 Purpose and Scope

The purpose of this task is to demonstrate that the HC portion of the Project can be constructed with existing technology and availability of construction materials, work force, and equipment. This task includes the following:

- General construction conditions on conveyance activities, including site access, weather and environmental considerations, and staging use
- Characterization of material balance for TRR-East and TRR-West, considering borrow material sources, locations of placement within the TRR and their required volumes, and disposal
- Equipment use tables (including schedule and durations of use)
- Construction sequencing plan, risks, and construction schedule for the facilities within the HC contract (The constructability analysis will demonstrate the ability to provide public benefits by 2030.)
- Work force staff and equipment needs estimated over the construction period, for facilities within the HC contract

2.3 Limitations

The scope of work for this technical memorandum (TM) is restricted to the development of the constructability activities for the Sites Reservoir under the HC contract. Constructability activities for the reservoir facilities are separately considered in a companion TM for the HR contract.

Jacobs represents that our services have been conducted in a manner that is consistent with the standards of care ordinarily applied as the state of practice in the profession, within the limits prescribed by our client.

This TM is intended for the sole use of the Sites Project Authority. The scope of services performed may not be appropriate to satisfy the needs of other users. Any use or reuse of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

3.0 Public Interface and Site Safety

3.1 Public Interface and Traffic Routing

Construction of conveyance facilities will involve approximately 4 years of regularly transporting construction equipment and materials on public roadways leading to the site. The anticipated increase in traffic in the rural area of the Project warrants special planning. The Authority is taking measures for the appropriate conveyance of construction traffic, considering the safety and convenience of the traveling public. Construction access routes to the site have been defined to avoid the Town of Maxwell.

Objectives of the traffic handling strategy will be: avoiding the comingling the traveling public with construction activities, avoiding public interface with heavy off-road equipment, and minimizing public interface with other construction equipment required on public roadways.

Construction access figures are provided in Appendix A.

3.2 Site Safety

The contractor is responsible for means and methods to complete the work safely. The contractor also is required to provide for public safety and safe access for inspection and to Authority employees.

California Code of Regulations (CCR), Title 8 and California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) will have overall jurisdiction regarding project safety, including tunneling. Additionally, the interconnected utility (WAPA or PG&E) Health and Safety Standards and Protocols will be included in the works for the contractor to follow and implement.

Work around construction equipment requires special precautions and the contractor will be required to provide and maintain equipment in accordance with CCR Title 8.

4.0 General Considerations

4.1 Procurement and Work Packages

Procurement packages should divide the work in a manner that considers market conditions, resource availability, and bonding, and is conducive to concurrent construction of conveyance facilities. The construction procurement strategy and program should also recognize the need for participation from large, national, and international contractors with adequate resources to complete the anticipated work. The procurement strategy should consider contractor prequalification and proposals, as necessary, to provide for contracting with constructors who are qualified for the work involved; the strategy should anticipate adequate time in the procurement schedule.

For this constructability analysis, and considering the site arrangement, contractor resources, and work type, potential contract packages are anticipated as follows:

- Design-bid-build (traditional) contracts:
  - TCCA Red Bluff Pumping Plant improvements
  - GCID Main Canal improvements
  - TRR Alternatives
    - TRR-East
      - Contract 1: Ground improvement (cement deep soil mixing [CDSM]), also includes haul roads, GCID Canal bridge, material handling, stockpile
      - Contract 2: PGP and reservoir earthwork, also includes base liner, spillway, I/O works, GCID Canal plug
    - TRR-West
      - Contract 1: Earthwork (reservoir excavations), also includes haul roads, surface water diversion, stockpile (Note: Because this earthwork does not have to be done all at one time or any particular time, this contract can be broken into multiple contracts and/or can be part of HR Reservoir contract[s] to optimize material usage)
      - Contract 2: PGP and I/O works, also includes reservoir base liners, tunnels between main and extension reservoirs, existing canal lateral relocation, GCID Canal plug
  - Funks Reservoir
    - Contract 1: Dredging, also includes haul roads, surface water diversion (including Funks Creek), material handling, dewatering, stockpile
    - Contract 2: PGP and reservoir earthwork, includes Funks Creek diversion, approach channel excavation, temporary cofferdams
- Design-Build Contracts:
  - TRR/Funks pipelines
  - Dunnigan pipeline Alternative 1 or 2
  - Transmission power lines
  - Electrical substations
  - Interconnection substation for WAPA or PG&E

4.2 Site Access

4.2.1 Improvements to the TCCA Red Bluff Pumping Plant

Site access plan and details for the GCID Main Canal upgrade locations are provided on the figures in Appendix A.

4.2.2 GCID Main Canal Improvements Area

Site access plan and details for the GCID Main Canal improvement locations are provided on the figures in Appendix A.

4.2.3 Funks and TRR Area

The proposed Funks PGP and TRR PGP sites are located in Colusa County, about 7 miles west of Maxwell, California. Access is shown on the figures in Appendix A.

Some roadway improvements will be required within the Funks area. The Funks PGP site will be accessed via a 30-foot-wide all weather gravel road from Maxwell Sites Road to the south. Paved parking will be provided at the PGP. Existing gravel roads will be improved to be 30 feet wide; these roads will be relocated through the PGP site. A 30-foot-wide all weather gravel bypass road may be provided to the west of the site. On the northern side of the site, the existing dirt road will be improved to be a 30-foot-wide all weather gravel road that will follow the existing road alignment until it reaches the TRR pipeline. At that location, a new 30-foot-wide all weather gravel access road will be built alongside the Funks and TRR pipelines to the connection with the Sites tunnels.

Most of the proposed Funks PGP site is in a Federal Emergency Management Agency (FEMA) Area of Minimal Flood Hazard, Zone X, but a portion of the existing gravel road to the northwest of the PGP site and adjacent to the existing creek is located within a FEMA Special Hazard Flood Area without Base Flood Elevation, Zone A. This portion may need to be raised, if all-season access from that direction will be required.

The proposed TRR-East is located in Colusa County, east of the GCID Main Canal, north of Funks Creek, and just West of McDermott Road. The site will be accessed via a maximum 30-foot-wide all weather gravel road from McDermott Road. Paved parking will be provided near the pumping generating plant.

The proposed TRR-East site is located within a designated FEMA Special Flood Hazard Areas, Zone A, Without Based Flood Elevation. A base flood elevation will need to be determined prior to project approval.

The proposed TRR-West is located in Colusa County, west of the GCID Main Canal, east of Funks Reservoir, and north of Funks Creek. The site will be accessed via an all-weather gravel road off Funks Reservoir. Paved parking will be provided near the PGP.

The proposed TRR-West site is not located within a flood zone.

4.2.4 Dunnigan Pipeline Area

Site access plans and details for the Dunnigan pipeline Alternatives 1 and 2 are on the figures in Appendix A.

4.3 Weather Considerations

Wet weather may affect construction activities, although not significantly. Potential impacts may occur for a few specific work components, as detailed in the following paragraphs.

Wet weather has potential to delay the placement of the welded geomembrane liner on the cofferdams at Funks Reservoir. This activity is to be performed during the drawdown of the reservoir during the TCC Canal non-operational period, from December to March. The liner needs to be heat-welded together and will not seal if it is wet. In rainy weather, time-consuming drying could delay completion. Alternatively, rain shelters can be used to avoid such delays.

Both the TRR-East and TRR-West reservoir options involve I/O connections to the GCID Main Canal, with this construction to be performed within the GCID Main Canal non-operational window (January through February). Moving heavy equipment around during times that are too wet can cause delays and other construction challenges.

Stormwater control and stream diversions (particularly Funks Creek) will need to be handled in accordance with the Project's stormwater pollution prevention plan during construction activities.

Wet weather will have an impact on the construction of the Dunnigan pipeline, Alternatives 1 and 2, once the pipelines are east of the Highway (Hwy) 99 and railroad crossing. This area has silty/clay soils that make it very difficult for pipeline construction during extended wet weather.

4.4 Environmental Impacts and Impacts on Construction

It is beyond the scope of work for this TM to provide a detailed evaluation of environmental impacts resulting from construction; these impacts are addressed by others. Project planning will need to consider protection of species, such as nesting birds. A strategy of brush and tree clearing or netting of trees prior to nesting season could be employed to deter nesting birds, which otherwise could impact construction. Giant garter snake habitat is present along the Dunnigan pipeline; work adjacent to creeks and drains will need to be considered as well.

Dust control measures, similar to those employed on similar civil construction works, will be implemented. These will include gravel plating of haul roads, use of dust suppressants or surfactants on haul roads, water applied to haul roads, spray bars and dust catchment systems on aggregate processing equipment and batch plants, and other measures. Stockpiles and other open sources of fugitive dust will likely require temporary seeding. Air monitoring stations will be used.

4.5 Geotechnical Considerations

All of the planned conveyance facilities are considered constructable, using standard construction procedures and current geotechnical engineering practices.

4.5.1 TRR Alternatives

4.5.1.1 TRR-East

TRR-East features include embankment berms, canal I/O works, and a bridge over the GCID Main Canal. An important geotechnical consideration prior to the construction of TRR-East embankments involves ground improvement activities. Previous explorations within the footprint of the reservoir indicate adverse subsurface conditions that may be susceptible to liquefaction, lateral spreading, and ground settlement. To address these concerns, ground improvement will be performed and is anticipated to consist of CDSM methods.

Prior to mobilizing equipment for bridge construction, current site conditions along the eastern and western edges of the GCID Main Canal and available access routes should be considered. Limited available workspace for construction activities (such as pile driving and pile cap construction) and permissible access roads crossing the GCID Main Canal may limit mobilization or delay construction. Equipment mobilization should be initiated based on anticipated construction sequencing to the extent feasible.

Because of shallow or seasonal perched groundwater conditions, temporary dewatering may be required during excavation across the base of the reservoir. Groundwater removed during TRR-East construction activities would be managed and stored in accordance with state and local regulations.

Embankment berms associated with TRR-East will be under Division of Safety of Dams' (DSOD's) jurisdictional oversight. Anticipated turnaround times for required DSOD permitting and inspections must be accounted for to facilitate appropriate construction scheduling and help avoid delays in construction.

4.5.1.2 TRR-West

TRR-West features include two reservoir excavations (main and extension), the canal I/O works, and the extension reservoir connecting tunnel.

One of the geotechnical considerations includes high-cut slopes that could experience groundwater seepage, seasonal surface water erosion, and sediment transport. These considerations are routine and can be managed by implementing best management practices, as described in the Project's stormwater pollution prevention plan.

Excavations for each reservoir and the I/O works will produce topographically low areas that will concentrate groundwater, surface water, and construction water during construction activities. This concentration of water is considered routine and can be managed by a site-specific pumping plan to prevent conflicts with construction activities.

TRR-West features also cross existing corridor facilities (including overhead electrical transmission, underground gas lines, the GCID Main Canal, and a local landowner canal lateral). These crossings should be considered during construction to facilitate appropriate scheduling time for permitting, depth and distance to associated feature, and operating closure constraints (for the GCID Main Canal). In particular, the tunnel connecting the reservoirs crosses below the gas lines and considerations must be made to ensure tunnel roof stability and ground control (see Section 3.9 for more details).

Unlike TRR-East, TRR-West does not fall within DSOD's jurisdiction (because no dam will be constructed), which will remove the time associated with DSOD permitting and inspections.

4.5.2 Funks

Funks Reservoir features include sediment removal by dredging, temporary cofferdams construction and removal, and PGP approach channel excavation. Geotechnical considerations include soil characteristics of the dredge material to be reused as a material for construction.

For the dredged sediments to be used throughout the Project, they will need to be dewatered. Some soils from dredging are anticipated to be predominantly finer material and, therefore, likely to require more time to dry enough to be used for construction. Suitable materials for the temporary cofferdams are proposed to come from both the dredging and other areas of excavation. The cofferdam material will need to be sourced prior to the cofferdam construction, which would occur in the December through February non-operational period of Funk/TCC.

4.5.3 Other Conveyance Features

Other conveyance features that involve earthwork and geotechnical considerations, and for which limited geotechnical information is currently available include:

- The GCID Main Canal improvements. Geotechnical considerations include structural stability and uplift for the main head gate and siphon structures, and dewatering at those locations so the structures can be built in the dry.
- The TRR-East pipelines. Geotechnical considerations include dewatering the pipe trench near the GCID Main Canal, crossing the GCID Main Canal, pipe trench stability, tunneling/crossing the TCC and crossing the northern portion of Funks Reservoir.
- The TRR-West pipelines. Geotechnical considerations include pipe trench stability, tunneling/crossing the TCC, and crossing the northern portion of Funks Reservoir.
- The Funks pipelines. Geotechnical consideration include pipe trench stability and dewatering the trench along Funks Creek.

- The Dunnigan pipeline Alternative 1. Geotechnical considerations include pipe trench stability, tunneling under Interstate 5, Hwy 99, and the railroad; and dewatering the pipe trench as it heads east of the Hwy 99.
- The Dunnigan pipeline Alternative 2. Geotechnical considerations include the same as Dunnigan pipeline Alternative 1 and tunneling under the CBD and associated east levee (State Levee), crossing State Hwy 45, and going over the Sacramento River Levee.

The TCCA Red Bluff Pumping Plant improvements do not require any geotechnical considerations because the improvements are to an existing facility that involves no earthwork.

All of these features may be in close proximity of existing features near each location. Schedules should be planned and coordinated accordingly to protect existing features, and allow for operating windows, permitting, and associated approvals to avoid schedule delays.

4.6 Existing Utilities

4.6.1 Red Bluff Pumping Plant and TCC

The Red Bluff Pumping Plant and the TCC, which is a concrete-lined canal, needs to remain in service year round except for a 6- to 8-week period in December through early February. The dual TRR-West or the TRR-East pipelines will cross the canal at one location close to the entrance of the TCC to Funks Reservoir. Depending on time of year and further design, the dual 12-foot-diameter pipelines could be installed either by tunneling underneath the TCC or open-cutting the TCC.

Since the TCC and the Red Bluff Pumping Plan are Bureau of Reclamation owned facilities, work associated with the Red Bluff Pumping Plant, the TCC and Funks Reservoir will need to be coordinated with the Bureau of Reclamation and the Tehama-Colusa Canal Authority (TCCA).

4.6.2 GCID Main Canal

The GCID Main Canal is an earthen canal without any liner. It needs to remain in service year round, except for a 6- to 8-week period in December through early February. The dual TRR-East pipelines will cross the canal just west of TRR-East. It is expected that the dual 12-foot-diameter pipelines could be installed by open-cutting the canal. The connection of the GCID Main Canal to either TRR-East or TRR-West would be one of the last construction items for either reservoir project.

Since the GCID Main canal is a GCID owned facility, work associated with the GCID Main Canal will need to be coordinated with GCID.

4.6.3 PG&E

PG&E has two 230 kV transmission lines, running north to south, through the project site between Funks Reservoir and the GCID Main Canal. In PG&E's same right-of-way corridor, they also have two high-pressure gas lines. Coordination with PG&E will have to occur during design to be able to cross their facilities with the TRR-East pipelines, or the TRR-West reservoir.

In addition, coordination will need to occur with PG& E if the decision is made to connect to their 230 kV transmission lines for obtaining electricity for the PGPs and for transmitting power generated by the PGPs back to the electrical grid. This coordination would include: establishing the point of interconnection (POI); designing the modification of existing structures and conductors for crossing transmission lines; designing, constructing, and starting up and commissioning the substation prior to energization; and sequencing with the pumping station power energizing and startup schedule with the utility.

4.6.4 WAPA

WAPA has one 230 kV and one 500 kV transmission line running north to south through the project site, between Funks Reservoir and the GCID Main Canal. Coordination with WAPA will have to occur during design to be able to cross under their facilities with the TRR-East or TRR-West pipelines.

In addition, coordination will need to occur with WAPA if the decision is made to connect to their 230 kV transmission lines to obtain electricity for the PGPs and transmit power generated by the PGPs back to the electrical grid. This coordination would include: establishing the POI; designing the modification of existing structures and conductors for crossing transmission lines; designing, constructing, and starting up and commissioning of the substation prior to energization; and sequencing with the pumping station power energizing and startup schedule with the utility.

4.6.5 CBD

The CBD is an existing earth drainage feature that is unlined that has a state levee on its eastern bank. The CBD in general and at the location of project facilities (River Mile 10.0) is full of water all year. The levee is maintained by numerous entities. The CBD itself is not maintained by anyone. The CBD water surface elevation is controlled by the Department of Water Resources at the Knights Landing Outfall Gates structure near the town of Knights Landing.

Design and construction of the CBD outlet structure for Dunnigan pipeline Alternatives 1 and 2, and tunneling under the CBD and east levee for Alternative 2 will need to be coordinated with local landowners, Reclamation District No. 108, and the Department of Water Resources.

4.7 Site Staging and Use

Staging areas will be required near each of the conveyance facilities being constructed. The staging areas will be developed by the construction contractors for various activities, including: construction office facilities, material laydown areas, and equipment storage and maintenance. Each of the facilities has one or more proposed staging areas identified.

4.7.1 Red Bluff Pumping Plant Improvements

There are two staging areas that can be used at the existing pumping plant, as shown on the figures in Appendix A.

4.7.2 GCID Main Canal Improvements

Staging areas are located at the main headgate structure, the Willows siphon, the Walker Creek siphon, and the railroad siphon.

4.7.3 TRR

4.7.3.1 TRR-East

Equipment laydown and staging areas for TRR-East will be primarily situated inside the footprint of the reservoir and I/O works areas. One temporary (approximately 21-acre) stockpile area will be located west of TRR-East and the GCID Canal and can be used for staging during construction activities. Relatively limited staging areas and site access routes should be considered as construction progresses to facilitate availability of adequate storage and laydown capacity and to avoid potential schedule delays.

4.7.3.2 TRR-West

Staging for TRR-West construction of the main reservoir, extension reservoir, and I/O works will be within the footprint of these same features. Because staging will occur in the same areas as construction, site access routes and laydown areas should be considered as construction progresses to avoid potential schedule delays.

One temporary (approximately 20-acre) stockpile area will be located north of TRR-West extension reservoir and can be used for staging during construction activities. The staging area for the extension reservoir connecting tunnel will be within the footprint of the main and extension reservoirs because this tunnel will be constructed after the reservoirs are excavated.

4.7.4 Funks

Staging areas at Funks Reservoir will be needed for the dredging equipment, the materials needed to build the PGP, and the liner material for the cofferdams. The PGP footprint and areas identified nearby will be used for staging of heavy equipment and construction materials used for dredging and during the cofferdam construction. Once the PGP construction begins, the staging area will be moved slightly up the Funks Creek valley. Many of the stockpile areas identified for Funks Reservoir materials would have dual purposes as staging and laydown areas throughout the life of the Project.

4.7.5 Remaining Conveyance Facilities

For the TRR-East pipelines, TRR-West pipelines, Funks pipelines, Dunnigan pipelines Alternatives 1 and 2, staging areas will be developed along the length of pipelines within the designated construction easements, at the contractor's discretion. The electrical transmission lines will be installed after the TRR pipeline.

4.8 Construction Water

Average construction water use is expected to be approximately 350,000 to 400,000 gallons per day, primarily related to the pipelines for trench compaction, work at TRR East or TRR West, dust control, and lost water due to dredging of Funks Reservoir. Total water use for the Project associated with the HC facilities is roughly calculated to be approximately 175 to 200 million gallons.

Water used for construction would be transferred to the facility footprints from either the TC Canal or the GCID Main Canal by trucks and/or pipes. The pipes are not expected to be buried, except at crossings of heavily trafficked areas, where they may be installed several feet below ground surface. We have assumed water will be conveyed mostly by 4,000 gallon water trucks.

The Dunnigan pipeline Alternative 1 and 2 would obtain water from wells or dewatering efforts required during pipeline construction or from the TC Canal.

4.9 Tunneling

Between the TRR pipeline, Funks pipeline, and Dunnigan pipeline, seven tunnels will be constructed across the Project. Four proposed, 12-foot-diameter, tunnels (two for TRR-East and two for Funks) will be used to cross the GCID Main Canal and the TCC Canal. The remaining three tunnels are for the Dunnigan pipeline: for Alternative 1, 10.5-foot casings will be required, first under Interstate 5 and then Hwy 99 and railroad; and for Alternative 2 the tunnel locations and size will be the same at Alternative 1, with an additional tunnel of the same size to cross under the CBD.

For TRR-West there are four proposed, 12-foot-diameter tunnels, to connect the two reservoirs (main and extension) that make up the TRR-West reservoir. The tunnels will go under the PG&E transmission towers and two PG&E high-pressure gas pipelines.

All tunneling features will follow standard guidelines.

5.0 Site Materials and Use

The primary objective for materials will be to use excavated materials for fill, as a direct or single haul-and-place activity. The potential for double handling exists because the timing and suitability of materials will vary, as well as the coordination of where and when materials are needed as fill. Most excavation and materials processing activities can be sequenced early in the overall Project to maintain flexibility for efficient reuse of earthen materials (for example, as random fill). A less preferred option would be permanent disposal on site.

The least preferred option would be off-haul of materials for disposal. Disposal quantities should be small if more beneficial project site areas are identified for reuse. The project team will further develop the ultimate dispositions of these materials to optimize the reuse of material for the overall Sites project, as discussed in the following subsections for each TRR option or Funks Reservoir modification.

Haul roads are needed to perform the construction activities in and around the reservoirs. Haul routes will be designated to accommodate construction traffic and avoid public use. Within the project limits, the routes may be separated between light traffic use and heavy equipment hauling for site safety.

5.1 TRR

5.1.1 TRR-East

Construction of the TRR-East reservoir embankments will require that fill be obtained from borrow sources located elsewhere within the Sites project (that is, not from within the TRR-East footprint). Construction of TRR-East also will produce excess material that is unsuitable as embankment fill and must be hauled away from the TRR-East site.

The CDSM ground improvement under the reservoir embankments will consist of a large, treated, volume of in-place material mixing, which also will generate a significant volume of fluid spoils (soil, cement, and water). These CDSM spoils are unlikely to be acceptable as reservoir embankment fill and, therefore, will be hauled away from the TRR-East site. CDSM spoils may be acceptable after dewatering for non-engineered fill uses, such as for pipeline trench backfill in certain zones above the pipelines (zones not exposed). CDSM spoils to be reused will be hauled to a stockpile location for dewatering prior to reuse. Some CDSM spoils may be unsuitable for reuse and have to be disposed of either on site (elsewhere within the Sites project) or hauled offsite for disposal.

Development of the TRR-East reservoir will require excavation of surficial soils and underlying soils to a depth of 2 feet across the TRR-East reservoir footprint. These soils are anticipated to be unsuitable for use as reservoir embankment fill and, therefore, will be hauled away from the TRR-East site. As for the CDSM spoils, some of the soils excavated across the TR- East reservoir footprint may be acceptable for non-engineered fill uses, and some may need to be disposed of on site or hauled offsite for disposal.

To construct the TRR-East reservoir embankments, fill will need to be obtained from borrow sources located elsewhere within the Sites project. The primary source of fill for the embankments will be the excavations for the TRR pipelines trenches. The pipeline trenches will produce significant quantities of materials that will be suitable as embankment fill; these materials will be hauled from the pipeline trench excavations to the TRR-East site.

5.1.2 TRR-West

The TRR-West option (if selected) will produce very large quantities of materials from the excavations that are needed to create the reservoir. As much as 8 to 9 million cubic yards of material may be produced from these excavations. Very little of this material will be needed as fill at the TRR-West location. Therefore, these large quantities of material will be hauled from the TRR-West site to other locations on the Sites project for use as fill. Other locations for depositing this excess material include HR reservoir dams, road construction, fill for the Sites Ladoga Road bridge abutments, quarry restoration, or disposed in the Sites Reservoir Deadpool.

The vast majority of the material that would be excavated for development of the TRR-West option will be suitable for beneficial reuse as general fill on the overall Project. This reuse will include placement as Zone 4 random fill at the dams, as fill for the large embankments of Sites-Lodoga Road, as fill for quarry restoration, or as other general fill. Topsoil stripped from the TRR-West footprint will not be suitable as general fill; a stockpile area is located adjacent to TRR-West to allow temporary storage of topsoil strippings.

5.2 Funks

Funks Reservoir modifications will involve predominantly excavations by dredging in over-water areas or conventional earthmoving when the reservoir pool is lowered. These activities will produce large quantities of materials that will not be used as fill at Funks and will be used elsewhere on the Sites project. Approximately 740,000 bank cubic yards of materials will be excavated by hydraulic dredging and conventional excavation from Funk Reservoir. These materials will be placed in stockpile areas for dewatering, to prepare these materials for later beneficial reuse on the Project. Likely, some quantity of dredged material will be unsuitable for reuse as engineered fill and may need to be disposed of onsite or offsite. At least 80 percent of materials are estimated to be suitable for reuse on the Project after dewatering. After dewatering, potential uses of these materials may include pipeline backfill, Zone 4 random fill (the stockpiles will be close to Golden Gate Dam), Sites-Lodoga Road embankment fill, quarry restoration, or other general fill.

5.3 General Concrete

It is anticipated that there will be a concrete batch plant onsite to supply concrete for the PGPs and other facilities. At this point, it is unknown if excavated site materials will be available or if aggregate will be hauled in from offsite. This will be verified through future geotechnical investigations. It is anticipated that concrete low strength material will be used as backfill for the large-diameter pipes. This material can potentially made from onsite materials mixed with hauled-in cement. This will be verified with future geotechnical investigations.

6.0 Equipment and Workforce

6.1 Labor Force, Project Labor Agreements

Providing for a sufficient labor force for a project of this magnitude poses challenges but is manageable. Much of the labor force is anticipated to come from the surrounding region, with contractors also bringing some skilled work force from other areas. While Colusa County is rural, with a population of about 20,000, the surrounding counties, including Placer, Sacramento and Yolo counties, have a regional population of over 2 million. It may be advantageous to consider project labor agreements with trade unions as a means of accommodating the project labor requirements, as well as avoiding labor disputes. A project labor agreement, well in advance of the need for craft labor, would provide for established labor rates, benefits, and work rules, as well as stability of the workforce. Unions and contractors will have advance notice in identifying required craft labor and training programs. Further, project labor agreements will minimize the risk of labor disputes during the course of the work. This strategy has been used successfully on other major civil works projects in California.

6.2 Equipment Needs

The required equipment consists of standard heavy earthmoving and excavation equipment, typical for large civil projects. Although the quantity of equipment may be large, especially for TRR West construction, this type of equipment is commonly found in the region and elsewhere. Large contractors would use their own equipment, lease or purchase new equipment.

The approach to estimating the equipment use and limitations for the construction cost estimates, includes the following:

- The equipment use tables are intended to inform the project team of expected equipment type, hours and horsepower, as well as expected labor needed.
- At this point in the Project, the design is at feasibility level. Further design development will determine final quantities, with other factors influencing final equipment use.
- Various contractors will approach the work differently from each other, and likely differently from the design engineer’s interpretation of equipment use and staffing.

- The equipment used for construction cost estimating are an approximation of the equipment, crews, and production needed to complete the Project. This is somewhat dictated by a lack of design details, although some details and quantities have been extrapolated based on best industry practices and expectations.
- Site geologic study and interpretation is incomplete. Future geotechnical work will affect final design and quantities.
- Procurement strategies and outcomes, including contract packages, will have some impact on the use and timing of equipment and crews.
- Travel speeds for vehicles within the Project site: The average speed for pickup trucks and supervisory vehicles will be about 20 miles per hour (mph), but will vary with individual duties and activities.
- Travel speeds for offsite hauling vehicles: For offsite hauling vehicles (such as those making deliveries to the job), an average of 40 mph was used from points of origination to delivery sites and returns to points of origin.
- Travel speeds for onsite hauling vehicles: The team used average speeds for hauling calculations. For onsite hauling vehicles, such as those used to haul excavated or processed material, speeds averaged 15 mph.
- Travel speeds for support equipment: Equipment such as water trucks and graders have travel speeds of about 15 mph. Operational speeds while performing work will be about 3 to 5 mph.
- No off-road, mobile, electric-powered equipment is anticipated at this time.
- Workforce and staff will vary during the course of the Project, as work activities ramp-up, peak, and taper off toward completion.
- Regarding staff and workforce commute, it is anticipated that much of the workforce will come from the surrounding area, including the greater Sacramento area. The average daily commute is expected to be approximately 70 miles, or about 1.5 hours, each way.
- Start and end dates reflect the preliminary construction schedule as provided in Appendix B.

The actual daily equipment and workforce use will vary based on what activities are being performed across the Project at any given time.

6.3 Equipment on Roads

Daily construction traffic will consist of trucks hauling equipment and materials to and from the worksites and the daily arrival and departure of construction workers. Construction traffic on local roadways will include dump trucks, bottom-dump trucks, concrete trucks, flatbed trucks for delivering construction equipment and permanent project equipment, pickups, water trucks, equipment maintenance vehicles, and other delivery trucks. Dump trucks would be used for earth moving and clearing, removal of excavated material, and import of other structural and paving materials. Other delivery trucks would deliver construction equipment, job trailer items, concrete-forming materials, reinforcing steel and structural steel, piping materials, foundation piles and sheet piling, sand and gravel from offsite sources, new facility equipment, and other construction-related deliveries. Construction equipment/materials would not be permitted to pass through the community of Maxwell on the Maxwell Sites Road.

7.0 Construction Sequencing Plan and Construction Schedule

7.1 General Plan and Approach

The first activities for project construction will include permitting and obtaining access on roads and real estate. Initial access will also allow for setup of staging, stockpile, office, and shop facilities, as well as mobilization of workforce and resources.

The general sequence of nonroad construction will begin with the Dunnigan Pipeline Alt 1 or Alt 2 and follow with the rest of the conveyance facilities. These facilities will be constructed in parallel over two to three years. Construction of the electrical transmission lines (after the TRR pipeline) and electrical substations will be initiated last in the sequence.

Note that construction within 1,000 feet of occupied residences will be restricted between 10:00 p.m. and 7:00 a.m. to eliminate potential noise concerns. Construction in areas beyond 1,000 feet of occupied residents may occur 24 hours a day, 7 days a week.

7.2 Construction Schedule

See Table 1 for the estimated construction schedule on conveyance facilities, including dates for permitting, engineering, and geotechnical investigations. The construction schedule is provided in Appendix C.

Table 1. Estimate Construction Schedule for Conveyance Facilities

Task Name	Duration (days)	Start Date	Finish Date
California Water Commission Award of Funds	0	12/1/23	12/1/23
Determine Engineering Procurement & Delivery Method	120	1/1/22	6/16/22
Sites Board Approval/Notice to Proceed for Phase 3	23	6/1/22	7/1/22
Real Estate Access & Permitting (Geotech & Surveying)	260	7/5/21	7/1/22
Initial Geotech & Surveying	130	7/4/22	12/30/22
Final Geotech Investigation	130	1/2/23	6/30/23
Engineering	867	9/1/22	1/15/25
Conveyance to Sacramento River Construction			
Dunnigan Pipeline – Alternative 1	355	9/26/24	2/4/26
Dunnigan Pipeline – Alternative 2	505	2/13/25	1/20/27
Regulating Reservoirs and Conveyance Construction			
Funks/TRR Pipelines	505	2/13/25	1/20/27
Transmission Powerlines	765	5/22/25	4/26/28
Funks Reservoir	680	5/22/25	12/29/27
Funks Pumping Generating Plant	880	5/22/25	10/4/28
TRR-East or TRR-West Reservoir	780	5/22/25	5/17/28
TRR Pumping Generating Plant	880	5/22/25	10/4/28
Substations	645	3/12/26	8/30/28
Sacramento River Diversion and Conveyance Construction			
Red Bluff Pumping Plan Improvements	560	2/3/25	3/26/27
GCID Improvements	680	5/22/25	12/29/27

7.3 Schedule and Work Hours

A more detailed schedule can be found in Appendix B. Note the following assumptions:

- The construction schedule is calculated on 20 working days per month to account for holidays and weather delays.
- Durations of construction are based on production rates associated with the anticipated equipment types needed for construction.

- Productions and durations are calculated on 10-hour work shifts, accounting for breaks.
- Crews would likely work 6 days per week on critical functions.

7.4 Procurement and Contract Packaging

The construction schedule includes assumptions on procurement and contract packaging on the conveyance facilities listed in Section 3.1.

7.5 Commissioning and Interface with HR Facilities

Most of the HC facilities can be commissioned without the HR facilities. However there are some HC facilities that will require HR facilities prior to final commission. These facilities include the tie-in of the TRR and Funks pipelines to the Golden Gate Dam Inlet/outlet tunnels (HR) so that full testing of the PGP's pumps and hydropower generators can occur. Also power from PGE & WAPA from their point of connection to the PGP switch yards will be required for full testing of the PGP equipment.

The most recent schedule including HC and HR facilities is provided in Appendix B.

8.0 Conclusions

The objective of this TM is to show that the Project can be constructed with existing technology and availability of construction materials, work force, and equipment. This study shows that the HC facilities can be constructed by the end of 2028, for a construction duration of about 4 years, with full commissioning in 2029 and 2030 (together with the HR facilities).

The construction schedule to have the HC facilities complete by end of 2028 is reasonable, but will require careful planning to ensure long-lead time equipment is specified and ordered early. This equipment includes the pumps, generator turbines, and switchgear for substations. The timing of completing work at existing facilities such as installing new pumps at the Red Bluff Pumping Plant, dredging of the Funks Reservoir and tying into the GCID Main Canal will be performed over several seasons given the short duration when these facilities may be taken out of service.

Construction materials are primarily composed of earthwork and concrete, both of which are readily available in the timeframe allowed for the quantity required. Earthwork may require moving excavated spoils for reuse on other project features such as the large reservoirs and for construction of the TRR East. However, there should be sufficient spoils material available given the large volume generated from the pipelines construction.

Providing for a sufficient labor force for this project poses a challenge, but is manageable. It is anticipated that much of the labor force would come from the surrounding region, with contractors also bringing some skilled work force from other areas. The surrounding counties, including Placer, Sacramento and Yolo Counties, have a regional population of over two million. It may be advantageous to consider project labor agreements with trade unions as a means of accommodating the project labor requirements, as well as avoiding labor disputes. This strategy has been used successfully on other large civil works projects in California.

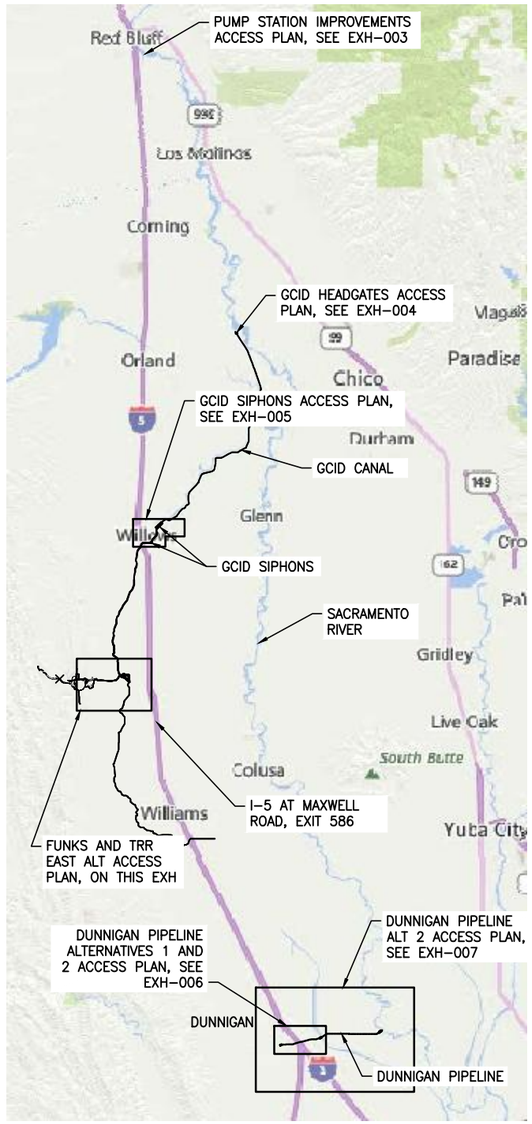
The required equipment consists of standard heavy earthmoving and excavation equipment. Although the quantity of equipment may be large, especially for reservoir construction, this type of equipment is commonly found in the region and elsewhere. Large contractors would use their own equipment, lease or purchase new equipment.

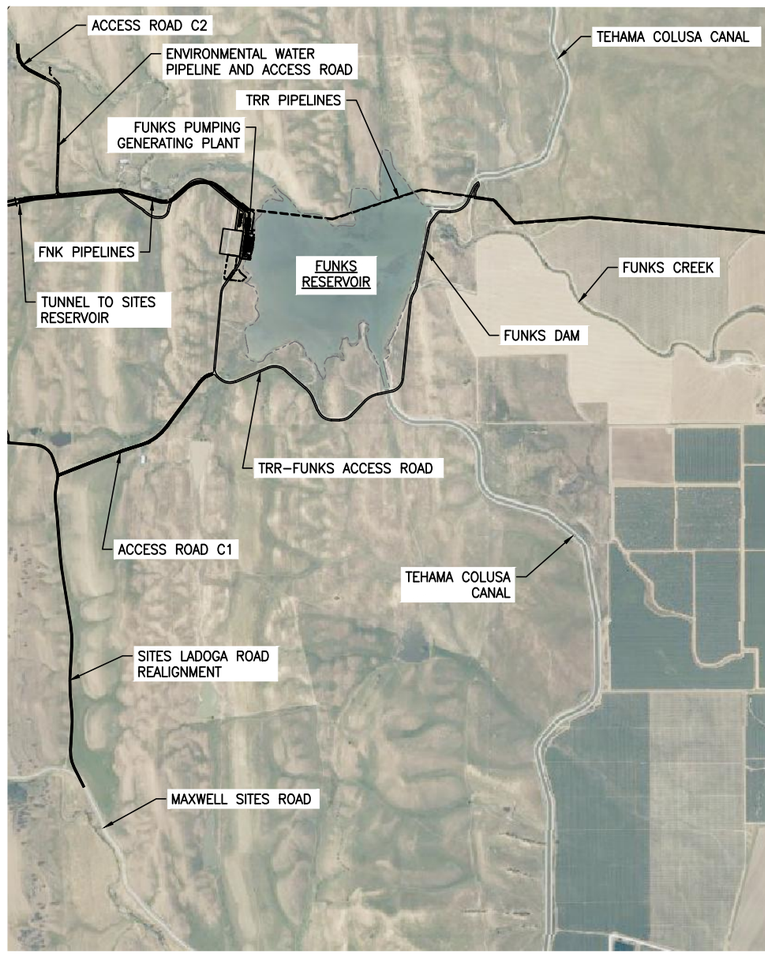
In summary, although there are risks to the scheduled four-year completion of construction, the HC facilities of the Sites Reservoir Project can be constructed with existing technology and available construction materials, work force and equipment.

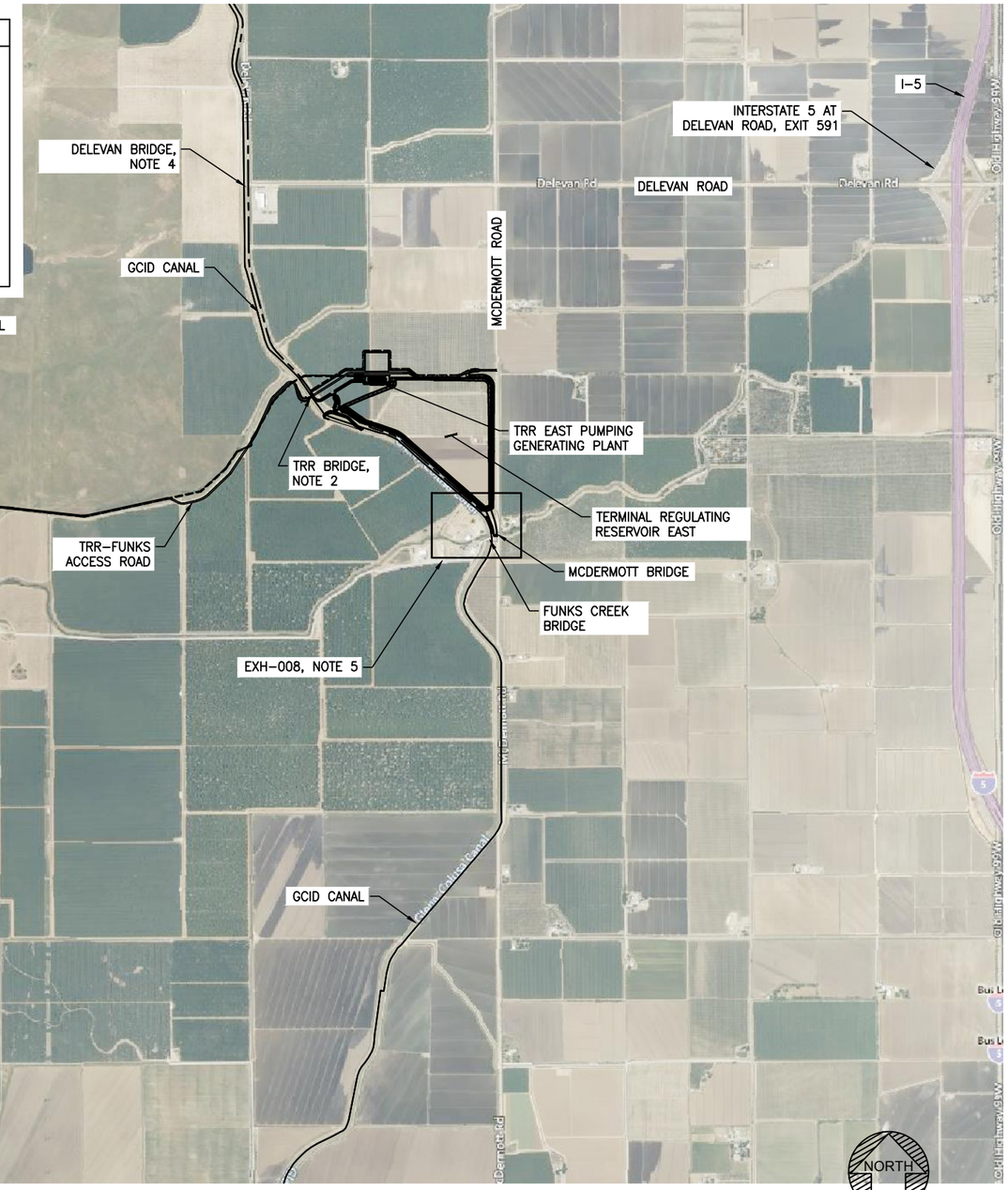
Appendix A
Site Access Plans

SITE ACCESS NOTES

1. FOR MAIN CONSTRUCTION ACCESS TO TRR EAST: EXIT I-5 AT DELEVAN ROAD, EXIT 591. TRAVEL WEST ON DELEVAN ROAD, THEN TURN SOUTH ON MCDERMOTT ROAD. TRAVEL SOUTH ON MCDERMOTT ROAD TO THE TRR EAST SITE ON THE RIGHT.
2. CONSTRUCTION VEHICLES ARE TO USE TRR-FUNKS ACCESS ROAD FOR CONSTRUCTION ACCESS AFTER CONSTRUCTING THE TRR BRIDGE.
3. ALTERNATE ACCESS TO FUNKS RESERVOIR PRIOR TO THE CONSTRUCTION OF THE TRR BRIDGE IS AS FOLLOWS: EXIT I-5 AT DELEVAN ROAD, EXIT 591. TRAVEL WEST ON DELEVAN ROAD, THEN TURN SOUTH ON MCDERMOTT ROAD. TRAVEL SOUTH ON MCDERMOTT ROAD TO MAXWELL SITES ROAD. TURN WEST ON MAXWELL SITES ROAD, THEN TAKE THE SITES LADOGA ROAD REALIGNMENT TO ACCESS ROAD C1 TO THE TRR-FUNKS ACCESS ROAD TO REACH THE FUNKS PUMPING GENERATING PLANT SITE.
4. DELEVAN BRIDGE IS A PRIVATE ACCESS BRIDGE AND HAS A MAX WEIGHT LIMIT OF XXX TONS.
5. FOR ALTERNATE CONSTRUCTION ACCESS USING PRIVATE BRIDGES ACROSS THE GCID CANAL AND FUNKS CREEK SOUTH OF THE TRR EAST SITE, SEE EXH-008.







NORTH

OVERALL LOCATION PLAN
NTS

DRAFT – PREDECISIONAL WORKING DOCUMENT – FOR DISCUSSION PURPOSES ONLY

FUNKS AND TRR EAST ALT ACCESS PLAN
SCALE: 1" = 1500'

0 1500' 3000'

PROJECT FEASIBILITY STUDY – NOT FOR CONSTRUCTION

I/R	DATE	BY	CHK	APPR	DESCRIPTION

DESIGNED BY: B CHELONIS
DRAWN BY: B CHELONIS
CHECKED BY: J SMITH
IN CHARGE: P RUDE
DATE: APRIL 2021

JACOBS
2525 AIRPARK DR
REDDING CA, 96001
PHONE: (530) 243-5831

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

Sites

SITES RESERVOIR TO 2
OVERALL LOCATION
AND ACCESS PLAN
TERMINAL REGULATING RESERVOIR EAST ALT

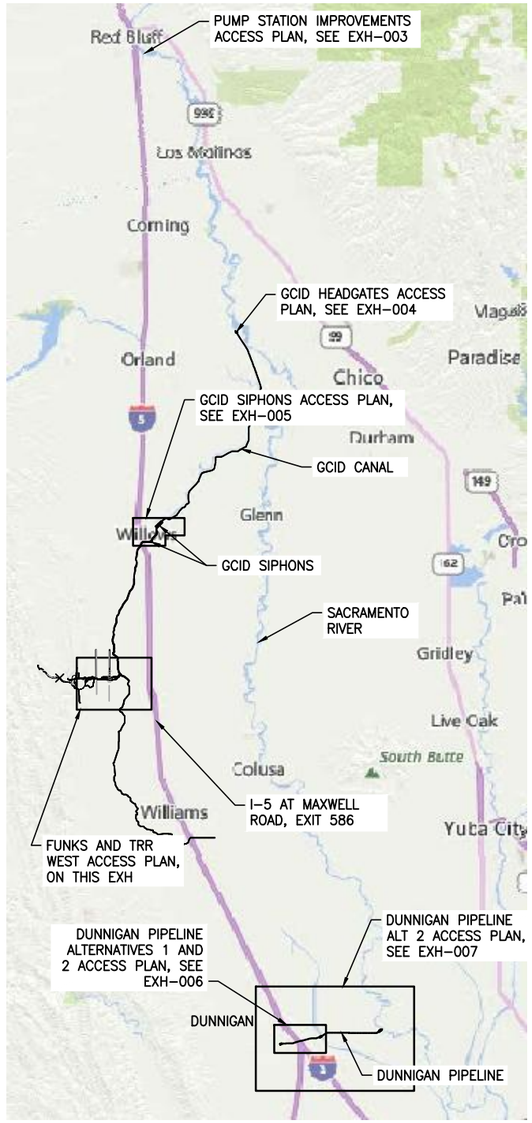
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALE FOR REDUCED PLOTS
0 1"

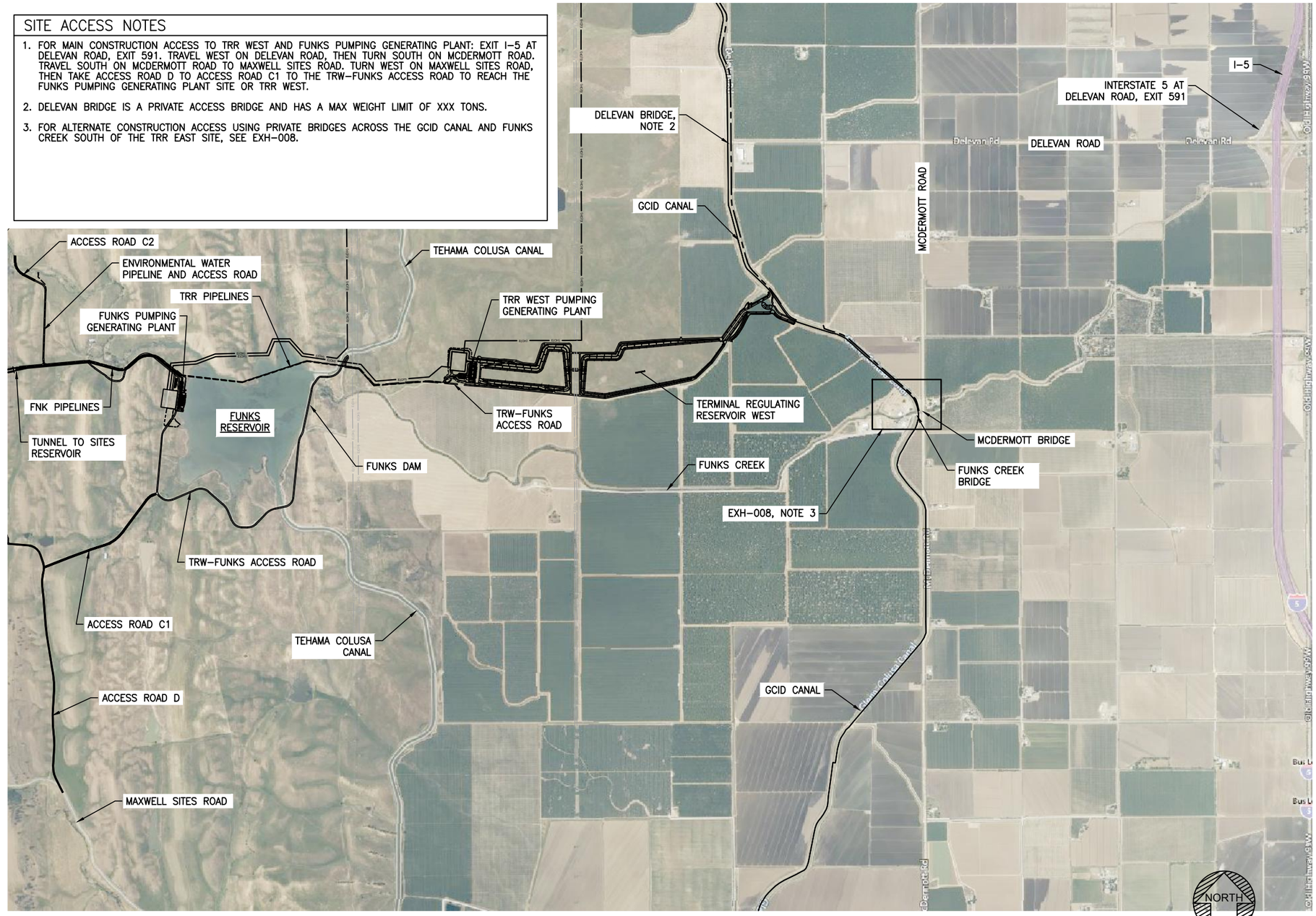
DRAWING NO.
EXH-001

PLOTTED BY:CHELONIS, BECKY/RDD -April 15, 2021-3:44:42 PM
DRAWING: GEN-EXH-001_D3380600.dwg
JACOBS PROJECT # D3880600

SITE ACCESS NOTES

1. FOR MAIN CONSTRUCTION ACCESS TO TRR WEST AND FUNKS PUMPING GENERATING PLANT: EXIT I-5 AT DELEVAN ROAD, EXIT 591. TRAVEL WEST ON DELEVAN ROAD, THEN TURN SOUTH ON MCDERMOTT ROAD. TRAVEL SOUTH ON MCDERMOTT ROAD TO MAXWELL SITES ROAD. TURN WEST ON MAXWELL SITES ROAD, THEN TAKE ACCESS ROAD D TO ACCESS ROAD C1 TO THE TRW-FUNKS ACCESS ROAD TO REACH THE FUNKS PUMPING GENERATING PLANT SITE OR TRR WEST.
2. DELEVAN BRIDGE IS A PRIVATE ACCESS BRIDGE AND HAS A MAX WEIGHT LIMIT OF XXX TONS.
3. FOR ALTERNATE CONSTRUCTION ACCESS USING PRIVATE BRIDGES ACROSS THE GCID CANAL AND FUNKS CREEK SOUTH OF THE TRR EAST SITE, SEE EXH-008.





NORTH

OVERALL LOCATION PLAN
NTS

DRAFT – PREDECISIONAL WORKING DOCUMENT – FOR DISCUSSION PURPOSES ONLY

FUNKS AND TRR WEST ALT ACCESS PLAN
SCALE: 1" = 1500'

0 1500' 3000'

I/R	DATE	BY	CHK	APPR	DESCRIPTION

DESIGNED BY: B CHELONIS
DRAWN BY: B CHELONIS
CHECKED BY: J SMITH
IN CHARGE: P RUDE
DATE: APRIL 2021

JACOBS
2525 AIRPARK DR
REDDING CA, 96001
PHONE: (530) 243-5831

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

Sites

SITES RESERVOIR TO 2
OVERALL LOCATION
AND ACCESS PLAN
TERMINAL REGULATING RESERVOIR WEST ALT

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALE FOR REDUCED PLOTS
0 1"

DRAWING NO.
EXH-002

PROJECT FEASIBILITY STUDY – NOT FOR CONSTRUCTION

PLOTTED BY:CHELONIS, BECKY/RDD –April 15, 2021–3:44:42 PM
DRAWING: GEN-EXH-002_D3380600.dwg
JACOBS PROJECT # D3880600

SITE ACCESS NOTES

1. FOR CONSTRUCTION ACCESS TO THE RED BLUFF PUMPING PLANT, EXIT I-5 AT SOUTH MAIN STREET (EXIT 647). TRAVEL SOUTH ON SOUTH MAIN STREET, THEN TURN EAST ON ALTUBE AVENUE. PROCEED TO PUMPING PLANT ON ALTUBE AVENUE AS SHOWN ON THIS DRAWING.

0 150' 300'
1" = 150'

DRAFT – PREDECISIONAL WORKING DOCUMENT – FOR DISCUSSION PURPOSES ONLY

ACCESS PLAN
SCALE: 1" = 150'

I/R	DATE	BY	CHK	APPR	DESCRIPTION

DESIGNED BY: B CHELONIS
DRAWN BY: B CHELONIS
CHECKED BY: J SMITH
IN CHARGE: P PRUDE
DATE: MARCH 2021

JACOBS
2525 AIRPARK DR
REDDING CA, 96001
PHONE: (530) 243-5831

REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

Sites

SITES RESERVOIR TO 2
RED BLUFF PUMPING PLANT
ACCESS PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALE FOR REDUCED PLOTS
0 1"

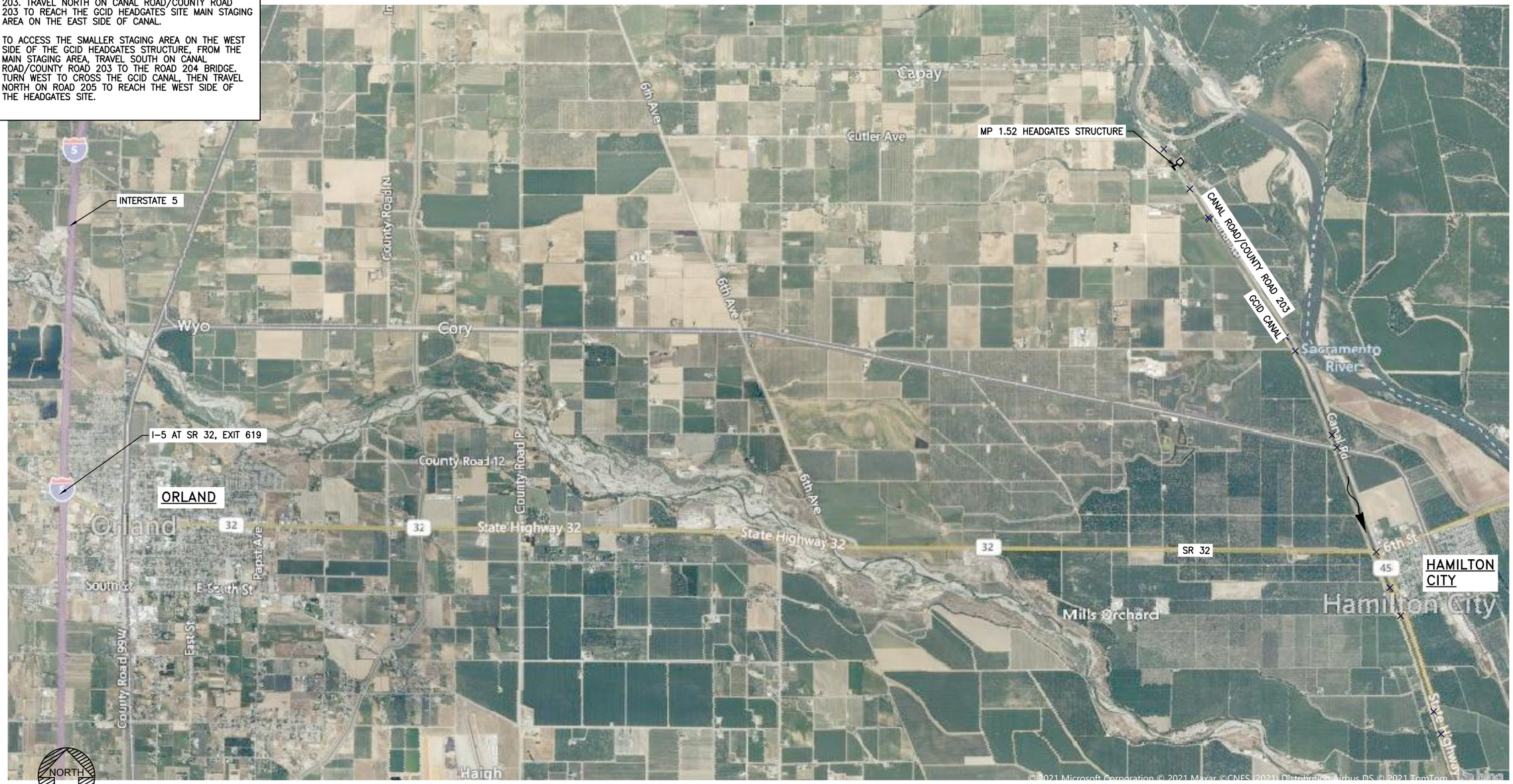
DRAWING NO.
EXH-003

PROJECT FEASIBILITY STUDY – NOT FOR CONSTRUCTION

PLOTTED BY:CHELONIS, BECKY/RDD –March 19, 2021–3:44:42 PM
DRAWING: GEN-EXH-003_D3380600.dwg
JACOBS PROJECT # D3880600

SITE ACCESS NOTES

1. GCID HEADGATES SITE ACCESS ROUTE: EXIT INTERSTATE 5 AT ORLAND, CALIFORNIA STATE HIGHWAY 32 (SR 32), EXIT 619. CONTINUE EAST ON SR 32 TO HAMILTON CITY, THEN TURN NORTH ON CANAL ROAD/COUNTY ROAD 203. TRAVEL NORTH ON CANAL ROAD/COUNTY ROAD 203 TO REACH THE GCID HEADGATES SITE MAIN STAGING AREA ON THE EAST SIDE OF CANAL.
2. TO ACCESS THE SMALLER STAGING AREA ON THE WEST SIDE OF THE GCID HEADGATES STRUCTURE, FROM THE MAIN STAGING AREA, TRAVEL SOUTH ON CANAL ROAD/COUNTY ROAD 203 TO THE ROAD 204 BRIDGE. TURN WEST TO CROSS THE GCID CANAL, THEN TRAVEL NORTH ON ROAD 205 TO REACH THE WEST SIDE OF THE HEADGATES SITE.



0 30' 60'
1" = 30'

DRAFT – PREDECISIONAL WORKING DOCUMENT – FOR DISCUSSION PURPOSES ONLY

GCID HEADGATES ACCESS PLAN
SCALE: 1" = 30'

I/R	DATE	BY	CHK	APPR	DESCRIPTION

DESIGNED BY: B CHELONIS
DRAWN BY: B CHELONIS
CHECKED BY: J SMITH
IN CHARGE: P PRUDE
DATE: MARCH 2021

JACOBS
2525 AIRPARK DR
REDDING CA, 96001
PHONE: (530) 243-5831

REGISTERED PROFESSIONAL ENGINEER WATER RESOURCES

Sites

SITES RESERVOIR TO 2
GCID MAIN CANAL
HEADGATES ACCESS PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALE FOR REDUCED PLOTS
0 1"

DRAWING NO.
EXH-004

PROJECT FEASIBILITY STUDY – NOT FOR CONSTRUCTION

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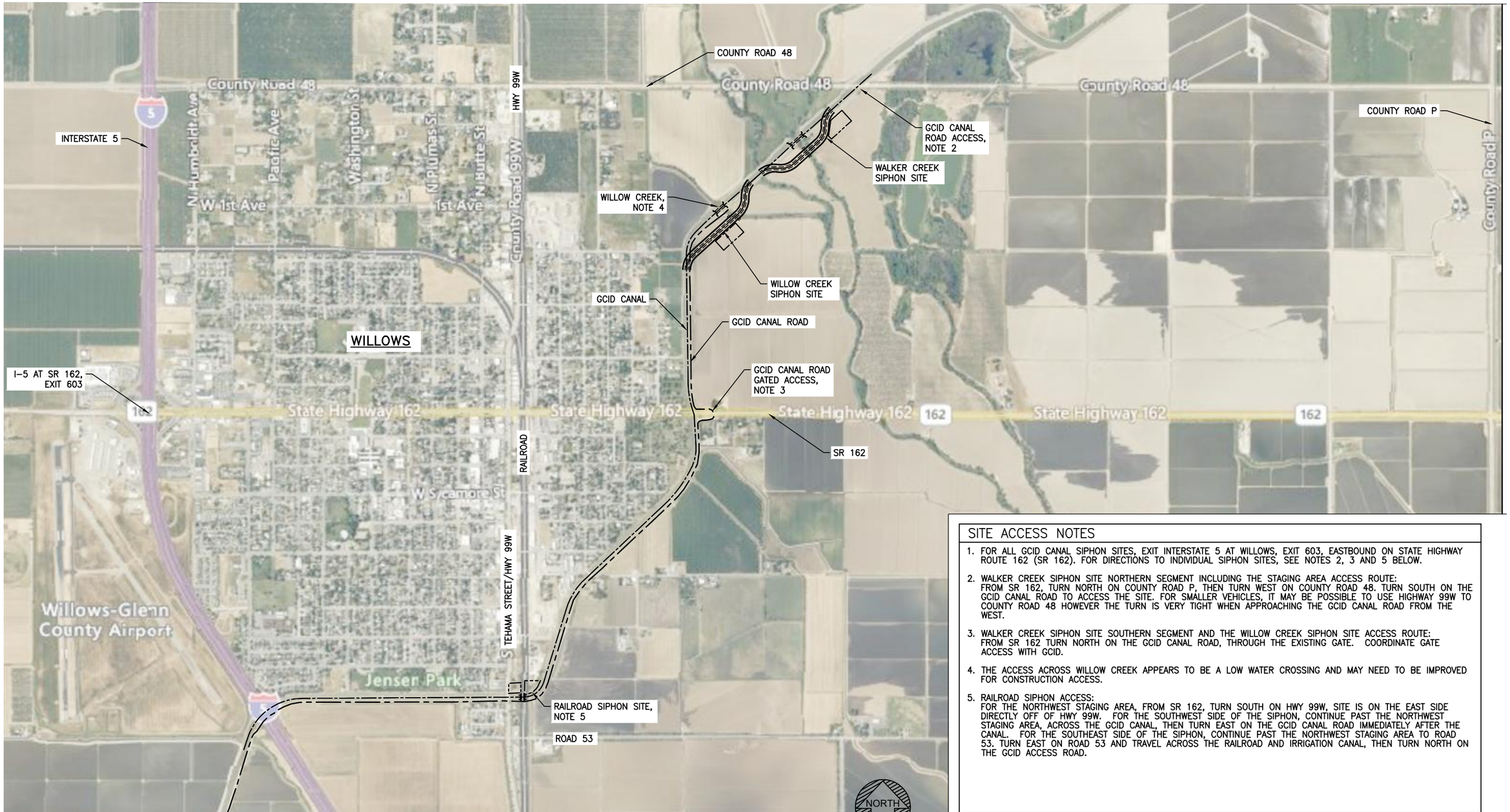
DRAWING: GEN-EXH-004_D3380600.dwg
JACOBS PROJECT # D3880600



SITE ACCESS NOTES

1. FOR ALL GCID CANAL SIPHON SITES, EXIT INTERSTATE 5 AT WILLOWS, EXIT 603, EASTBOUND ON STATE HIGHWAY ROUTE 162 (SR 162). FOR DIRECTIONS TO INDIVIDUAL SIPHON SITES, SEE NOTES 2, 3 AND 5 BELOW.
2. WALKER CREEK SIPHON SITE NORTHERN SEGMENT INCLUDING THE STAGING AREA ACCESS ROUTE: FROM SR 162, TURN NORTH ON COUNTY ROAD P, THEN TURN WEST ON COUNTY ROAD 48. TURN SOUTH ON THE GCID CANAL ROAD TO ACCESS THE SITE. FOR SMALLER VEHICLES, IT MAY BE POSSIBLE TO USE HIGHWAY 99W TO COUNTY ROAD 48 HOWEVER THE TURN IS VERY TIGHT WHEN APPROACHING THE GCID CANAL ROAD FROM THE WEST.
3. WALKER CREEK SIPHON SITE SOUTHERN SEGMENT AND THE WILLOW CREEK SIPHON SITE ACCESS ROUTE: FROM SR 162 TURN NORTH ON THE GCID CANAL ROAD, THROUGH THE EXISTING GATE. COORDINATE GATE ACCESS WITH GCID.
4. THE ACCESS ACROSS WILLOW CREEK APPEARS TO BE A LOW WATER CROSSING AND MAY NEED TO BE IMPROVED FOR CONSTRUCTION ACCESS.
5. RAILROAD SIPHON ACCESS: FOR THE NORTHWEST STAGING AREA, FROM SR 162, TURN SOUTH ON HWY 99W, SITE IS ON THE EAST SIDE DIRECTLY OFF OF HWY 99W. FOR THE SOUTHWEST SIDE OF THE SIPHON, CONTINUE PAST THE NORTHWEST STAGING AREA, ACROSS THE GCID CANAL, THEN TURN EAST ON THE GCID CANAL ROAD IMMEDIATELY AFTER THE CANAL. FOR THE SOUTHEAST SIDE OF THE SIPHON, CONTINUE PAST THE NORTHWEST STAGING AREA TO ROAD 53. TURN EAST ON ROAD 53 AND TRAVEL ACROSS THE RAILROAD AND IRRIGATION CANAL, THEN TURN NORTH ON THE GCID ACCESS ROAD.

DRAFT – PREDECISIONAL WORKING DOCUMENT – FOR DISCUSSION PURPOSES ONLY

GCID SIPHONS ACCESS PLAN
SCALE: 1" = 800'

0 800' 1600'
1" = 800'

PROJECT FEASIBILITY STUDY – NOT FOR CONSTRUCTION

I/R	DATE	BY	CHK	APPR	DESCRIPTION

DESIGNED BY: B CHELONIS
DRAWN BY: B CHELONIS
CHECKED BY: J SMITH
IN CHARGE: P RUDE
DATE: MARCH 2021

JACOBS
2525 AIRPARK DR
REDDING CA, 96001
PHONE: (530) 243-5831

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

Sites

SITES RESERVOIR TO 2

GCID SIPHONS ACCESS PLAN

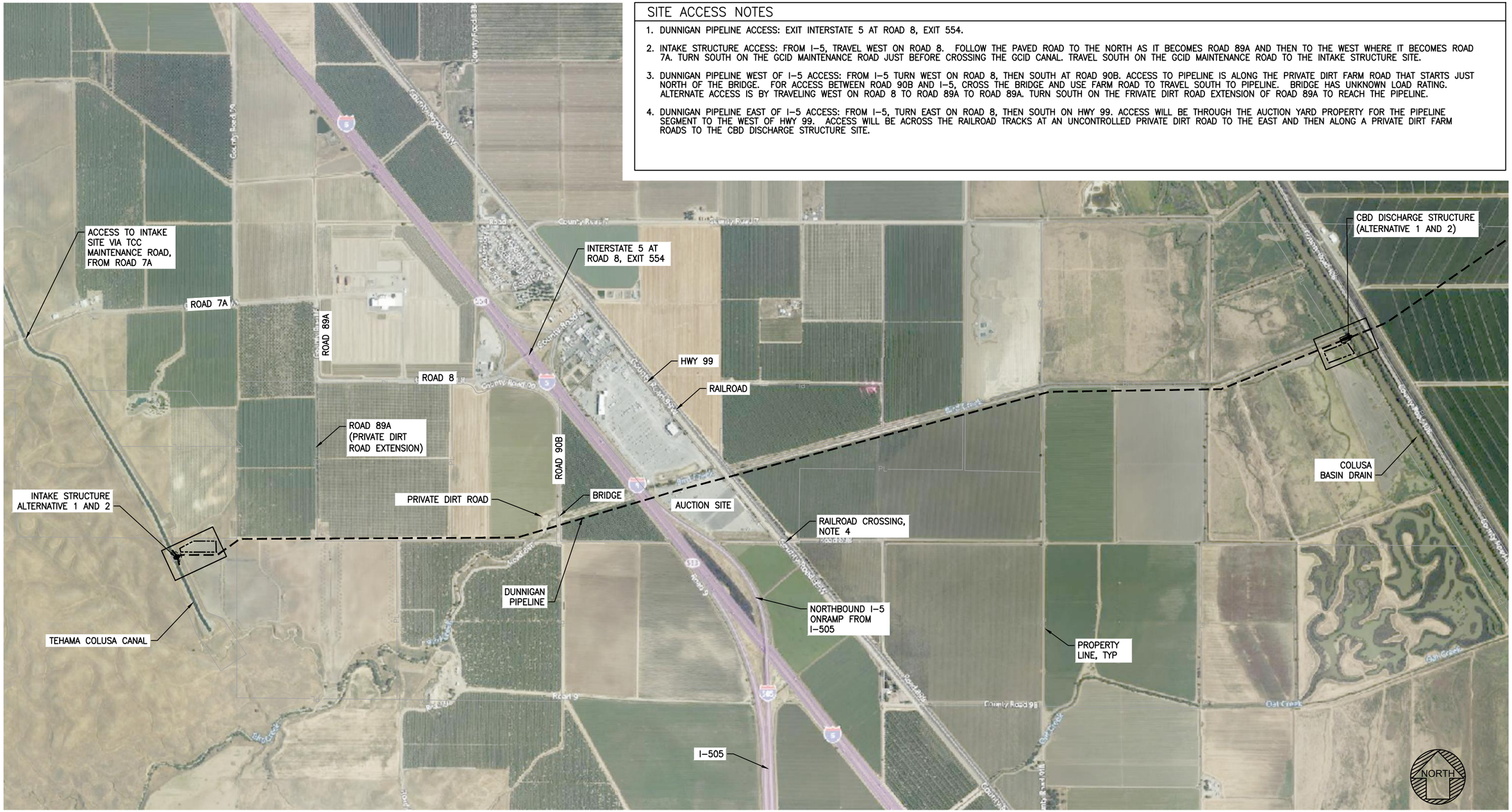
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALE FOR REDUCED PLOTS
0 1"

DRAWING NO.
EXH-005

PLOTTED BY:CHELONIS, BECKY/RDD -March 19, 2021-3:44:42 PM
DRAWING: GEN-EXH-005_D3380600.dwg
JACOBS PROJECT # D3880600

SITE ACCESS NOTES

1. DUNNIGAN PIPELINE ACCESS: EXIT INTERSTATE 5 AT ROAD 8, EXIT 554.
2. INTAKE STRUCTURE ACCESS: FROM I–5, TRAVEL WEST ON ROAD 8. FOLLOW THE PAVED ROAD TO THE NORTH AS IT BECOMES ROAD 89A AND THEN TO THE WEST WHERE IT BECOMES ROAD 7A. TURN SOUTH ON THE GCID MAINTENANCE ROAD JUST BEFORE CROSSING THE GCID CANAL. TRAVEL SOUTH ON THE GCID MAINTENANCE ROAD TO THE INTAKE STRUCTURE SITE.
3. DUNNIGAN PIPELINE WEST OF I–5 ACCESS: FROM I–5 TURN WEST ON ROAD 8, THEN SOUTH AT ROAD 90B. ACCESS TO PIPELINE IS ALONG THE PRIVATE DIRT FARM ROAD THAT STARTS JUST NORTH OF THE BRIDGE. FOR ACCESS BETWEEN ROAD 90B AND I–5, CROSS THE BRIDGE AND USE FARM ROAD TO TRAVEL SOUTH TO PIPELINE. BRIDGE HAS UNKNOWN LOAD RATING. ALTERNATE ACCESS IS BY TRAVELING WEST ON ROAD 8 TO ROAD 89A TO ROAD 89A. TURN SOUTH ON THE FRIVATE DIRT ROAD EXTENSION OF ROAD 89A TO REACH THE PIPELINE.
4. DUNNIGAN PIPELINE EAST OF I–5 ACCESS: FROM I–5, TURN EAST ON ROAD 8, THEN SOUTH ON HWY 99. ACCESS WILL BE THROUGH THE AUCTION YARD PROPERTY FOR THE PIPELINE SEGMENT TO THE WEST OF HWY 99. ACCESS WILL BE ACROSS THE RAILROAD TRACKS AT AN UNCONTROLLED PRIVATE DIRT ROAD TO THE EAST AND THEN ALONG A PRIVATE DIRT FARM ROADS TO THE CBD DISCHARGE STRUCTURE SITE.



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DUNNIGAN PIPELINE ACCESS PLAN
SCALE: 1" = 800'

I/R	DATE	BY	CHK	APPR	DESCRIPTION

DESIGNED BY: B CHELONIS
DRAWN BY: B CHELONIS
CHECKED BY: J SMITH
IN CHARGE: P RUDE
DATE: MARCH 2021

JACOBS
2525 AIRPARK DR
REDDING CA, 96001
PHONE: (530) 243-5831

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

Sites

SITES RESERVOIR TO 2
DUNNIGAN PIPELINE
ALTS 1 AND 2 ACCESS PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALE FOR REDUCED PLOTS
0 1"

DRAWING NO.
EXH–006

PROJECT FEASIBILITY STUDY – NOT FOR CONSTRUCTION

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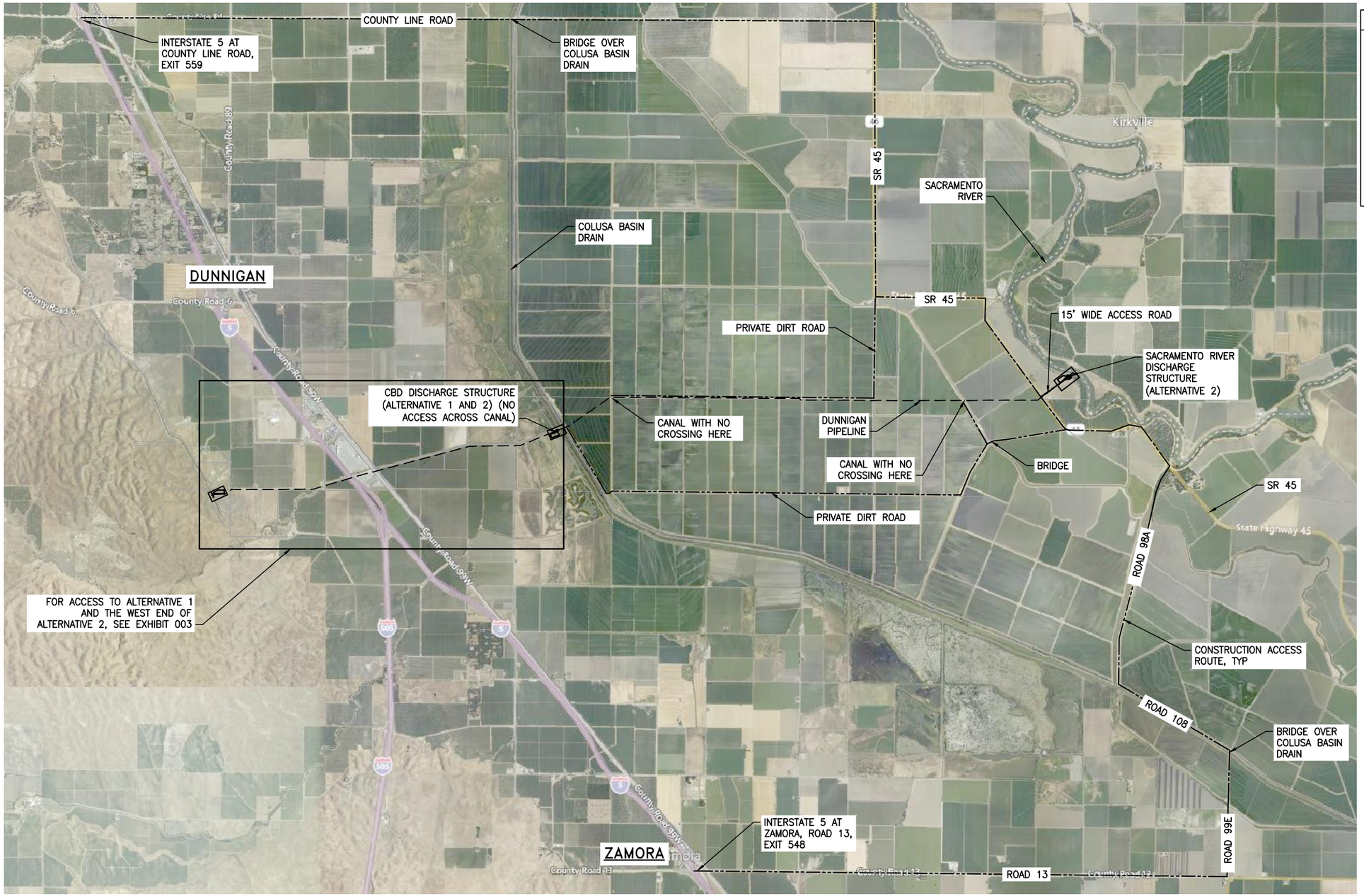
DRAWING: GEN–EXH–006_D3380600.dwg
JACOBS PROJECT # D3880600



SITE ACCESS NOTES

1. DUNNIGAN PIPELINE ACCESS FROM NORTH: EXIT INTERSTATE 5 AT COUNTY LINE ROAD, EXIT 559. CONTINUE EAST ON COUNTY ROAD, THEN TURN SOUTH ON SR 45. TRAVEL SOUTH ON SR 45 AND THEN PROCEED SOUTH ON PRIVATE DIRT ROAD TO ACCESS THE CENTRAL PORTION OF DUNNIGAN PIPELINE.

2. DUNNIGAN PIPELINE ACCESS FROM THE SOUTH: EXIT INTERSTATE 5 AT ZAMORA, ROAD 13, EXIT 548. CONTINUE EAST ON ROAD 13, THEN TURN NORTH ON ROAD 99E. CROSS THE GCID CANAL BRIDGE, THEN TURN NORTHWEST ON ROAD 108. TURN NORTH ON ROAD 98A AND CONTINUE ON THAT ROAD UNTIL IT INTERSECTS WITH SR 45. TURN NORTH ON SR 45 AND CONTINUE TO ACCESS ROUTES ALONG PRIVATE DIRT ROADS AS SHOWN IN PLAN.

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DUNNIGAN PIPELINE ACCESS PLAN
SCALE: 1" = 3000'

PROJECT FEASIBILITY STUDY – NOT FOR CONSTRUCTION

I/R	DATE	BY	CHK	APPR	DESCRIPTION

DESIGNED BY: B CHELONIS
DRAWN BY: B CHELONIS
CHECKED BY: J SMITH
IN CHARGE: P RUDE
DATE: MARCH 2021

JACOBS
2525 AIRPARK DR
REDDING CA, 96001
PHONE: (530) 243-5831

REGISTERED PROFESSIONAL ENGINEER
WATER RESOURCES

Sites

SITES RESERVOIR TO 2
DUNNIGAN PIPELINE
ALT 2 ACCESS PLAN

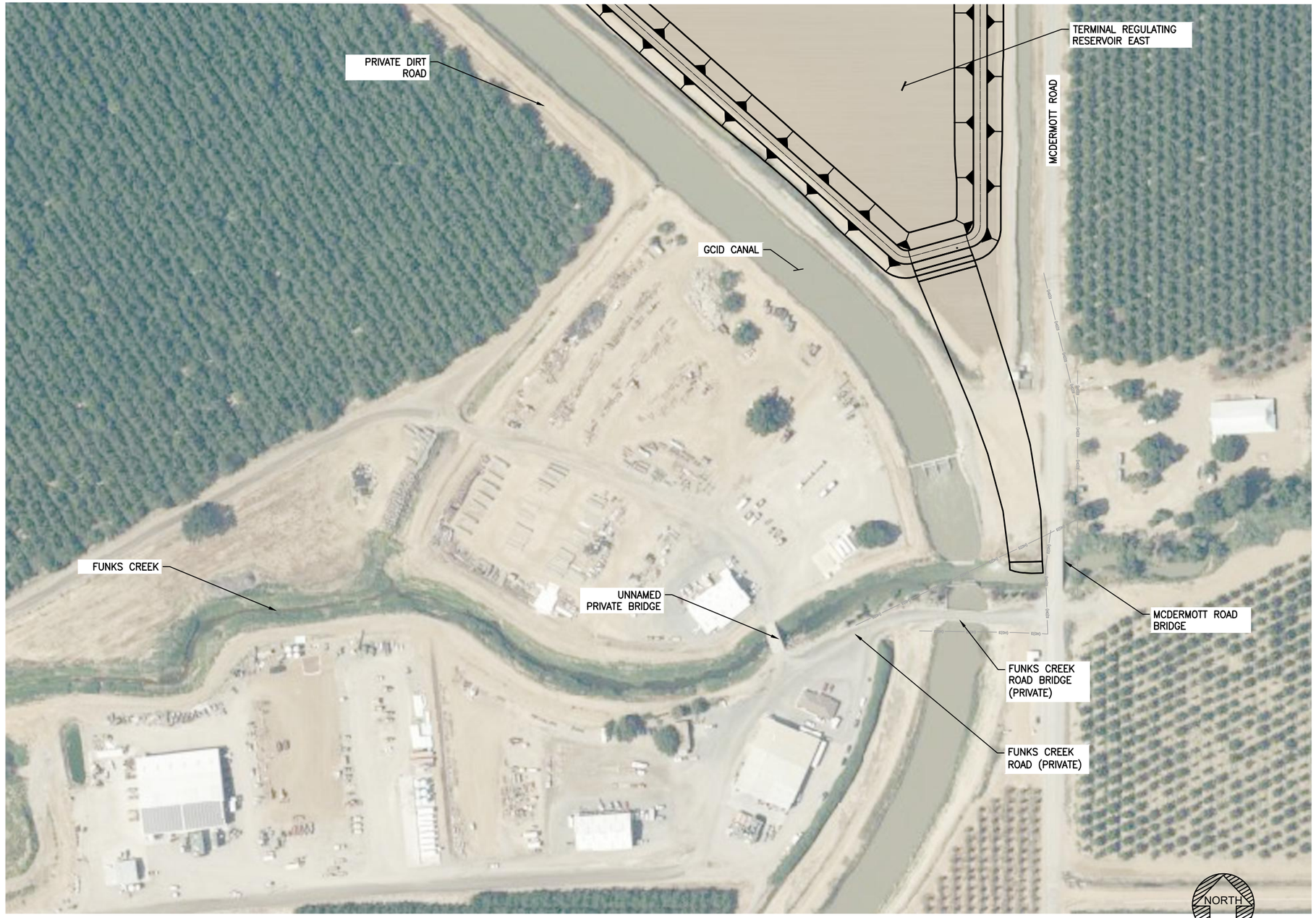
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALE FOR REDUCED PLOTS
0 1"

DRAWING NO.
EXH-007

PLOTTED BY:CHELONIS, BECKY/RDD -March 19, 2021-3:44:42 PM
DRAWING: GEN-EXH-007_D3380600.dwg
JACOBS PROJECT # D3880600

SITE ACCESS NOTES

1. MCDERMOTT ROAD BRIDGE HAS A MAX WEIGHT LIMIT OF XXX TONS.
2. FUNKS CREEK ROAD BRIDGE IS A PRIVATE ACCESS BRIDGE AND HAS A MAX WEIGHT LIMIT OF XXX TONS.
3. UNNAMED PRIVATE BRIDGE IS A PRIVATE ACCESS BRIDGE AND HAS A MAX WEIGHT LIMIT OF XXX TONS.
4. ALTERNATE CONSTRUCTION ACCESS PRIOR TO TRR BRIDGE CONSTRUCTION USING THE PRIVATE ACCESS BRIDGES IS BY AGREEMENT WITH THE OWNER ONLY. COORDINATE DETAILS WITH OWNER, INCLUDING ACCEPTABLE WEIGHT LIMITS FOR BRIDGES.



PRIVATE BRIDGE ACCESS PLAN
SCALE: 1" =100'

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I/R	DATE	BY	CHK	APPR	DESCRIPTION

DESIGNED BY: B CHELONIS
DRAWN BY: B CHELONIS
CHECKED BY:
IN CHARGE: P RUDE
DATE: MARCH 2021

JACOBS
2525 AIRPARK DR
REDDING CA, 96001
PHONE: (530) 243-5831

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

Sites

SITES RESERVOIR TO 2

PRIVATE BRIDGE ACCESS PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALE FOR REDUCED PLOTS
0 1"

DRAWING NO.
EXH-008

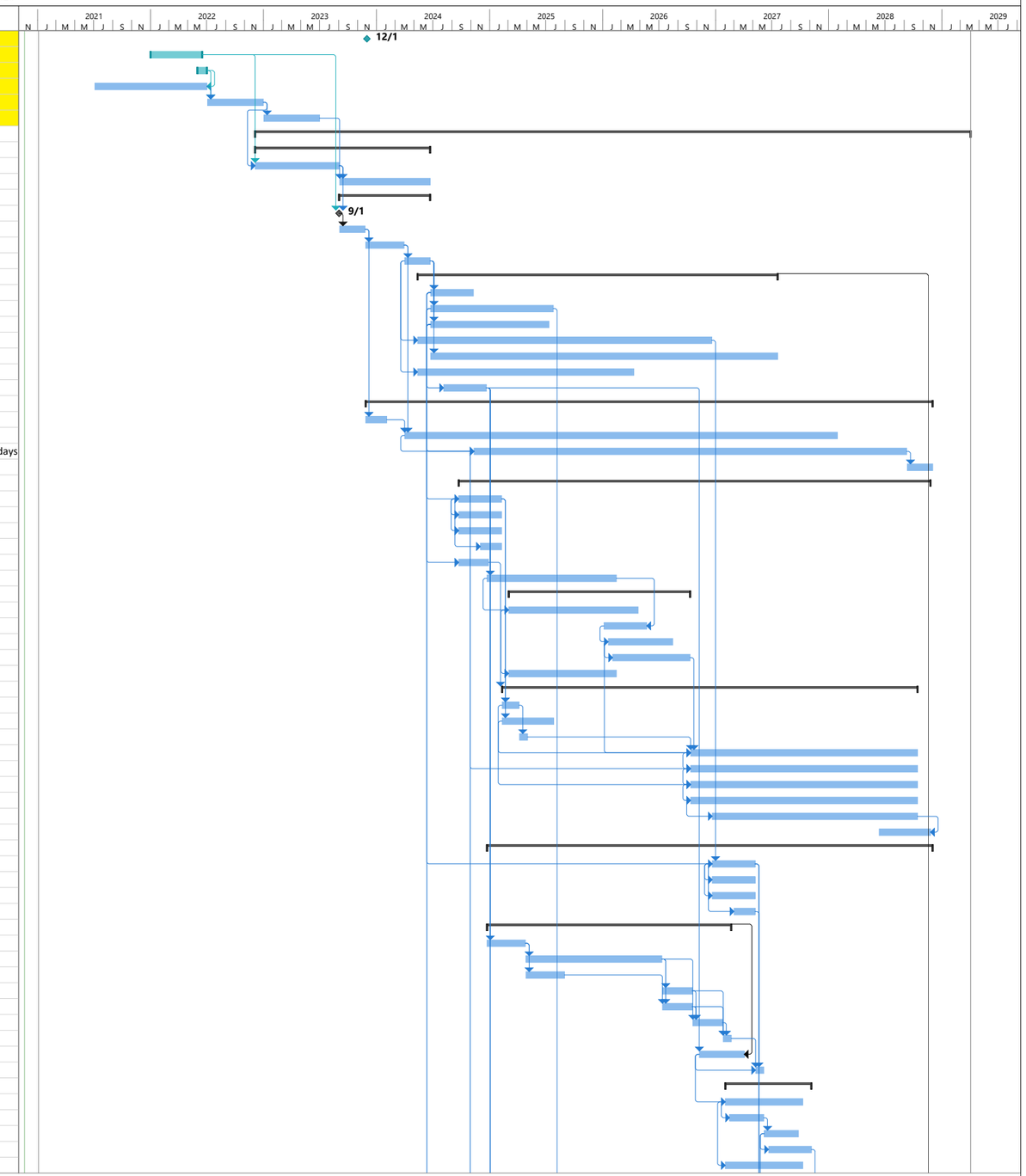
PROJECT FEASIBILITY STUDY – NOT FOR CONSTRUCTION

PLOTTED BY:CHELONIS, BECKY/RDD –March 19, 2021–3:44:42 PM
DRAWING: GEN–EXH–008_D3380600.dwg
JACOBS PROJECT # D3880600

Appendix B
Construction Schedule

Sites Reservoir
Preliminary Construction Schedule
Roads, Dams, and I/O Facilities
November 2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
1		CWC Award of Funds	0 days	Fri 12/1/23	Fri 12/1/23		
2		Determine Engineering Procurement & Delivery Method	120 days	Sat 1/1/22	Thu 6/16/22		9,12
3		Sites Board Approval/NTP for Phase 3	23 days	Wed 6/1/22	Fri 7/1/22		4FF,5
4		Real Estate Access & Permitting (Geotech & Surveying)	260 days	Mon 7/5/21	Fri 7/1/22	3FF	5
5		Initial Geotech & Surveying	130 days	Mon 7/4/22	Fri 12/30/22	3,4	6,9FS-20 days
6		Final Geotech Investigation	130 days	Mon 1/2/23	Fri 6/30/23	5	10
7		**Reservoir Facilities**	**1652 days**	**Mon 12/5/22**	**Tue 4/3/29**		
8		**Engineering**	**405 days**	**Mon 12/5/22**	**Fri 6/21/24**		
9		Preliminary Engineering	195 days	Mon 12/5/22	Fri 9/1/23	2,5FS-20 days	10,12
10		Final Engineering	210 days	Mon 9/4/23	Fri 6/21/24	6,9	
11		**Administrative and General**	**210 days**	**Fri 9/1/23**	**Fri 6/21/24**		
12		Contract Award	0 days	Fri 9/1/23	Fri 9/1/23	2,9	13
13		Notice To Proceed	60 days	Mon 9/4/23	Fri 11/24/23	12	14,25
14		Early Submittals And Approvals	90 days	Mon 11/27/23	Fri 3/29/24	13	15,26
15		Mobilization	60 days	Mon 4/1/24	Fri 6/21/24	14	17,18,20SS+30 days,22SS+30 days,19,21
16		**Roads, Bridges, Access, and Site Development**	**831 days**	**Mon 5/13/24**	**Mon 7/19/27**		**198**
17		Site Access and Staging Development	100 days	Mon 6/24/24	Fri 11/8/24	15	23SS+30 days,180SS+50 days,184SS+50 days,34SS+65 days
18		Northern Construction Access Roads	284 days	Mon 6/24/24	Thu 7/24/25	15	53SS+100 days,84,27SS+100 days
19		Southern Construction Access Roads	274 days	Mon 6/24/24	Thu 7/10/25	15	30SS+65 days,180SS+50 days,184SS+50 days
20		Sites Lodoga Road Realignment and Bridge	680 days	Mon 5/13/24	Fri 12/18/26	15SS+30 days	53
21		Huffmaster Road Realignment	801 days	Mon 6/24/24	Mon 7/19/27	15	
22		Reservoir Footprint Mitigation Actions	500 days	Mon 5/13/24	Fri 4/10/26	15SS+30 days	
23		Demolition and Clearing	100 days	Mon 8/5/24	Fri 12/20/24	17SS+30 days	35,182,65,58,88
24		**Process and Haul Filter Materials to Project**	**1310 days**	**Mon 11/27/23**	**Fri 12/1/28**		
25		Offsite Quarry Development	50 days	Mon 11/27/23	Fri 2/2/24	13	26
26		Process Filter Materials	1000 days	Mon 4/1/24	Fri 1/28/28	14,25	27SS+30 days
27		Filter Material Haul to Stockpile	1000 days	Mon 11/11/24	Fri 9/8/28	26SS+30 days,18SS+100 days	28,47SS+30 days,77SS+30 days,98SS+30 days,118SS+30 days,138SS+30 days
28		Quarry Reclamation and Restoration	60 days	Mon 9/11/28	Fri 12/1/28	27	
29		**Golden Gate Dam Construction**	**1090 days**	**Mon 9/23/24**	**Fri 11/24/28**		
30		Golden Gate Access and Staging	100 days	Mon 9/23/24	Fri 2/7/25	19SS+65 days	31SS,33SS+50 days,32SS,43,44
31		Erosion and Sediment Control	100 days	Mon 9/23/24	Fri 2/7/25	30SS	
32		Clearing / Grubbing Topsoil Salvage from Work Areas	100 days	Mon 9/23/24	Fri 2/7/25	30SS	
33		Demolition	50 days	Mon 12/2/24	Fri 2/7/25	30SS+50 days	
34		GG Dam - Bypass Pipeline and U/S Cofferdam	70 days	Mon 9/23/24	Fri 12/27/24	17SS+65 days	42
35		GG Dam - Foundation Excavation	300 days	Mon 12/23/24	Fri 2/13/26	23	37SS+50 days,38FF+70 days
36		**GG Dam - Foundation Preparation and Grouting**	**420 days**	**Mon 3/3/25**	**Fri 10/9/26**		
37		Foundation Cleaning	300 days	Mon 3/3/25	Fri 4/24/26	35SS+50 days	41SS
38		Grout Cap	100 days	Mon 1/5/26	Fri 5/22/26	35FF+70 days	39SS+10 days
39		Consolidation Grouting	150 days	Mon 1/19/26	Fri 8/14/26	38SS+10 days	40SS+10 days,46SS+100 days
40		Curtain Grouting	180 days	Mon 2/2/26	Fri 10/9/26	39SS+10 days	46
41		Dental Excavation and Concrete	250 days	Mon 3/3/25	Fri 2/13/26	37SS	
42		**GG Dam - Embankment**	**960 days**	**Mon 2/10/25**	**Fri 10/13/28**	**34**	
43		Initial Borrow Development (Core Material)	40 days	Mon 2/10/25	Fri 4/4/25	30	46SS+20 days,45
44		Initial Quarry Development for Zones 3 and 4	120 days	Mon 2/10/25	Fri 7/25/25	30	48SS+40 days
45		Borrow Overburden and Waste to Disposal Site	20 days	Mon 4/7/25	Fri 5/2/25	43	46
46		Place Zone 1 - Core	525 days	Mon 10/12/26	Fri 10/13/28	43SS+20 days,45,39SS+100 days,4	47SS
47		Place Zone 2A & 2B - Filters, Drains and Transitions	525 days	Mon 10/12/26	Fri 10/13/28	46SS,27SS+30 days	48SS
48		Place Zone 3 - Rockfill	525 days	Mon 10/12/26	Fri 10/13/28	47SS,44SS+40 days	49SS
49		Place Zone 4 - Random	525 days	Mon 10/12/26	Fri 10/13/28	48SS	50SS+50 days
50		Place Rip Rap	475 days	Mon 12/21/26	Fri 10/13/28	49SS+50 days	51FF+30 days
51		Site Reclamation and Topsoil Replacement	120 days	Mon 6/12/28	Fri 11/24/28	50FF+30 days	
52		**Sites Dam Construction**	**1030 days**	**Mon 12/23/24**	**Fri 12/1/28**		
53		Sites Dam Access and Staging	100 days	Mon 12/21/26	Fri 5/7/27	18SS+100 days,20	54SS,56SS+50 days,55SS,74,75
54		Erosion and Sediment Control	100 days	Mon 12/21/26	Fri 5/7/27	53SS	
55		Clearing / Grubbing Topsoil Salvage from Work Areas	100 days	Mon 12/21/26	Fri 5/7/27	53SS	
56		Demolition	50 days	Mon 3/1/27	Fri 5/7/27	53SS+50 days	66
57		**Sites Diversion Outlet Facility**	**565 days**	**Mon 12/23/24**	**Fri 2/19/27**		**65FF+30 days**
58		Develop Downstream Portal	90 days	Mon 12/23/24	Fri 4/25/25	23	59,60
59		Tunnel Excavation and Lining	315 days	Mon 4/28/25	Fri 7/10/26	58	62,61,63
60		Develop Upstream Portal	90 days	Mon 4/28/25	Fri 8/29/25	58	62
61		Outlet Structure Concrete	70 days	Mon 7/13/26	Fri 10/16/26	59	64,63
62		Inlet Structure Concrete	70 days	Mon 7/13/26	Fri 10/16/26	59,60	64,63
63		Mechanical	70 days	Mon 10/19/26	Fri 1/22/27	59,61,62	64
64		Sites Diversion Completion and Restoration	20 days	Mon 1/25/27	Fri 2/19/27	61,62,63	66
65		Sites Dam - Foundation Excavation	105 days	Mon 11/9/26	Fri 4/2/27	23,57FF+30 days	68SS+60 days,66SS+50 days
66		Construct Cofferdam to El. 310	20 days	Mon 5/10/27	Fri 6/4/27	56,65SS+50 days,64	
67		**Sites Dam - Foundation Preparation and Grouting**	**200 days**	**Mon 2/1/27**	**Fri 11/5/27**		
68		Foundation Cleaning	180 days	Mon 2/1/27	Fri 10/8/27	65SS+60 days	72SS,69SS+10 days
69		Grout Cap	80 days	Mon 2/15/27	Fri 6/4/27	68SS+10 days	70
70		Consolidation Grouting	80 days	Mon 6/7/27	Fri 9/24/27	69	71SS+10 days,76SS+100 days
71		Curtain Grouting	100 days	Mon 6/21/27	Fri 11/5/27	70SS+10 days	76
72		Dental Excavation and Concrete	180 days	Mon 2/1/27	Fri 10/8/27	68SS	

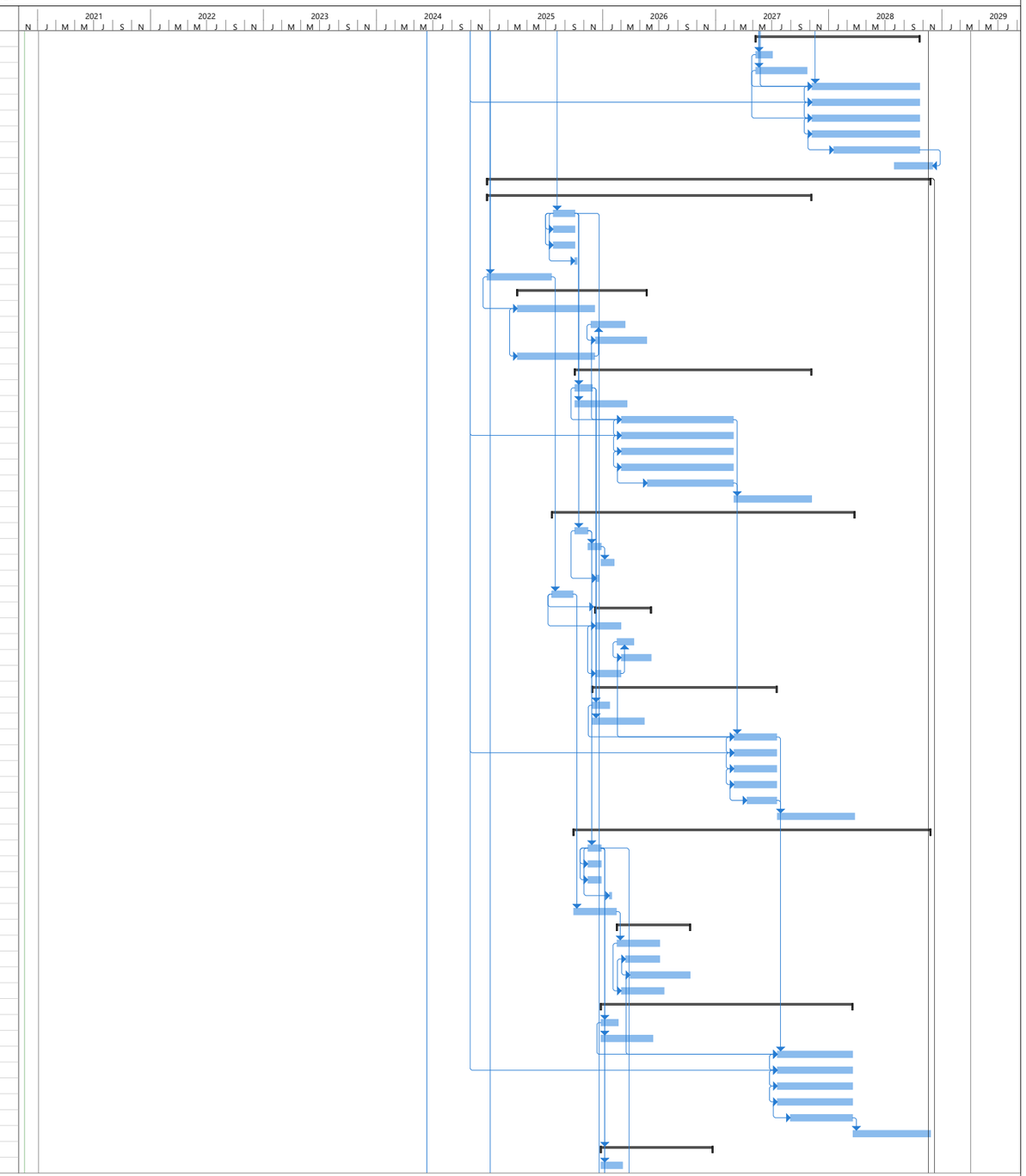


Project: Sites Reservoir
Date: Fri 11/20/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

Sites Reservoir
Preliminary Construction Schedule
Roads, Dams, and I/O Facilities
November 2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
73		**Sites Dam - Embankment**	**380 days**	**Mon 5/10/27**	**Fri 10/20/28**		
74		Initial Borrow Development (Core Material)	40 days	Mon 5/10/27	Fri 7/2/27	53	76SS+20 days
75		Initial Quarry Development for Zones 3 and 4	120 days	Mon 5/10/27	Fri 10/22/27	53	78SS+40 days
76		Place Zone 1 - Core	250 days	Mon 11/8/27	Fri 10/20/28	70SS+100 days,74SS+20 days,71	77SS
77		Place Zone 2A & 2B - Filters, Drains and Transitions	250 days	Mon 11/8/27	Fri 10/20/28	76SS,27SS+30 days	78SS
78		Place Zone 3 - Rockfill	250 days	Mon 11/8/27	Fri 10/20/28	77SS,75SS+40 days	79SS
79		Place Zone 4 - Random	250 days	Mon 11/8/27	Fri 10/20/28	78SS	80SS+50 days
80		Place Rip Rap	200 days	Mon 1/17/28	Fri 10/20/28	79SS+50 days	81FF+30 days
81		Site Reclamation and Topsoil Replacement	90 days	Mon 7/31/28	Fri 12/1/28	80FF+30 days	
82		**Saddle Dams**	**1025 days**	**Mon 12/23/24**	**Fri 11/24/28**		**198**
83		**Saddle Dam 3**	**750 days**	**Mon 12/23/24**	**Fri 11/5/27**		
84		Saddle Dam 3 - Access and Staging	50 days	Fri 7/25/25	Thu 10/2/25	18	85SS,87SS+50 days,86SS,95,96,155,104
85		Erosion and Sediment Control	50 days	Fri 7/25/25	Thu 10/2/25	84SS	
86		Clearing / Grubbing Topsoil Salvage from Work Areas	50 days	Fri 7/25/25	Thu 10/2/25	84SS	
87		Demolition	5 days	Fri 10/3/25	Thu 10/9/25	84SS+50 days	
88		Saddle Dam 3 - Foundation Excavation	150 days	Mon 12/23/24	Fri 7/18/25	23	90SS+70 days,108
89		**Saddle Dam 3 - Foundation Preparation and Grouting**	**300 days**	**Mon 3/31/25**	**Fri 5/22/26**		
90		Foundation Cleaning	180 days	Mon 3/31/25	Fri 12/5/25	88SS+70 days	93SS
91		Grout Cap	80 days	Mon 11/24/25	Fri 3/13/26	93FS-10 days	92SS+10 days
92		Curtain Grouting	120 days	Mon 12/8/25	Fri 5/22/26	91SS+10 days	97SS+60 days
93		Dental Excavation and Concrete	180 days	Mon 3/31/25	Fri 12/5/25	90SS	91FS-10 days
94		**Saddle Dam 3 - Embankment**	**546 days**	**Fri 10/3/25**	**Fri 11/5/27**		
95		Initial Borrow Development (Core Material)	40 days	Fri 10/3/25	Thu 11/27/25	84	97SS+20 days,115,116
96		Initial Quarry Development for Zones 3 and 4	120 days	Fri 10/3/25	Thu 3/19/26	84	
97		Place Zone 1 - Core	260 days	Mon 3/2/26	Fri 2/26/27	95SS+20 days,92SS+60 days	98SS,117
98		Place Zone 2A & 2B - Filters, Drains and Transitions	260 days	Mon 3/2/26	Fri 2/26/27	97SS,27SS+30 days	99SS
99		Place Zone 3 - Rockfill	260 days	Mon 3/2/26	Fri 2/26/27	98SS	100SS
100		Place Zone 4 - Random	260 days	Mon 3/2/26	Fri 2/26/27	99SS	101SS+60 days
101		Place Rip Rap	200 days	Mon 5/25/26	Fri 2/26/27	100SS+60 days	102
102		Site Reclamation and Topsoil Replacement	180 days	Mon 3/1/27	Fri 11/5/27	101	
103		**Saddle Dam 5**	**700 days**	**Mon 7/21/25**	**Fri 3/24/28**		
104		Saddle Dam 5 - Access and Staging	30 days	Fri 10/3/25	Thu 11/13/25	84	107SS+50 days,105,124
105		Erosion and Sediment Control	30 days	Fri 11/14/25	Thu 12/25/25	104	106
106		Clearing / Grubbing Topsoil Salvage from Work Areas	30 days	Fri 12/26/25	Thu 2/5/26	105	
107		Demolition	5 days	Fri 12/12/25	Thu 12/18/25	104SS+50 days	
108		Saddle Dam 5 - Foundation Excavation	50 days	Mon 7/21/25	Fri 9/26/25	88	109SS+100 days,110SS+20 days,128
109		**Saddle Dam 5 - Foundation Preparation and Grouting**	**130 days**	**Mon 12/8/25**	**Fri 6/5/26**	**108SS+100 days**	
110		Foundation Cleaning	60 days	Mon 12/8/25	Fri 2/27/26	108SS+20 days	113SS
111		Grout Cap	40 days	Mon 2/16/26	Fri 4/10/26	113FS-10 days	112SS+10 days
112		Curtain Grouting	70 days	Mon 3/2/26	Fri 6/5/26	111SS+10 days	117SS+60 days
113		Dental Excavation and Concrete	60 days	Mon 12/8/25	Fri 2/27/26	110SS	111FS-10 days
114		**Saddle Dam 5 - Embankment**	**426 days**	**Fri 11/28/25**	**Fri 7/16/27**		
115		Initial Borrow Development (Core Material)	40 days	Fri 11/28/25	Thu 1/22/26	95	117SS+20 days
116		Initial Quarry Development for Zones 3 and 4	120 days	Fri 11/28/25	Thu 5/14/26	95	
117		Place Zone 1 - Core	100 days	Mon 3/1/27	Fri 7/16/27	112SS+60 days,115SS+20 days,97	118SS,137
118		Place Zone 2A & 2B - Filters, Drains and Transitions	100 days	Mon 3/1/27	Fri 7/16/27	117SS,27SS+30 days	119SS
119		Place Zone 3 - Rockfill	100 days	Mon 3/1/27	Fri 7/16/27	118SS	120SS
120		Place Zone 4 - Random	100 days	Mon 3/1/27	Fri 7/16/27	119SS	121SS+30 days
121		Place Rip Rap	70 days	Mon 4/12/27	Fri 7/16/27	120SS+30 days	122
122		Site Reclamation and Topsoil Replacement	180 days	Mon 7/19/27	Fri 3/24/28	121	
123		**Minor Saddle Dams (1,2,6,8A)**	**825 days**	**Mon 9/29/25**	**Fri 11/24/28**		
124		Minor Saddle Dams - Access and Staging	30 days	Fri 11/14/25	Thu 12/25/25	104	125SS,127SS+50 days,126SS,135,136,143,144,145,156,168
125		Erosion and Sediment Control	30 days	Fri 11/14/25	Thu 12/25/25	124SS	
126		Clearing / Grubbing Topsoil Salvage from Work Areas	30 days	Fri 11/14/25	Thu 12/25/25	124SS	
127		Demolition	5 days	Fri 1/23/26	Thu 1/29/26	124SS+50 days	
128		Minor Saddle Dams - Foundation Excavation	100 days	Mon 9/29/25	Fri 2/13/26	108	130
129		**Minor Saddle Dams - Foundation Preparation and Grout**	**170 days**	**Mon 2/16/26**	**Fri 10/9/26**		
130		Foundation Cleaning	100 days	Mon 2/16/26	Fri 7/3/26	128	133SS+10 days
131		Grout Cap	80 days	Mon 3/16/26	Fri 7/3/26	133SS+10 days	132SS+10 days
132		Curtain Grouting	140 days	Mon 3/30/26	Fri 10/9/26	131SS+10 days	137SS+60 days
133		Dental Excavation and Concrete	100 days	Mon 3/2/26	Fri 7/17/26	130SS+10 days	131SS+10 days
134		**Minor Saddle Dams - Embankment**	**581 days**	**Fri 12/26/25**	**Fri 3/17/28**		
135		Initial Borrow Development (Core Material)	40 days	Fri 12/26/25	Thu 2/19/26	124	137SS+20 days
136		Initial Quarry Development for Zones 3 and 4	120 days	Fri 12/26/25	Thu 6/11/26	124	
137		Place Zone 1 - Core	175 days	Mon 7/19/27	Fri 3/17/28	132SS+60 days,135SS+20 days,117	138SS
138		Place Zone 2A & 2B - Filters, Drains and Transitions	175 days	Mon 7/19/27	Fri 3/17/28	137SS,27SS+30 days	139SS
139		Place Zone 3 - Rockfill	175 days	Mon 7/19/27	Fri 3/17/28	138SS	140SS
140		Place Zone 4 - Random	175 days	Mon 7/19/27	Fri 3/17/28	139SS	141SS+30 days
141		Place Rip Rap	145 days	Mon 8/30/27	Fri 3/17/28	140SS+30 days	142
142		Site Reclamation and Topsoil Replacement	180 days	Mon 3/20/28	Fri 11/24/28	141	
143		**Saddle Dam 8B - Spillway**	**257 days**	**Fri 12/26/25**	**Mon 12/21/26**	**124**	
144		Batch Plant Setup and Operational	50 days	Fri 12/26/25	Thu 3/5/26	124	



Project: Sites Reservoir
Date: Fri 11/20/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

Sites Reservoir
Preliminary Construction Schedule
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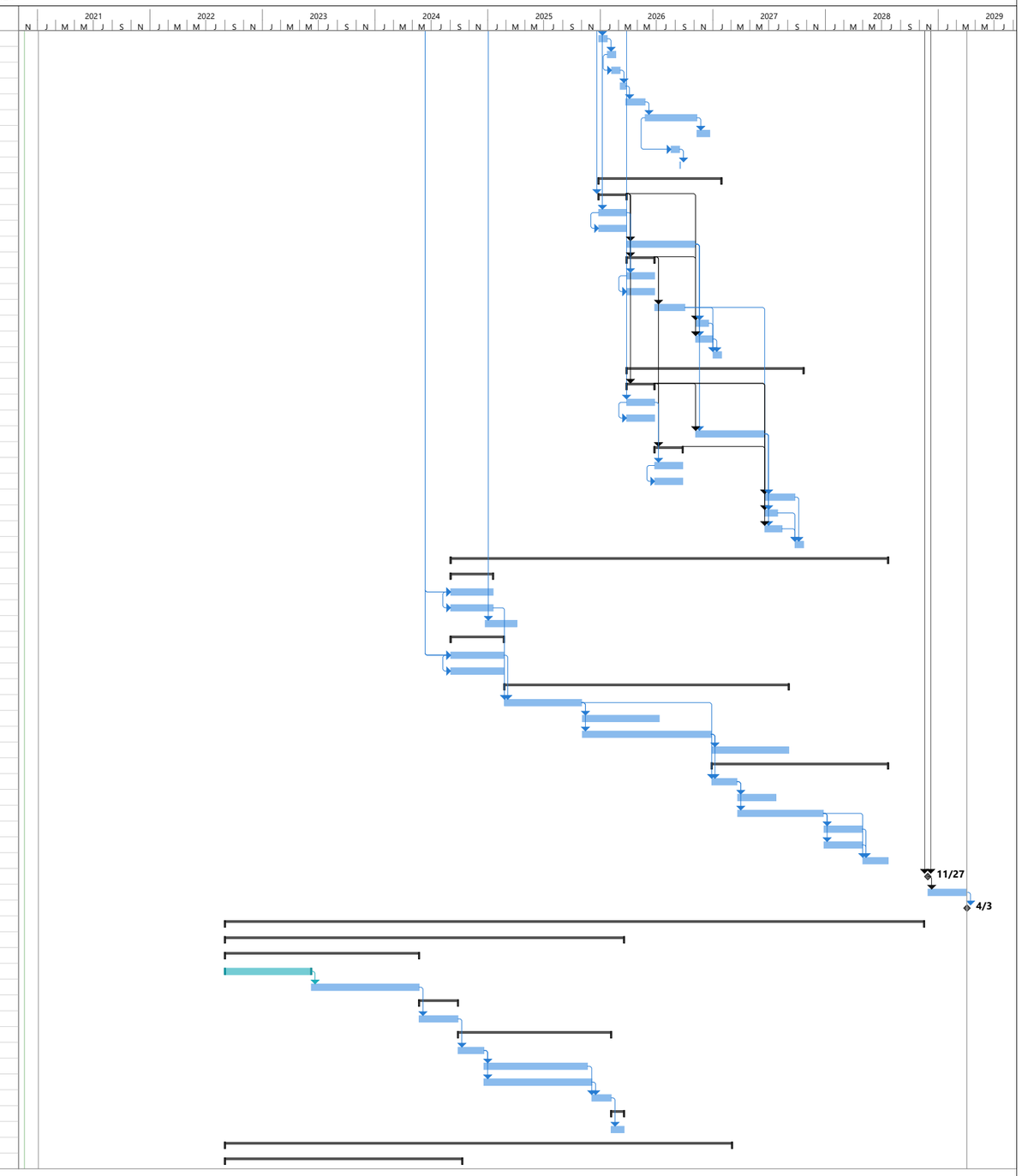
November 2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
145		SD8 - Foundation Excavation	20 days	Fri 12/26/25	Thu 1/22/26	124	146
146		SD8 - Foundation Cleaning	20 days	Fri 1/23/26	Thu 2/19/26	145	147SS+10 days
147		SD8 - Dental Excavation and Concrete	20 days	Fri 2/6/26	Thu 3/5/26	146SS+10 days	148
148		SD8 - Grout Cap	12 days	Fri 3/6/26	Mon 3/23/26	147	149
149		SD 8 - Foundation Grouting	45 days	Tue 3/24/26	Mon 5/25/26	148	150
150		SD 8 - Mass Concrete	120 days	Tue 5/26/26	Mon 11/9/26	149	151,152SS+60 days
151		SD 8 - Bridge	30 days	Tue 11/10/26	Mon 12/21/26	150	
152		SD 8 - Clay Backfill	20 days	Tue 8/18/26	Mon 9/14/26	150SS+60 days	153
153		SD 8 - Riprap and Drain Gravel	3 days	Tue 9/15/26	Thu 9/17/26	152	
154		**Emergency Release Structure No. 1**	**285 days**	**Fri 12/26/25**	**Thu 1/28/27**		
155		**Develop Downstream Portal**	**65 days**	**Fri 12/26/25**	**Thu 3/26/26**	**84**	**158,159,163,167**
156		Portal Excavation	65 days	Fri 12/26/25	Thu 3/26/26	124	157SS,160
157		Rock Bolting	65 days	Fri 12/26/25	Thu 3/26/26	156SS	
158		Tunnel Excavation and Lining (12 ft)	160 days	Fri 3/27/26	Thu 11/5/26	155	164,163,170
159		**Develop Upstream Portal**	**65 days**	**Fri 3/27/26**	**Thu 6/25/26**	**155**	**171,164,162**
160		Portal Excavation	65 days	Fri 3/27/26	Thu 6/25/26	156	161SS
161		Rock Bolting	65 days	Fri 3/27/26	Thu 6/25/26	160SS	
162		Outlet Structure Concrete	70 days	Fri 6/26/26	Thu 10/1/26	159	165,174
163		Install 10-Ft Cut and Cover Pipe	30 days	Fri 11/6/26	Thu 12/17/26	155,158	165
164		Inlet Structure Concrete	40 days	Fri 11/6/26	Thu 12/31/26	158,159	165
165		ERS - 1 Completion and Restoration	20 days	Fri 1/1/27	Thu 1/28/27	162,163,164	
166		**Emergency Release Structure No. 2**	**410 days**	**Fri 3/27/26**	**Thu 10/21/27**		
167		**Develop Downstream Portal**	**65 days**	**Fri 3/27/26**	**Thu 6/25/26**	**155**	**170,171,175,174**
168		Portal Excavation	65 days	Fri 3/27/26	Thu 6/25/26	124	169SS,172
169		Rock Bolting	65 days	Fri 3/27/26	Thu 6/25/26	168SS	
170		Tunnel Excavation and Lining	160 days	Fri 11/6/26	Thu 6/17/27	167,158	176,175,174
171		**Develop Upstream Portal**	**65 days**	**Fri 6/26/26**	**Thu 9/24/26**	**167,159**	**176**
172		Portal Excavation	65 days	Fri 6/26/26	Thu 9/24/26	168	173SS
173		Rock Bolting	65 days	Fri 6/26/26	Thu 9/24/26	172SS	
174		Outlet Structure Concrete	70 days	Fri 6/18/27	Thu 9/23/27	162,167,170	177
175		Install 10-Ft Cut and Cover Pipe	30 days	Fri 6/18/27	Thu 7/29/27	167,170	177
176		Inlet Structure Concrete	40 days	Fri 6/18/27	Thu 8/12/27	170,171	177
177		ERS - 2 Completion and Restoration	20 days	Fri 9/24/27	Thu 10/21/27	174,175,176	
178		**Inlet Outlet Facilities**	**1015 days**	**Mon 9/2/24**	**Fri 7/21/28**		
179		**Develop Downstream Portal**	**100 days**	**Mon 9/2/24**	**Fri 1/17/25**		
180		Portal Excavation	100 days	Mon 9/2/24	Fri 1/17/25	17SS+50 days,19SS+50 days	181SS
181		Rock Bolting	100 days	Mon 9/2/24	Fri 1/17/25	180SS	187
182		Intake Channel Excavation	75 days	Mon 12/23/24	Fri 4/4/25	23	
183		**Develop Upstream Portal**	**125 days**	**Mon 9/2/24**	**Fri 2/21/25**		
184		Portal Excavation	125 days	Mon 9/2/24	Fri 2/21/25	17SS+50 days,19SS+50 days	185SS,187
185		Rock Bolting	125 days	Mon 9/2/24	Fri 2/21/25	184SS	
186		**Tunnels Excavation and Lining (Double Shift)**	**660 days**	**Mon 2/24/25**	**Fri 9/3/27**		
187		North Tunnel Excavation - Two Headings, Double Shift	180 days	Mon 2/24/25	Fri 10/31/25	181,184	188,189,192
188		North Tunnel Lining	180 days	Mon 11/3/25	Fri 7/10/26	187	
189		South Tunnel Excvation - Double Shift	300 days	Mon 11/3/25	Fri 12/25/26	187	190,192
190		South Tunnel Lining	180 days	Mon 12/28/26	Fri 9/3/27	189	
191		**Intake and Outlet Structures**	**410 days**	**Mon 12/28/26**	**Fri 7/21/28**		
192		Intake Structure Foundation	60 days	Mon 12/28/26	Fri 3/19/27	187,189	193,194
193		Tunnel Bifurcation	90 days	Mon 3/22/27	Fri 7/23/27	192	
194		Intake Structure Concrete	200 days	Mon 3/22/27	Fri 12/24/27	192	197,195,196
195		Intake Structure Gates and Mechanical	90 days	Mon 12/27/27	Fri 4/28/28	194	197
196		Tower Access Bridge	90 days	Mon 12/27/27	Fri 4/28/28	194	197
197		I/O Completion and Restoration	60 days	Mon 5/1/28	Fri 7/21/28	194,195,196	
198		Dams and I/O Ready for Commissioning	1 day	Mon 11/27/28	Mon 11/27/28	16,82	199
199		Dams and I/O Startup and Commissioning	90 days	Tue 11/28/28	Mon 4/2/29	198	200
200		Dams and I/O Substantial Completion	1 day	Tue 4/3/29	Tue 4/3/29	199	
201		**Conveyance Facilities**	**1620 days**	**Thu 9/1/22**	**Wed 11/15/28**		
202		**Dunnigan Pipeline - Alt 1**	**925 days**	**Thu 9/1/22**	**Wed 3/18/26**		
203		**Engineering**	**450 days**	**Thu 9/1/22**	**Wed 5/22/24**		
204		Preliminary	200 days	Thu 9/1/22	Wed 6/7/23		205
205		Final	250 days	Thu 6/8/23	Wed 5/22/24	204	207
206		**Bid and Award**	**90 days**	**Thu 5/23/24**	**Wed 9/25/24**		
207		Bid and Award	90 days	Thu 5/23/24	Wed 9/25/24	205	209
208		**Construction**	**355 days**	**Thu 9/26/24**	**Wed 2/4/26**		
209		Submittals	60 days	Thu 9/26/24	Wed 12/18/24	207	210,211
210		Structures	240 days	Thu 12/19/24	Wed 11/19/25	209	212
211		Pipeline	250 days	Thu 12/19/24	Wed 12/3/25	209	212
212		Testing	45 days	Thu 12/4/25	Wed 2/4/26	210,211	214
213		**Commissioning**	**30 days**	**Thu 2/5/26**	**Wed 3/18/26**		
214		Commission	30 days	Thu 2/5/26	Wed 3/18/26	212	
215		**Dunnigan Pipeline - Alt 2**	**1175 days**	**Thu 9/1/22**	**Wed 3/3/27**		
216		**Engineering**	**550 days**	**Thu 9/1/22**	**Wed 10/9/24**		



Project: Sites Reservoir
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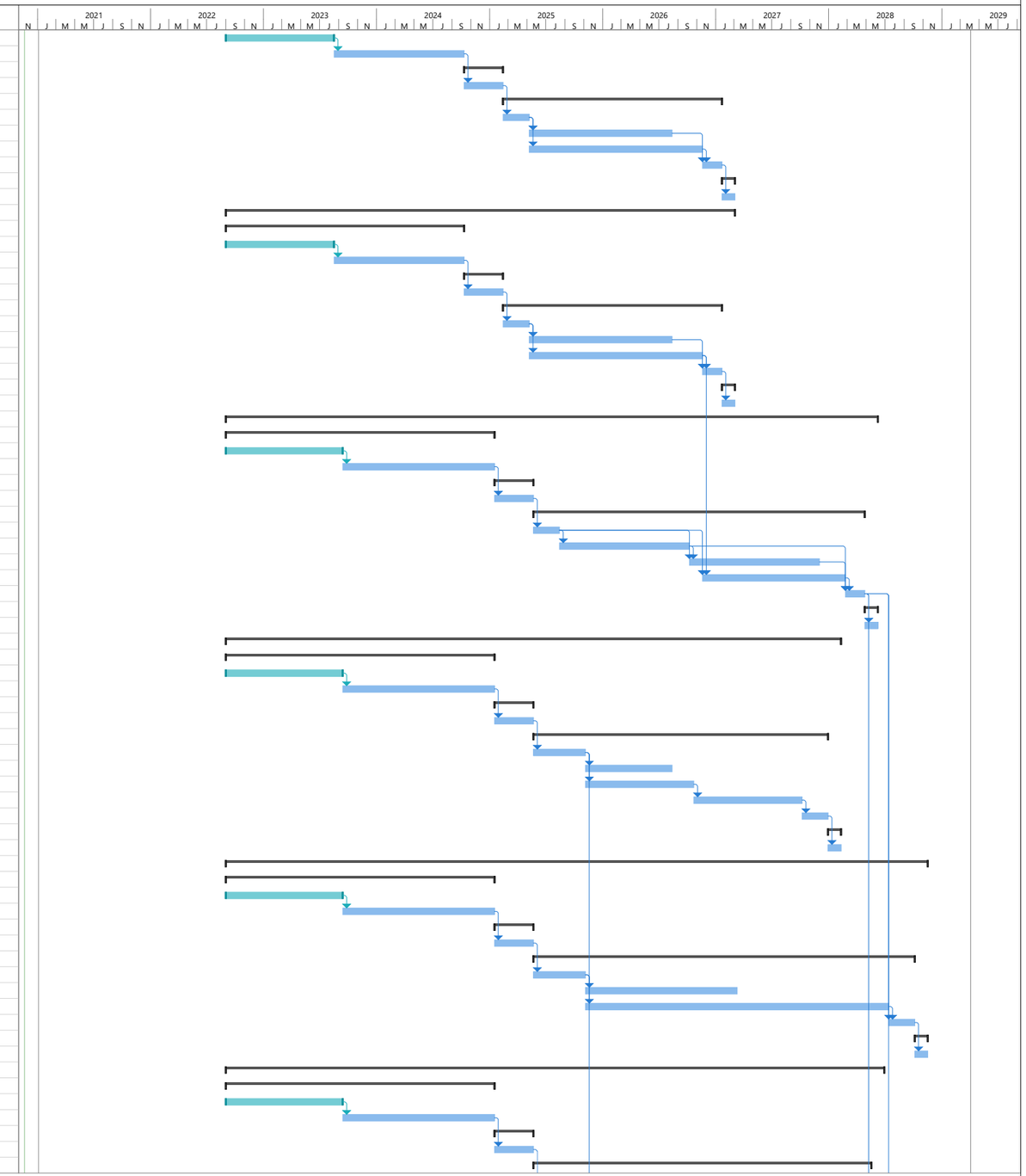
Sites Reservoir
Preliminary Construction Schedule
Roads, Dams, and I/O Facilities
November 2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
217		Preliminary	250 days	Thu 9/1/22	Wed 8/16/23		218
218		Final	300 days	Thu 8/17/23	Wed 10/9/24	217	220
219		**Bid and Award**	**90 days**	**Thu 10/10/24**	**Wed 2/12/25**		
220		Bid and Award	90 days	Thu 10/10/24	Wed 2/12/25	218	222
221		**Construction**	**505 days**	**Thu 2/13/25**	**Wed 1/20/27**		
222		Submittals	60 days	Thu 2/13/25	Wed 5/7/25	220	223,224
223		Structures	330 days	Thu 5/8/25	Wed 8/12/26	222	225
224		Pipeline	400 days	Thu 5/8/25	Wed 11/18/26	222	225
225		Testing	45 days	Thu 11/19/26	Wed 1/20/27	223,224	227
226		**Commissioning**	**30 days**	**Thu 1/21/27**	**Wed 3/3/27**		
227		Commission	30 days	Thu 1/21/27	Wed 3/3/27	225	
228		**Funks/TRR Pipelines**	**1175 days**	**Thu 9/1/22**	**Wed 3/3/27**		
229		**Engineering**	**550 days**	**Thu 9/1/22**	**Wed 10/9/24**		
230		Preliminary	250 days	Thu 9/1/22	Wed 8/16/23		231
231		Final	300 days	Thu 8/17/23	Wed 10/9/24	230	233
232		**Bid and Award**	**90 days**	**Thu 10/10/24**	**Wed 2/12/25**		
233		Bid and Award	90 days	Thu 10/10/24	Wed 2/12/25	231	235
234		**Construction**	**505 days**	**Thu 2/13/25**	**Wed 1/20/27**		
235		Submittals	60 days	Thu 2/13/25	Wed 5/7/25	233	236,237
236		Structures	330 days	Thu 5/8/25	Wed 8/12/26	235	238
237		Pipeline	400 days	Thu 5/8/25	Wed 11/18/26	235	238,251
238		Testing	45 days	Thu 11/19/26	Wed 1/20/27	236,237	240
239		**Commissioning**	**30 days**	**Thu 1/21/27**	**Wed 3/3/27**		
240		Commission	30 days	Thu 1/21/27	Wed 3/3/27	238	
241		**Transmission Powerlines**	**1505 days**	**Thu 9/1/22**	**Wed 6/7/28**		
242		**Engineering**	**620 days**	**Thu 9/1/22**	**Wed 1/15/25**		
243		Preliminary	270 days	Thu 9/1/22	Wed 9/13/23		244
244		Final	350 days	Thu 9/14/23	Wed 1/15/25	243	246
245		**Bid and Award**	**90 days**	**Thu 1/16/25**	**Wed 5/21/25**		
246		Bid and Award	90 days	Thu 1/16/25	Wed 5/21/25	244	248
247		**Construction**	**765 days**	**Thu 5/22/25**	**Wed 4/26/28**		
248		Submittals	60 days	Thu 5/22/25	Wed 8/13/25	246	249,250,251
249		Procurement	300 days	Thu 8/14/25	Wed 10/7/26	248	250,252
250		Towers/Powerlines to POI	300 days	Thu 10/8/26	Wed 12/1/27	248,249	252
251		Towers/Powerlines Funks/TRR	330 days	Thu 11/19/26	Wed 2/23/28	237,248	252
252		Testing	45 days	Thu 2/24/28	Wed 4/26/28	249,250,251	254,279,307,320
253		**Commissioning**	**30 days**	**Thu 4/27/28**	**Wed 6/7/28**		
254		Commission	30 days	Thu 4/27/28	Wed 6/7/28	252	
255		**Funks Reservoir**	**1420 days**	**Thu 9/1/22**	**Wed 2/9/28**		
256		**Engineering**	**620 days**	**Thu 9/1/22**	**Wed 1/15/25**		
257		Preliminary	270 days	Thu 9/1/22	Wed 9/13/23		258
258		Final	350 days	Thu 9/14/23	Wed 1/15/25	257	260
259		**Bid and Award**	**90 days**	**Thu 1/16/25**	**Wed 5/21/25**		
260		Bid and Award	90 days	Thu 1/16/25	Wed 5/21/25	258	262
261		**Construction**	**680 days**	**Thu 5/22/25**	**Wed 12/29/27**		
262		Submittals	120 days	Thu 5/22/25	Wed 11/5/25	260	263,264,315
263		Haulroads	200 days	Thu 11/6/25	Wed 8/12/26	262	
264		Sediment Removal	250 days	Thu 11/6/25	Wed 10/21/26	262	265
265		Cofferdams (build/remove)	250 days	Thu 10/22/26	Wed 10/6/27	264	266
266		Testing	60 days	Thu 10/7/27	Wed 12/29/27	265	268
267		**Commissioning**	**30 days**	**Thu 12/30/27**	**Wed 2/9/28**		
268		Commission	30 days	Thu 12/30/27	Wed 2/9/28	266	
269		**Funks Pumping Generating Plant**	**1620 days**	**Thu 9/1/22**	**Wed 11/15/28**		
270		**Engineering**	**620 days**	**Thu 9/1/22**	**Wed 1/15/25**		
271		Preliminary	270 days	Thu 9/1/22	Wed 9/13/23		272
272		Final	350 days	Thu 9/14/23	Wed 1/15/25	271	274
273		**Bid and Award**	**90 days**	**Thu 1/16/25**	**Wed 5/21/25**		
274		Bid and Award	90 days	Thu 1/16/25	Wed 5/21/25	272	276
275		**Construction**	**880 days**	**Thu 5/22/25**	**Wed 10/4/28**		
276		Submittals	120 days	Thu 5/22/25	Wed 11/5/25	274	277,278
277		Large Equipment Procurement	350 days	Thu 11/6/25	Wed 3/10/27	276	
278		Structures	700 days	Thu 11/6/25	Wed 7/12/28	276	279
279		Testing	60 days	Thu 7/13/28	Wed 10/4/28	252,278	281
280		**Commissioning**	**30 days**	**Thu 10/5/28**	**Wed 11/15/28**		
281		Commission	30 days	Thu 10/5/28	Wed 11/15/28	279	
282		**TRR East Reservoir**	**1520 days**	**Thu 9/1/22**	**Wed 6/28/28**		
283		**Engineering**	**620 days**	**Thu 9/1/22**	**Wed 1/15/25**		
284		Preliminary	270 days	Thu 9/1/22	Wed 9/13/23		285
285		Final	350 days	Thu 9/14/23	Wed 1/15/25	284	287
286		**Bid and Award**	**90 days**	**Thu 1/16/25**	**Wed 5/21/25**		
287		Bid and Award	90 days	Thu 1/16/25	Wed 5/21/25	285	289
288		**Construction**	**780 days**	**Thu 5/22/25**	**Wed 5/17/28**		



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November 2020

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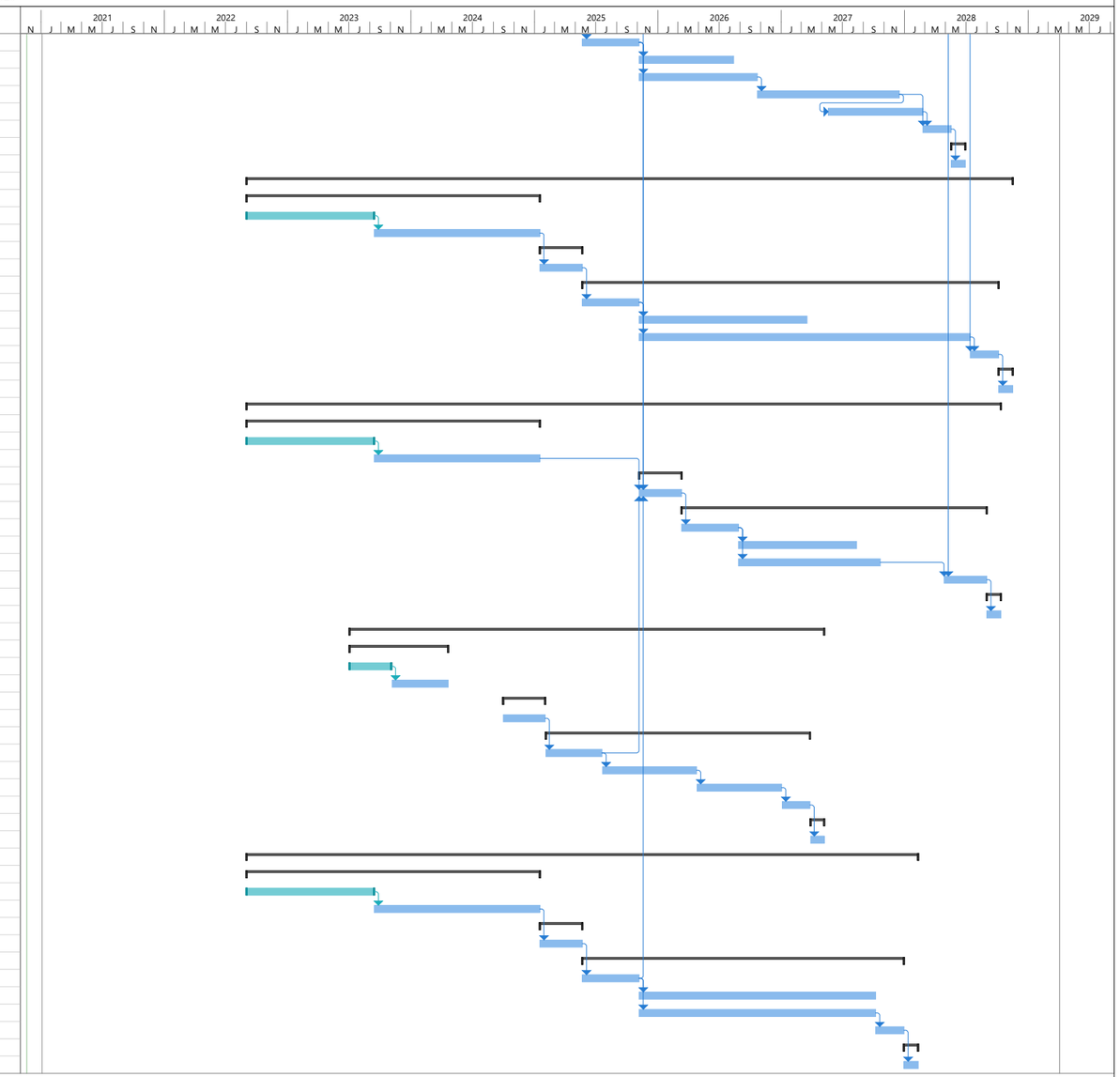
289		Submittals	120 days	Thu 5/22/25	Wed 11/5/25	287	290,291,315
290		Haulroads	200 days	Thu 11/6/25	Wed 8/12/26	289	
291		Ground Improvement	250 days	Thu 11/6/25	Wed 10/21/26	289	292
292		Earthwork/Structures	300 days	Thu 10/22/26	Wed 12/15/27	291	293FS-1200 hrs,294
293		Subgrade and Liner	200 days	Thu 5/20/27	Wed 2/23/28	292FS-1200 hrs	294
294		Testing	60 days	Thu 2/24/28	Wed 5/17/28	292,293	296
295		**Commissioning**	**30 days**	**Thu 5/18/28**	**Wed 6/28/28**		
296		Commission	30 days	Thu 5/18/28	Wed 6/28/28	294	
297		**TRR Pumping Generating Plant**	**1620 days**	**Thu 9/1/22**	**Wed 11/15/28**		
298		**Engineering**	**620 days**	**Thu 9/1/22**	**Wed 1/15/25**		
299		Preliminary	270 days	Thu 9/1/22	Wed 9/13/23		300
300		Final	350 days	Thu 9/14/23	Wed 1/15/25	299	302
301		**Bid and Award**	**90 days**	**Thu 1/16/25**	**Wed 5/21/25**		
302		Bid and Award	90 days	Thu 1/16/25	Wed 5/21/25	300	304
303		**Construction**	**880 days**	**Thu 5/22/25**	**Wed 10/4/28**		
304		Submittals	120 days	Thu 5/22/25	Wed 11/5/25	302	305,306
305		Large Equipment Procurement	355 days	Thu 11/6/25	Wed 3/17/27	304	
306		Structures	700 days	Thu 11/6/25	Wed 7/12/28	304	307
307		Testing	60 days	Thu 7/13/28	Wed 10/4/28	252,306	309
308		**Commissioning**	**30 days**	**Thu 10/5/28**	**Wed 11/15/28**		
309		Commission	30 days	Thu 10/5/28	Wed 11/15/28	307	
310		**Substations**	**1595 days**	**Thu 9/1/22**	**Wed 10/11/28**		
311		**Engineering**	**620 days**	**Thu 9/1/22**	**Wed 1/15/25**		
312		Preliminary	270 days	Thu 9/1/22	Wed 9/13/23		313
313		Final	350 days	Thu 9/14/23	Wed 1/15/25	312	315
314		**Bid and Award**	**90 days**	**Thu 11/6/25**	**Wed 3/11/26**		
315		Bid and Award	90 days	Thu 11/6/25	Wed 3/11/26	262,289,313,330,343	317
316		**Construction**	**645 days**	**Thu 3/12/26**	**Wed 8/30/28**		
317		Submittals	120 days	Thu 3/12/26	Wed 8/26/26	315	318,319
318		Large Equipment Procurement	250 days	Thu 8/27/26	Wed 8/11/27	317	
319		Structures	300 days	Thu 8/27/26	Wed 10/20/27	317	320
320		Testing	90 days	Thu 4/27/28	Wed 8/30/28	252,319	322
321		**Commissioning**	**30 days**	**Thu 8/31/28**	**Wed 10/11/28**		
322		Commission	30 days	Thu 8/31/28	Wed 10/11/28	320	
323		**Red Bluff Pumping Plant Improvements**	**1005 days**	**Mon 7/3/23**	**Fri 5/7/27**		
324		**Engineering**	**210 days**	**Mon 7/3/23**	**Fri 4/19/24**		
325		Preliminary	90 days	Mon 7/3/23	Fri 11/3/23		326
326		Final	120 days	Mon 11/6/23	Fri 4/19/24	325	
327		**Bid and Award**	**90 days**	**Mon 9/30/24**	**Fri 1/31/25**		
328		Bid and Award	90 days	Mon 9/30/24	Fri 1/31/25		330
329		**Construction**	**560 days**	**Mon 2/3/25**	**Fri 3/26/27**		
330		Submittals	120 days	Mon 2/3/25	Fri 7/18/25	328	315,331
331		Procurement	200 days	Mon 7/21/25	Fri 4/24/26	330	332
332		Mechanical/Electrical	180 days	Mon 4/27/26	Fri 1/1/27	331	333
333		Testing	60 days	Mon 1/4/27	Fri 3/26/27	332	335
334		**Commissioning**	**30 days**	**Mon 3/29/27**	**Fri 5/7/27**		
335		Commission	30 days	Mon 3/29/27	Fri 5/7/27	333	
336		**GCID Improvements**	**1420 days**	**Thu 9/1/22**	**Wed 2/9/28**		
337		**Engineering**	**620 days**	**Thu 9/1/22**	**Wed 1/15/25**		
338		Preliminary	270 days	Thu 9/1/22	Wed 9/13/23		339
339		Final	350 days	Thu 9/14/23	Wed 1/15/25	338	341
340		**Bid and Award**	**90 days**	**Thu 1/16/25**	**Wed 5/21/25**		
341		Bid and Award	90 days	Thu 1/16/25	Wed 5/21/25	339	343
342		**Construction**	**680 days**	**Thu 5/22/25**	**Wed 12/29/27**		
343		Submittals	120 days	Thu 5/22/25	Wed 11/5/25	341	315,344,345
344		Structures	500 days	Thu 11/6/25	Wed 10/6/27	343	
345		Earthwork	500 days	Thu 11/6/25	Wed 10/6/27	343	346
346		Testing	60 days	Thu 10/7/27	Wed 12/29/27	345	348
347		**Commissioning**	**30 days**	**Thu 12/30/27**	**Wed 2/9/28**		
348		Commission	30 days	Thu 12/30/27	Wed 2/9/28	346	



Project: Sites Reservoir
Date: Fri 11/20/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress