

**Environmental Assessment** 

# Firebaugh Canal Water District 1st Lift Canal Lining Project

September 2011

## **Mission Statements**

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitment to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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# List of Acronyms and Abbreviations

APE Area of Potential Effect

CEQ Council on Environmental Quality

CVP Central Valley Project

CFR Code of Federal Regulations

CFS Cubic Feet per Second DMC Delta-Mendota Canal

DOI Department of the Interior
EA Environmental Assessment
FCWD Firebaugh Canal Water District
FONSI Finding of No Significant Impact

GBP Grassland Bypass Project GDA Grassland Drainage Area HDPE High Density Polyethylene

ITA Indian Trust Assets
GHG greenhouse gas

NEPA National Environmental Policy Act NHPA National Historic Preservation Act

Reclamation Bureau of Reclamation

Service U.S. Fish and Wildlife Service VFD Variable Frequency Drive

# **Section 1** Purpose and Need for Action

#### 1.1 Background

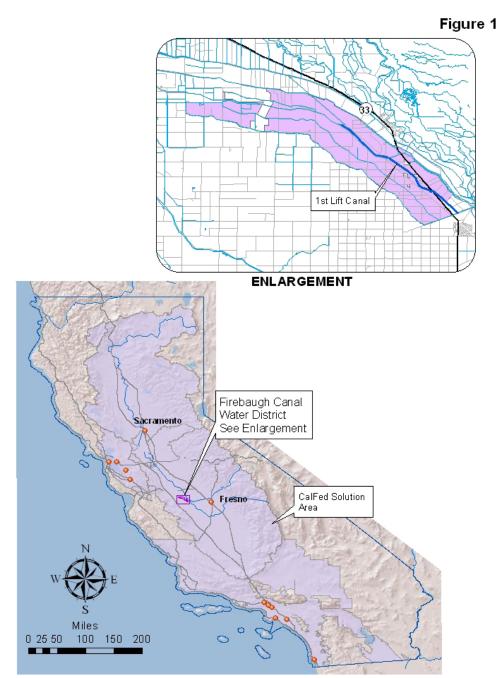
In conformance with the National Environmental Policy Act of 1969 (NEPA), as amended, the Bureau of Reclamation (Reclamation) has prepared this Environmental Assessment (EA) to evaluate and disclose any potential environmental impacts associated with implementation of the Firebaugh Canal Water District's (FCWD) 1st Lift Canal Lining Project. Reclamation proposes to disburse grant funds to FCWD to support construction of the Proposed Action. The Proposed Action is located west of the community of Firebaugh within the FCWD, which encompasses approximately 22,000 acres on the Westside of the San Joaquin Valley in Fresno, California (Figures 1 and 2). The 1st Lift Canal lining would begin at its crossing of the Delta-Mendota Canal (DMC) south of Washoe Avenue to the canal's end approximately 0.05 miles north of Nees Avenue.

FCWD was formed originally as Firebaugh Canal Company, a pre-1914 mutual water company with riparian water rights from the San Joaquin River. The FCWD has approximately 40 miles of canals and 36 miles of laterals. When Friant Dam was completed in 1942, the FCWD exchanged its water right for Cental Valley Project (CVP) water through the DMC and the Mendota Pool.

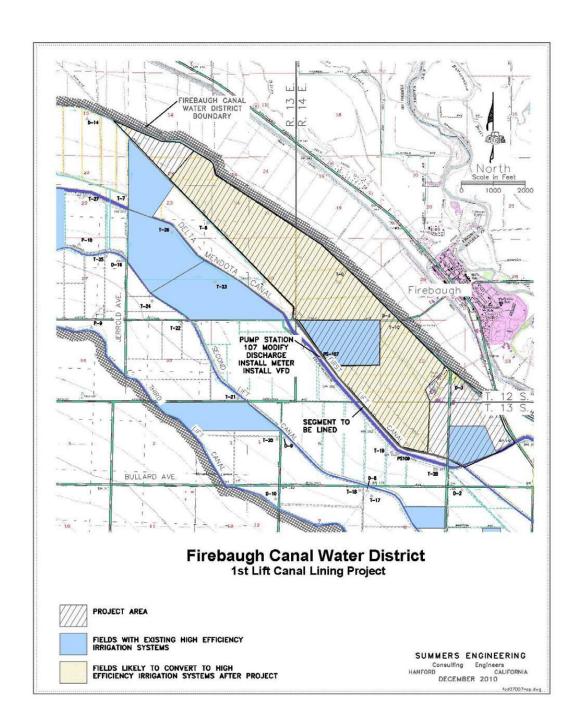
#### This EA:

- (1) Describes the existing environmental resources in the Proposed Action area;
- (2) Evaluates the effects of the No Action and Proposed Action alternatives on the resources; and
- (3) Proposes measures to avoid, minimize, or mitigate any adverse effects.

This EA is in compliance with NEPA and Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508). Reclamation has also prepared a Finding of No Significant Impact (FONSI), which explains why the Proposed Action would not have any significant effects on the human or natural environment.



Firebaugh Canal Water District Location Map - 1st Lift Canal Lining Project



#### 1.2 Purpose and Need

The United States faces an increasing set of water resource challenges. Aging infrastructure, rapid population growth, depletion of groundwater resources, impaired water quality associated with particular land uses and land covers, water needs for both human and environmental uses, and climate variability and change all play a role in determining the amount of fresh water available at any given place and time. Water shortages and water-use conflicts have become more commonplace in many areas of the United States, even in normal water years. As competition for water resources grow for irrigation of crops, growing cities and communities, energy production, and the environment the need for information and tools to aid water resource managers also grows. Water issues and challenges are increasing across the nation, but particularly in the western United States due to prolonged drought.

These water issues are exacerbating the challenges facing traditional water management approaches, which by themselves no longer meet today's needs. The Department of the Interior's (DOI) WaterSMART (Sustain and Manage America's Resources for Tomorrow) program establishes a framework to provide Federal leadership and assistance on the efficient use of water, integrating water and energy policies to support the sustainable use of all natural resources, and coordinating the water conservation activities of various Department bureaus and offices. Through the program, DOI is working to achieve a sustainable water strategy to meet the nation's water needs. With WaterSMART Grants, Reclamation provides cost-shared funding on a competitive basis for on-the-ground water conservation and energy efficiency projects. The WaterSMART Grant Program is under the authority of Section 9504(a) of the Secure Water Act, Subtitle F of Title IX of the Omnibus Public Land Management Act of 2009, P.L. 111-11 (42 USC 10364).

The purpose of the Proposed Action is for Reclamation to further the goals and objectives of the WaterSMART program as they apply to water management operations in the FCWD. Reclamation intends to do so by providing grant funding for the lining of approximately 2.6 miles of existing earthen channel with a concrete to reduce seepage losses. In addition, the grant funding will be used to upgrade an existing pump station which would increase flowrate flexibility resulting in improved flow measurement accuracy.

Currently the unlined canal loses approximately 300 acre feet per year through seepage to a perched saline sink. This amounts to 4.5 percent of the water conveyed by the 1st Lift Canal and 0.4 percent of the FCWD's total annual water supply. FCWD lies within the Grassland Drainage Area (GDA) and is a participating agency in the Grassland Bypass Project (GBP), through which,

subsurface drain water generated within the region is discharged to the San Joaquin River. Most of the GDA is underlain with a saline perched water table, which is managed with on-farm tile systems and regional deep drains. Deep percolation from irrigation and seepage from unlined canal systems is collected by the tile systems and regional drains, where it is managed and eventually discharged to the San Joaquin River. To manage these discharges, FCWD participated in the development of an In-Valley Drainage Solution such that no subsurface drain water leaves the GDA boundary. Because the regional perched water table is high in salts, boron, and selenium, it is not usable for irrigation.

Two complementary plans (the San Luis Unit Feature Re-Evaluation and the Westside Regional Drainage Plan) have been developed to implement the In-Valley Drainage Solution. Both plans contain a solution chain that includes source control (such as seepage reduction) to reduce drainage production, recirculation (as a management tool), drainage reuse (to reduce drainage volume), and, ultimately, drainage treatment and salt disposal. Implementation of the Proposed Action would reduce seepage losses by approximately 300 acre feet per year which results in a reduction of an estimated 45 pounds of selenium, 4,000 pounds of boron, and 1,000 tons of salt each year. The Proposed Action fits in the source control category, by reducing the volume of subsurface drainage produced through seepage reduction.

The Proposed Action would not result in a change to the acreage served by the FCWD facilities nor would the system's capacity be increased.

#### 1.3 Potential Resource Issues

The resource areas listed below have the potential to be affected by the Proposed Action and are discussed further in Section 3.

- Surface Water Resources
- Groundwater Resources
- Biological Resources
- Cultural Resources
- Indian Trust Assets
- Environmental Justice
- Climate Change

### 1.4 Resources Not Analyzed in Detail

Effects on several environmental resources were examined and found to be minor. Because of this, the following resources were eliminated from further discussion from this EA: Aesthetic Resources; Geology, Soils, Seismicity, and Minerals; Hazards and Hazardous Materials; Land Use and Agriculture; Noise; Socioeconomics, Population, and Housing; Recreation; Transportation and Circulation; and Utilities, Public Services, and Service Systems.

# Section 2 Alternatives Including Proposed Action

#### 2.1 No Action Alternative

The No Action Alternative would consist of Reclamation not providing grant funding to facilitate water conservation measures at FCWD. Although it is possible that FCWD may find alternative sources of funding for the Proposed Action, for the purposes of this EA, the consequence of Reclamation not funding the Proposed Action would be no construction of the Proposed Action. The irrigation system currently in place would continue to operate. FCWD would continue to provide irrigation service to the FCWD and its users via the unlined 1st lift canal. Deep percolation from irrigation and seepage from the unlined canal would continue to be collected by the tile systems and regional drains, managed and eventually discharged into the San Joaquin River.

### 2.2 Proposed Action Alternative

The Proposed Action Alternative consists of providing grant funds to support the lining of 2.6 miles of FCWD's main lift channel with concrete and upgrading Pump Station 107, which delivers water from the DMC to the 1st Lift Canal (Photographs 1 through 6). Approximately 10 percent of the FCWD's allocated water supply is lost from factors such as seepage from canals and conveyance facilities. The estimated conserved volume of water is 300 acre feet per year. This amounts to 4.5 percent of the water conveyed by the 1st Lift Canal and 0.4 percent of the FCWD's total annual water supply.

Pump Station 107 is a fixed speed pump station that delivers water from the DMC to the 1st Lift Canal at a constant rate of 18 cubic feet per second (cfs). The pump discharge has been constructed so that a full pipe is not maintained, which prevents accurate flow measurement. The upgrades would include installation of a variable speed drive to increase flow rate flexibility and modification of the pump discharge to improve flow measurement accuracy.



Construction Activities would include (see Appendix A for construction drawings):

• <u>Site preparation:</u> The existing canal alignment would be cleaned of weeds and accumulated silt. All canal facilities including turnouts, stilling wells, and other features, would be removed. Silt would be spread along the existing banks to dry. One to three excavators would be used to perform this work and a dump truck would be used to haul removed features from the site.

- <u>Soil stabilization</u>: After the site has been cleaned, it would be evaluated by the contractor and engineer to determine the stability of the subgrade throughout the alignment. Where the subgrade is too unstable or proper compaction it would be over-excavated, mixed with lime or other soil-cement materials, replaced within the canal footprint and compacted. This process would only be applied where required. Construction equipment would include excavators, specialized soil-cement mixing vehicles, scrapers, and sheep's foot rollers.
- <u>Backfill and compaction:</u> The existing canal would be filled with material from the adjacent banks and compacted according to the design drawings. Scrapers would be used to excavate, transport and place material into six to nine inch lifts. A water truck would be used to control material moisture levels and rollers would be used to compact the material as it is placed. Construction equipment would include one to three scrapers, one to two rollers, and one to two water trucks. Total compacted embankment is estimated at 24,400 cubic yards.
- <u>Channel excavation:</u> Upon completion of backfill and compaction, the new channel would be excavated to the design grade and cross section according to the design drawings. Excavation would be completed by a specialized trencher and the excavated material would be graded into the canal bank by a scraper.
- <u>Lining placement</u>: Once the channel is excavated, the concrete lining would be placed. A paving sled built to fit the canal geometry would be pulled by the trencher or other construction equipment to place the lining along the canal alignment at a uniform thickness. At existing culverts or other structures, the paving sled would be removed from the canal approximately 20 feet upstream of the feature. At these locations, handplaced lining would be installed to make a smooth transition to the culvert. Concrete trucks would follow the paving sled on both sides to provide the concrete for the lining.
- <u>Turnout installations</u>: Where turnouts are located, the concrete lining would be removed and a precast concrete gate structure and canal gate would be placed such that the invert of the gate is near the canal invert. A 24-inch high density polyethylene (HDPE) corrugated pipe would be installed to connect the gate to existing turnout boxes for water deliveries. Hand-placed transition lining would be poured to make a smooth transition from the canal to the gate structure. An excavator or backhoe would be used for this work.

- Pump Station 107 discharge replacement: The existing discharge pipeline from the Pump Station 107 pump to the discharge point in the 1st Lift Canal would be removed by an excavator. A new 24-inch steel discharge manifold would be installed and transition to a 24-inch polyvinyl chloride (PVC) pipeline in accordance with the design drawings. Expected maximum trench depth is 16 feet with an average depth of approximately 10 feet. The discharge pipeline would terminate at the 1st Lift Canal with a cast in place headwall and meter. After installation of the pipeline, the trench would be backfilled and compacted.
- Pump Station 107 electrical controls: The existing electrical controls for Pump Station 107 would be removed and replaced with a new variable frequency drive (VFD) and control panel. This equipment would be installed by hand. It is expected that existing wiring and conduits would remain in use. One to two service trucks would be utilized for this action.

# Section 3 Affected Environment & Environmental Consequences

The Proposed Action is located within the FCWD in Fresno County in the San Joaquin Valley, California. The County is bounded by the Sierra Nevada Mountains to the east and the Pacific Coastal Range to the west. The region is characterized by flat valley lowland agriculture, with a climate that is cool and moist in the winter and hot and dry in the summer.

The Proposed Action would line approximately 2.6 miles of an existing earthen channel with concrete. The Proposed Action would begin at the canal's crossing of the DMC south of Washoe Avenue to the canal's end approximately 0.05 miles north of Nees Avenue. The DMC runs parallel to the canal. The existing channel is a main lift canal for FCWD with a capacity of 70 cfs for this reach of the canal. Full water allocation is 85,000 acre-feet per year. The canal's operating season is approximately 360 days, supplying water for irrigation purposes. Currently the unlined canal loses approximately 300 acre feet per year through seepage to a perched saline sink. This lost water is not only unavailable for irrigation uses, but also contributes to the discharge of saline subsurface drain water to the San Joaquin River system. Additionally, the existing earthen canal promotes the growth of aquatic vegetation which inhibits the use of high-efficiency irrigation systems (such as sub-surface drip).

The average annual water supply to FCWD is 85,000 acre feet in a non critical water year and 58,000 acre feet in a critical (drought) water year. The water use within the FCWD boundaries is virtually 100 percent for agricultural irrigation and is obtained through an exchange contract with Reclamation via the DMC. There are 22,000 acres developed to irrigate crop land within the FCWD and approximately 35 water users. The majority of the crops grown consist of cotton, alfalfa, tomatoes, wheat, barley, melons, pomegranates, pistachios, asparagus and onions. The FCWD typically delivers 100 percent of its allocation and does not anticipate a significant change in demand in the future.

The FCWD has approximately 40 miles of canals and 36 miles of laterals. Approximately 15 miles of canals and laterals have been lined since 2000. All lined canals have performed as expected and the FCWD and its users have benefited. In recent years, FCWD has spent more than \$6 million on infrastructure projects to line and pipe canal laterals and about 60 percent of the FCWD's irrigated land has converted to drip and other high-efficiency irrigation systems. The FCWD participated in a regional water use study which estimated the typical on-farm efficiency at between 80 percent and 90 percent. This study

evaluated crop evapotranspiration requirements, leaching and drainage requirements, irrigation methods, and actual water deliveries.

#### 3.1 Surface Water Resources

#### 3.1.1 Affected Environment

The FCWD's water supply is almost entirely surface water from the DMC and the Mendota Pool. FCWD lies within the GDA and is a participating agency in the GBP. The GBP consolidates subsurface drain water from the GDA into a single channel (Grassland Bypass Channel) and into the San Luis Drain, where it is discharged into Mud Slough, approximately eight miles upstream of the San Joaquin River. Under the current conditions the 1st Lift Canal contributes to the shallow water table in the form of seepage. A portion of this deep percolation is collected by the adjacent subsurface drainage system, and another portion is likely collected by deep drainage and drainage systems further down slope, contributing to the subsurface drainage production of the region.

#### 3.1.2 Environmental Consequences

#### No Action

Under the No Action Alternative, no changes would occur to the existing operations or the FCWD's surface water supply.

#### **Proposed Action**

The Proposed Action would reduce water lost to seepage by lining 2.6 miles of existing canal. The estimated conserved volume is 300 acre feet per year (a reduction of an estimated 45 pounds of selenium, 4,000 pounds of boron, and 1,000 tons of salt each year). The estimated conserved amount equates to 4.5 percent of the water conveyed by the 1st Lift Canal and 0.4 percent of the FCWD's total annual water supply. This estimate was developed based on seepage studies performed on the FCWD's 2nd and 3rd Lift Canals, which have similar conditions to the 1st Lift Canal (see Appendix B).

The Proposed Action would also reduce suspended silt and aquatic growth in the canal which would increase the quality of the water delivered to water users. The increase in water quality would reduce wear on the pump stations as well as the number of backwash cycles of filter stations. Although the existing, unlined channel does not prohibit the installation of a high-efficiency irrigation system, the aquatic growth and suspended silt does discourage their installation. By eliminating these issues the Proposed Action could potentially encourage the installation of high-efficiency irrigation systems such as buried drip systems. Drip systems would accurately measure the volume of water required for a crop's roots, eliminating surface runoff and the associated contaminants. Additionally, drip irrigation systems allow for the application of fertilizers and

other materials directly through the drip tape eliminating the need for surface spraying and the associated potential for drift, further improving the regional water use efficiency and conservation efforts.

In addition, the proposed modifications to Pump Station 107 would improve water delivery flexibility by converting the existing fixed-speed pump to a variable speed, which would allow the FCWD to set the flow rate to more closely match actual demands. Through the installation of a flow meter and the integration of the pump station into its SCADA system, the FCWD would be able to monitor delivered and required flow remotely. The Proposed Action would not result in short-term or long-term adverse impacts to surface water or resources dependent on surface water.

#### 3.2 Groundwater Resources

#### 3.2.1 Affected Environment

The FCWD is underlain by a shallow saline aquifer which is high in dissolved salts, boron, and selenium, all of which are considered constituents of concern by the Central Valley Regional Water Quality Control Board. This shallow water table is managed through on-farm subsurface (tile) drainage systems and regional deep drains that intercept seepage from irrigation and unlined canal systems. The FCWD pumps approximately 4,000 acre feet a year from shallow groundwater wells. These wells are operated primarily to reduce the production of subsurface drainage within the watershed. Currently the 1st Lift Canal contributes to approximately 300 acre feet of subsurface irrigation water per year into the groundwater through seepage.

#### 3.2.2 Environmental Consequences

#### No Action

Under the No Action Alternative, groundwater resources would continue to be utilized consistent with the current conditions.

#### Proposed Action

The Proposed Action would line approximately 2.6 miles of existing earthen channel with concrete. Currently the unlined canal loses approximately 300 acre feet per year through seepage to a perched saline sink. This amounts to 4.5 percent of the water conveyed by the 1st Lift Canal and 0.4 percent of the FCWD's total annual water supply. The reduction in the amount of seepage to the local perched water table would reduce the production of subsurface drain water which is currently discharged to the San Joaquin River and eventually to San Joaquin/Sacramento Delta. The implementation of the Proposed Action would reduce seepage losses potentially resulting in a reduction of an estimated 45 pounds of selenium, 4,000 pounds of boron, and 1,000 tons of salt each year

that currently moves through the watershed. The Proposed Action would not result in short-term or long-term adverse impacts to groundwater resources.

### 3.3 Biological Resources

#### 3.3.1 Affected Environment

The FCWD encompasses approximately 22,000 acres on the Westside of the San Joaquin Valley in Fresno, California. The majority of the crops grown within the FCWD consist of cotton, alfalfa, tomatoes, wheat, barley, melons, pomegranates, pistachios, asparagus and onions. Development of land to irrigate crops has been the historic land use within in the FCWD. Currently the Proposed Action area is annually excavated, graded, and sprayed for maintenance purposes resulting in the absence of sufficient habitat criteria required to support special-status species.

#### 3.3.2 Environmental Consequences

#### No Action

Under the No Action Alternative, biological resources would not change from their current conditions.

#### <u>Proposed Action</u>

The Proposed Action would line approximately 2.6 miles of existing earthen channel with concrete. Currently the unlined canal loses approximately 300 acre feet per year through seepage to a perched saline sink. The reduction in the amount of seepage to the local perched water table would reduce the production of subsurface drain water which is currently discharged to the San Joaquin River and eventually to San Joaquin/Sacramento Delta.

The Proposed Action would involve the placement of compacted embankment and excavation of earth as required to trim the canal to the required cross-section. All work would be performed within the footprint of the existing canal and no habitat would be impacted. Lands surrounding the Proposed Action are either actively farmed or contain farm support facilities (such as shops and farm houses).

#### Potential Federally Listed Species in the Proposed Action area

The following table includes federally listed, proposed and candidate species potentially occurring within the Proposed Action area. This list was generated from accessing the U.S. Fish and Wildlife's (Service) website in July of 2011 for the Firebaugh USGS 7.5-minute quadrangle.

Table 1: Federally Listed Species Identified as Potentially Occurring in the Firebaugh USGS 7.5-minute Quadrangle

Common Name	Scientific Name	Federal Status	Potential habitat utilized by species in Proposed Action Area
INVERTEBRATES			
Branchinecta lynchi	Vernal pool fairy shrimp	T	No
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	Т	No
AMPHIBIANS			
Rana draytonii	California red-legged frog	T	No
FISH			
Hypomesus transpacificus newberryi	Delta smelt	Т	No
Oncorhynchus mykiss	Central Valley steelhead	T	No
REPTILES			
Gambelia sila	Blunt-nosed leopard lizard	Е	No
Thamnophis gigas	Giant garter snake	T	No
MAMMALS			
Dipodomys ingens	Giant kangaroo rat	Е	No
Dipodomys nitratoides exillis	Fresno kangaroo rat	Е	No
Vulpes macrotis mutica	San Joqauin kit fox	Е	No

#### Key:

- (PE) Proposed Endangered Proposed in the Federal Register as being in danger of extinction
- (PT) Proposed Threatened Proposed as likely to become endangered within the foreseeable future
- (E) Endangered-Listed in the Federal Register as being in danger of extinction
- (T) Threatened Listed as likely to become endangered within the foreseeable future
- (C) Candidate Candidate which may become a proposed species

For the purpose of this EA, biological resources include vegetation, wildlife, and waters of the United States. The Proposed Action area is annually excavated, graded, and sprayed for maintenance purposes resulting in the absence of sufficient habitat criteria required to support special-status species. Based on the habitat requirements of the listed species that could potentially occur within the Proposed Action area, the Proposed Action does not provide suitable habitat for the Vernal pool fairy shrimp, Valley elderberry longhorn beetle, Blunt-nosed leopard lizard, California red-legged frog, delta smelt, Central Valley steelhead, Giant kangaroo rat, and the Fresno kangaroo rat. Therefore, these species are not discussed in this section.

Though occurrences of neither listed sensitive species nor migratory birds have been observed during the implementation of previous projects within the FCWD area, an analysis of potential impacts and associated avoidance measures for both giant garter snake and San Joaquin kit fox are discussed below due to the Proposed Action area providing a potential migratory corridor that could conceivable be utilized by these species.

#### **Giant Garter Snake**

Crops that have been known to provide suitable habitat for giant gartner snake (i.e. rice) have not been grown in the FCWD for at leat the last 30 years. Although the Proposed Project area does not contain suitable giant garter snake habitat, it could be a movement corridor for snakes. Documented sightings of giant garter snake occurred in the Mendota Pool area, some 6 to 10 miles southeast of the Proposed Action area. Potential impacts to the giant garter snake could be a disruption in their migration if the Proposed Action were to be constructed during the migratory season. However, construction would occur during the non-migratory season (October 2-April 30) when giant garter snakes are dormant and would not be migrating. Since the Proposed Action area does not provide habitat for giant garter snakes, but could potentially provide a migratory corridor utilized by the species, limiting work to the inactive period reduces the potential for impact. In addition, there are no wetlands within the Proposed Action area that would attrack giant garter snakes. The Proposed Action area would be restored to pre-project conditions and, therefore, no indirect effects would occur as a result of the Proposed Action. Avoidance and minimization measures as described below would be implemented by FCWD to further avoid and minimize any potential project impacts to giant garter snakes. Reclamation has determined that the Proposed Action would have no effect on giant garter snake.

#### Avoidance and Minimization Measures for Giant Garter Snake

The following Avoidance and Minimization Measures would be applied for giant garter snake. Since giant garter snake habitat is not being directly impacted, there are no mitigation or conservation measures, or compensation/set-asides proposed.

- The Proposed Action area will be surveyed for giant garter snakes 24 hours before construction activities. Survey of the Proposed Action project area will be repeated if a lapse in construction activity for two weeks or greater has occurred. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed.
- After completion of construction activities, removal of any temporary fill and construction debris will be completed.

- The disturbed areas will be restores to pre-project conditions.
- Confine movement of heavy equipment to existing roadways.
- Clearing of vegetation will not occur under the Proposed Action.
- Construction personnel will receive environmental awareness training that instructs workers to recognize giant garter snake and its habitat(s).

#### San Joaquin Kit Fox

Although the Proposed Project area does not contain suitable habitat for San Joaquin kit fox, it could be utilized as a movement corridor. The Proposed Action area would be restored to pre-project conditions and, therefore, no indirect effects would occur as a result of the Proposed Action. Avoidance and minimization measures would be implemented by FCWD if there is detection of the species utilizing the Proposed Action area as a migratory corridor. Reclamation has determined that the Proposed Action would have no effect on San Joaquin kit fox.

The Proposed Action would not result in a significant change in the surrounding environment and would not result in short-term or long-term adverse impacts to biological resources. However, by reducing the seepage contribution to the local perched water table, the Proposed Action would reduce the production of subsurface drain water which is currently discharged to the San Joaquin River and eventually to San Joaquin/Sacramento Delta thus providing possible habitat benefits in the surrounding area. In addition, the FCWD has completed multiple canal lining projects within the district. These previous projects objectives were successful and no impacts to species were documented.

#### 3.4 Cultural Resources

#### 3.4.1 Affected Environment

Cultural resources is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation that outlines the Federal Government's responsibility to cultural resources. Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources listed on or eligible for inclusion in the National Register of Historic Places (National Register). Those resources that are on or eligible for inclusion in the National Register are referred to as historic properties.

The Section 106 process is outlined in the Federal regulations at 36 Code of Federal Regulations (CFR) Part 800. These regulations describe the process that the Federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, and consult with the State Historic Preservation Office, to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

The Proposed Action does not involve the types of activities that have the potential to effect historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1).

#### 3.4.2 Environmental Consequences

#### No Action Alternative

Under the No Action Alternative, there would not be an undertaking as defined by Section 301 of the NHPA. The condition of cultural resources would be the same as under the existing conditions. No impacts to cultural resources are associated with this No Action Alternative.

#### <u>Proposed Action</u>

The implementation of the Proposed Action has no potential to cause effects to historic properties pursuant to 36 CFR Part 800.3(a)(1). Because the Proposed Action has no potential to cause effects to historic properties, the project will have no impact on cultural resources.

In the unlikely event that cultural resources or human remains are identified during the implementation of this project there may be additional considerations pursuant to Section 106 of the NHPA. If inadvertent discoveries of cultural resources or human remains occur during project implementation, work shall temporarily stop and Reclamation cultural resources staff shall be contacted immediately.

#### 3.5 Indian Trust Assets

#### 3.5.1 Affected Environment

Indian Trust Assets (ITAs) are legal interests in property or rights held in trust by the United States for Indian Tribes or individuals. Trust status originates from rights imparted by treaties, statutes, or executive orders. These rights are reserved for, or granted to, tribes. A defining characteristic of an ITA is that such assets cannot be sold, leased, or otherwise alienated without Federal approval. Indian reservations, rancherias, and allotments are common ITAs. Allotments can occur both within and outside of reservation boundaries and are parcels of land where title is held in trust for specific individuals. Additionally, ITAs include the right to access certain traditional use areas and perform certain traditional activities. It is Reclamation policy to protect ITAs from adverse impacts resulting from Reclamation's programs and activities whenever possible.

#### 3.5.2 Environmental Consequences

#### No Action

The No Action Alternative would have no effect on ITAs.

#### **Proposed Action**

There are no Indian reservations, rancherias or allotments in the project area (the nearest ITA is Table Mountain Rancheria, approximately 46 miles northeast of the project location.). The Proposed Action does not have a potential to affect ITAs.

#### 3.6 Environmental Justice

#### 3.6.1 Affected Environment

Executive Order 12898 requires each Federal agency to achieve environmental justice as part of its mission, by identifying and addressing disproportionately high adverse human health or environmental effects, including social and economic effects, of its programs and activities on minority populations and low-income populations of the United States.

#### 3.6.2 Environmental Consequences

#### No Action

The No Action Alternative would have no effect on low-income or minority individuals within the project area.

#### **Proposed Action**

No significant changes in agricultural communities or practices would result from the Proposed Action, other than potential changes to individual irrigation systems. These changes are not likely to affect agricultural employment, which employs a higher proportion of low-income and minority workers than are employed in the general workforce. In fact, the use of more sprinkler or drip irrigation systems may ensure the continued viability of agriculture in the area, which would sustain agricultural employment. Accordingly, the Proposed Action would not have any significant or disproportionately negative impacts on low-income or minority individuals within the project area.

#### 3.7 Global Climate Change

#### 3.7.1 Affected Environment

Climate change is a shift in the "average weather" that a given region experiences. Global climate change means changes in the climate of the Earth as a whole. There is general consensus in the scientific community that global climate change is now occurring, and that the cause of this change is mainly human activities that generate emissions of greenhouse gases (GHGs). GHGs are gases that trap heat in the earth's atmosphere, including carbon dioxide, methane, nitrous oxide and other less-abundant gases. Increased GHG levels in the atmosphere have been linked to an increase in the average global temperature that has been observed. The increased GHG concentrations primarily have resulted from increased combustion of fossil fuels. Other sources of GHG emissions include decomposition of organic matter, industrial and agricultural activities, and deforestation (IPCC, 2004).

The project area is located in the Central Valley, which is expected to experience an increase in extreme heat days. Most of the project area's water supply ultimately comes from the Sierra Nevada snowpack, so reductions in snowpack content would adversely affect the surface and groundwater supplies. The project area is located in an agricultural region, so climate change impacts could adversely affect agricultural productivity, which in turn would affect the local economy.

To date, the Federal government has not adopted any comprehensive national strategy for reducing GHG emissions, although it has adopted some actions related to emission reduction, such as higher fuel economy standards for automobiles. The State of California has addressed climate change on its own initiative. In 2008, California adopted the Climate Change Scoping Plan, with the purpose of reducing GHG emission levels to year 1990 levels by 2020. The Scoping Plan proposes a regional emissions cap-and-trade system and complementary measures such as expansion of energy efficiency programs,

increase in the use of renewable energy sources, creation of certain fees to price use of public goods and incentivize GHG emission reduction, and reduction of emissions from State and local government operations. California has adopted other GHG reduction regulations, such as the Low Carbon Fuel Standard, motor vehicle GHG emission standards, and regional planning that integrates land uses with transportation systems.

#### 3.7.2 Environmental Consequences

#### No Action

Since the project would not be implemented under the No Action alternative, the project area would not be affected by the potential consequences of climate change, such as reduced water supply.

#### **Proposed Action**

The Proposed Action would generate GHG emissions from construction activities, mainly through the combustion of fuels by construction equipment and vehicles. These emissions would be temporary, and would cease once construction work is completed. In addition, California's Low Carbon Fuel Standard would lead to the use of fuels that would generate fewer GHG emissions when combusted than would current fuels. The Proposed Action would not generate a significant amount of GHGs, and therefore would not result in an adverse impact on global climate change.

## **Section 4** Cumulative Impacts

According to the CEQ regulations for implementing the procedural provisions of NEPA, a cumulative impact is defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Currently, there are no other known foreseeable development projects located in the vicinity of the Proposed Action area. Project operations would not be altered due to the Proposed Action and therefore would not contribute to any long-term effects on environmental resources. The Proposed Action would not result in cumulative impacts to any of the resources described within this EA.

## Section 5 Consultation and Coordination

#### Fish and Wildlife Coordination Act (16 USC. 651 et seq.)

The Fish and Wildlife Coordination Act (FWCA) requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. This is not a water development project; therefore, the FWCA does not apply.

#### Endangered Species Act (16 USC. 1521 et seq.)

Section 7 of this Act requires Federal agencies to ensure that all federally associated activities within the United States do not jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of the critical habitat of these species. Action agencies must consult with the USFWS, which maintains current lists of species that have been designated as threatened or endangered, to determine the potential impacts a project may have on protected species. Reclamation determined that the Proposed Action would have no effect on federally proposed or listed threatened and endangered species or their proposed or designated critical habitat. No further consultation is required under Section 7 of the Endangered Species Act.

#### Migratory Bird Treaty Act (16 USC § 703 ET SEQ.)

The Migratory Bird Treaty Act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns. The Proposed Action would not affect migratory birds therefore no further coordination is needed under the MBTA.

#### National Historic Preservation Act (16 USC 470 et seq.)

The NHPA of 1966, as amended, is the primary Federal legislation outlining the Federal government's responsibility to cultural resources. Specifically, Section 106 of the NHPA requires "[t]he head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building,

structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking." The process for implementing Section 106 of the NHPA is found at 36 CFR Part 800. The Section 106 process requires consultation with Indian tribes, other interested parties, and the State Historic Preservation Officer (SHPO), or Tribal Historic Preservation Officer (THPO) if applicable. Reclamation has concluded the Section 106 process.

# **Section 6** List of Preparers and Reviewers

Carolyn Bragg, Natural Resources Specialist BranDee Bruce, Historian Sheryl Looper, CVP Water Resource Program Specialist

# **Section 7** References

- California Climate Action Team. Climate Action Team Biennial Report Executive Summary. April 2010.
- Intergovernmental Panel on Climate Change. 2004. "16 Years of Scientific Assessment in Support of the Climate Convention." December 2004.
- U.S. Fish and Wildlife Service. List of Species that Potentially Occur within USGS 7.5-minute Firebaugh Quadrangle. Website accessed in July 2011.

# **Appendix A: Construction Drawings**

DRAWING

NUMBER

L-1

PP-1

PP-2

PP-3

PP-5

PP-6

CS-1

CS-2

CS-3

PS-1

PS-2

MD-1

DRAWING LIST

TITLE

PROJECT LOCATION MAP

PLAN & PROFILE

STATION 0+00 TO 25+00

PLAN & PROFILE

STATION 25+00 TO 50+00 PLAN & PROFILE

STATION 50+00 TO 75+00

PLAN & PROFILE

IN THIS AREA

EXCAVATION I-800-642-2444

CALL USA AT LEAST 48 HOURS PRIOR TO ANY

DRAWING NO. L-1

FIGURE NUMBER

# FIREBAUGH CANAL WATER DISTRICT

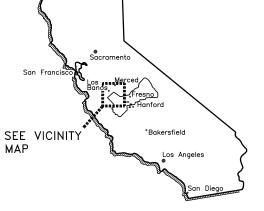
# **LOCATION MAP** FIRST LIFT CANAL LINING PROJECT

SUMMERS ENGINEERING INC. Consulting Engineers

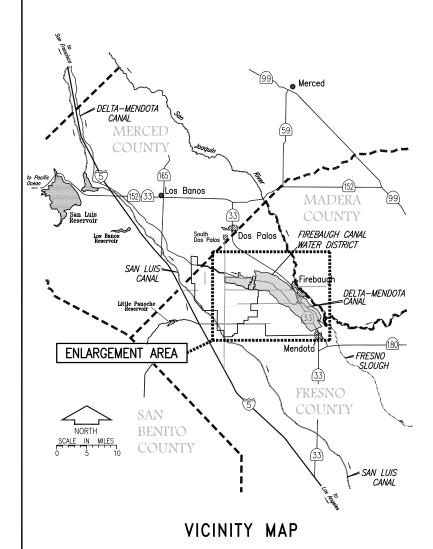
OCTOBER 1, 2011

PRELIMINARY For Review Only Subject to Revision AUGUST 30, 2011

ENLARGEMENT - AREA

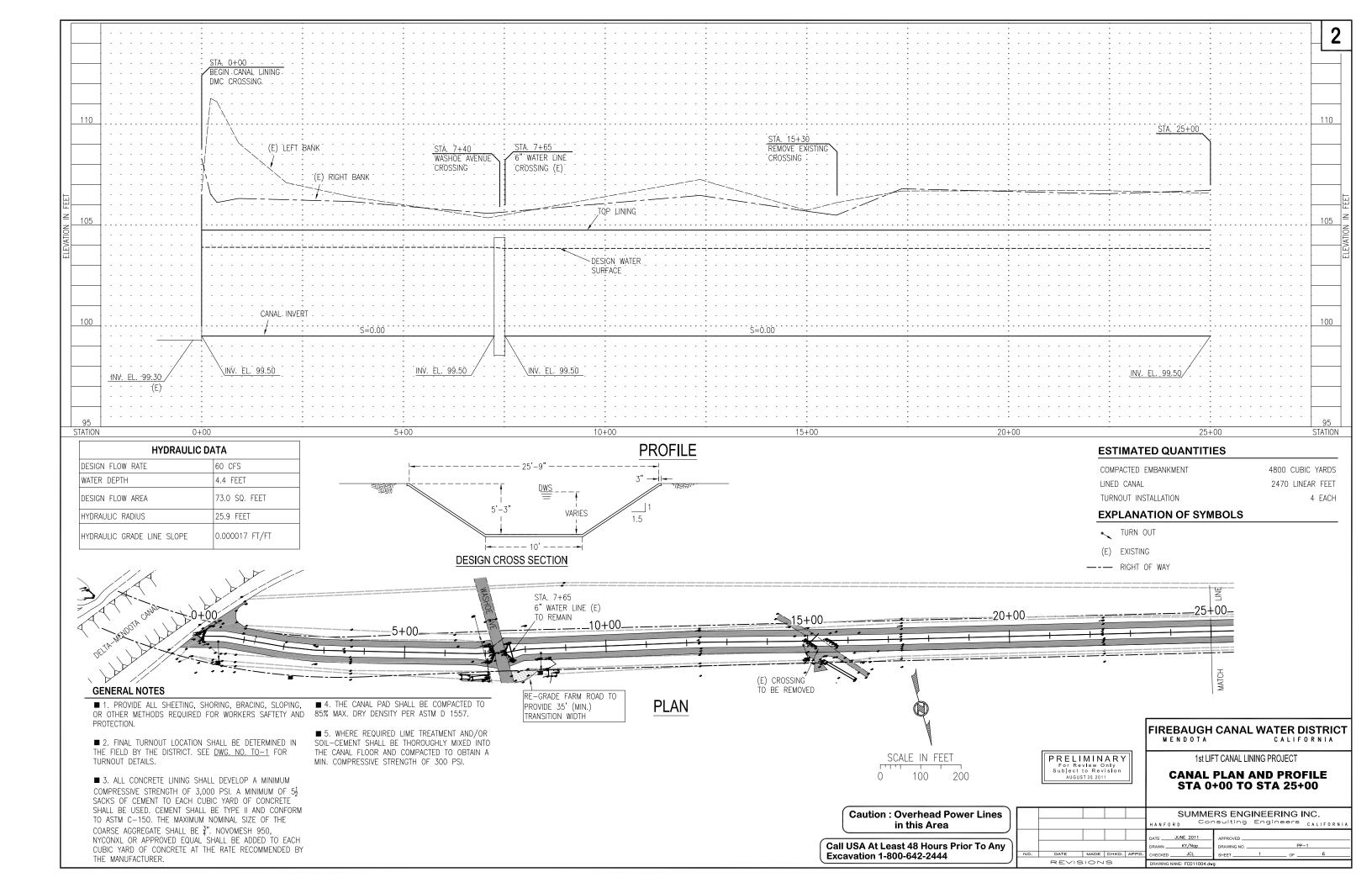


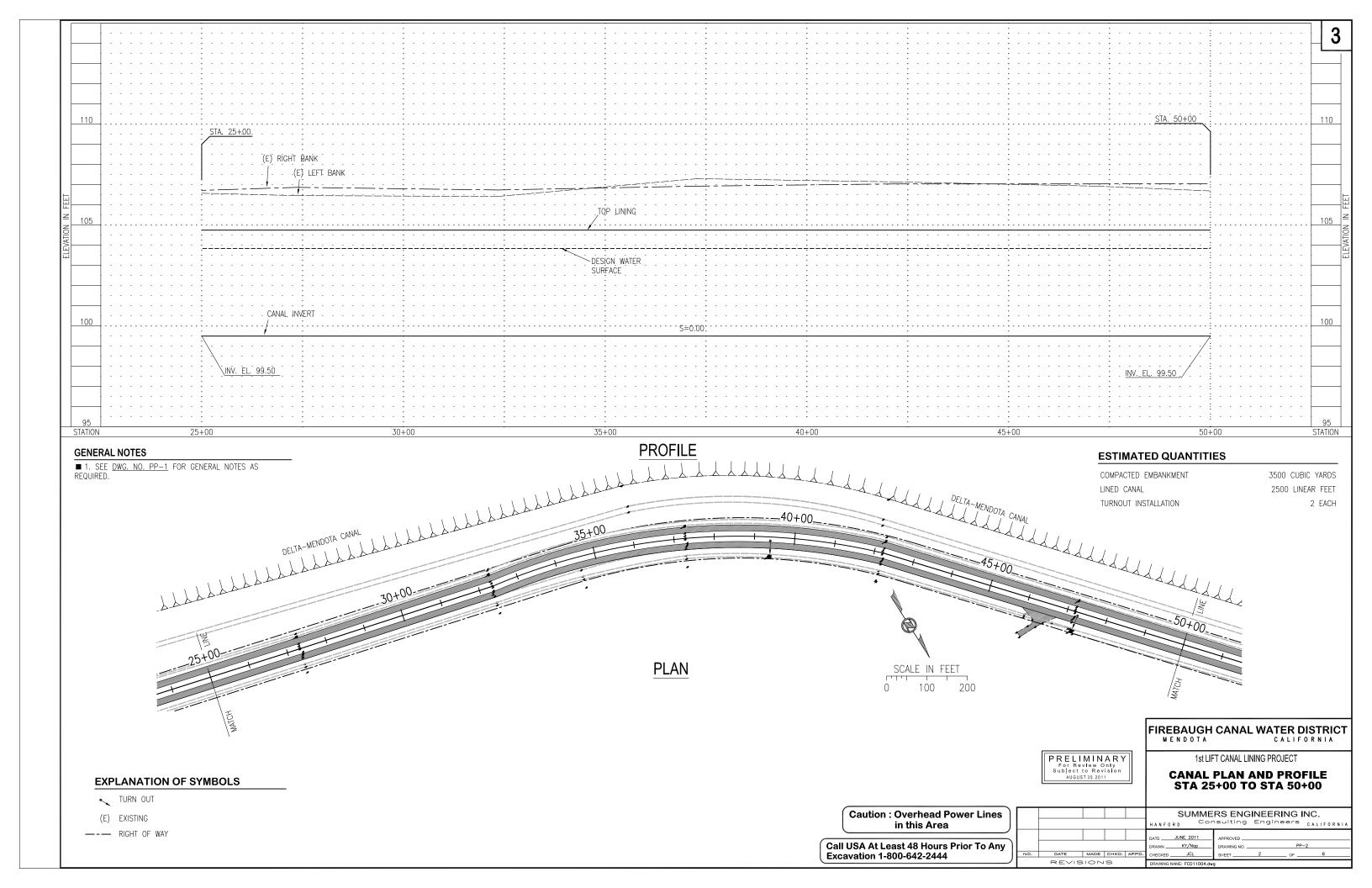
STATE OF CALIFORNIA

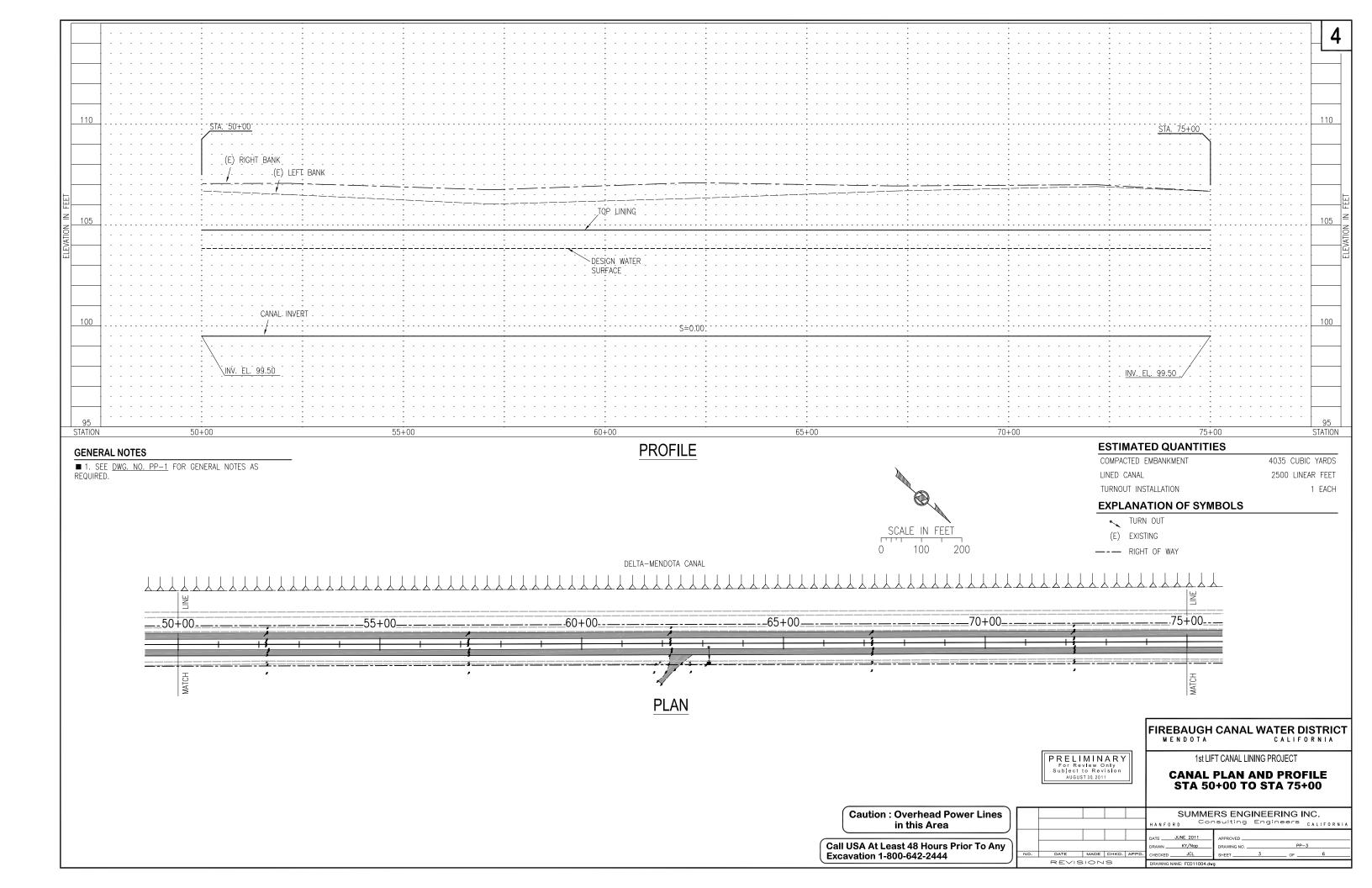


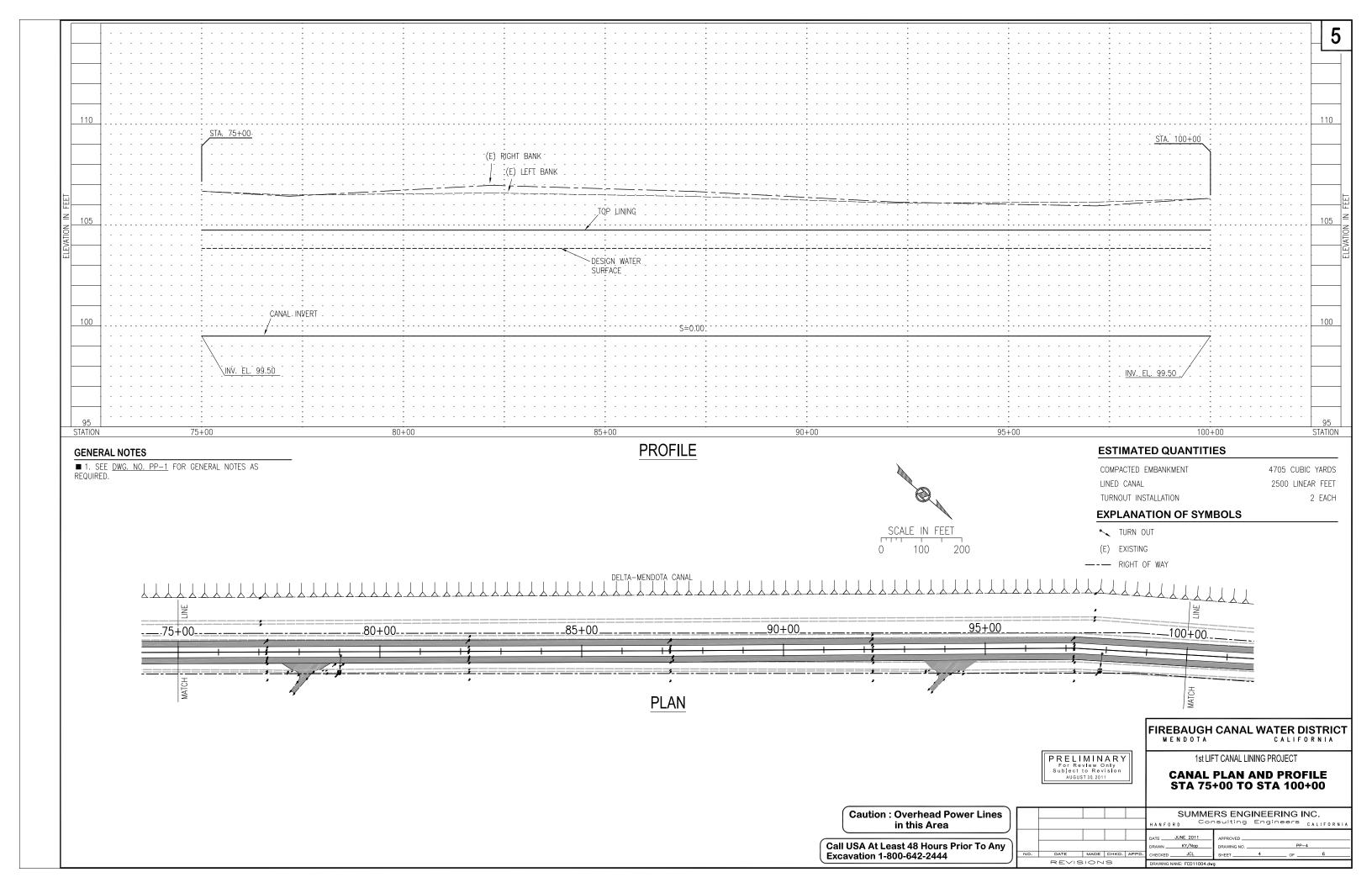
THE LOCATIONS SHOWN ON THE DRAWINGS FOR EXISTING AND/OR NEW PIPE, VALVES, CONNECTIONS AND APPURTENANCES, GAS MAINS, WATER MAINS, UNDERGROUND AND OVERHEAD TELEPHONE CABLES, UNDERGROUND AND OVERHEAD ELECTRICAL SERVICES, AND OTHER UTILITIES WERE DETERMINED FROM RECORDS AVAILABLE TO THE ENGINEER AND MAY HAVE BEEN ALTERED IN THE FIELD. THE CONTRACTOR SHALL CONTACT THE RESPONSIBLE UTILITY AND VERIFY LOCATIONS BEFORE EXCAVATING.

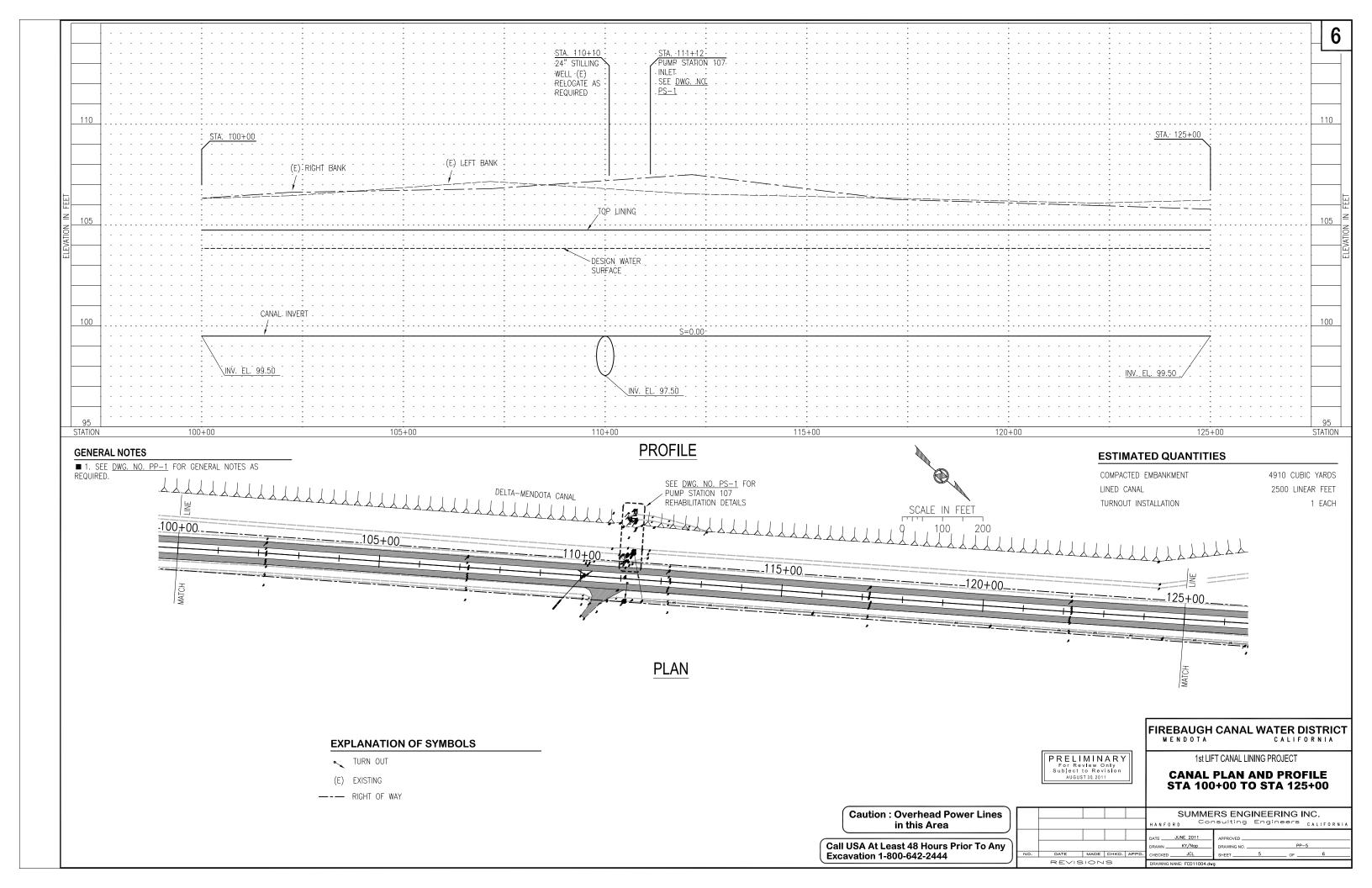
STATION 75+00 TO 100+00 PLAN & PROFILE STATION 100+00 TO 125+00 T12S PLAN & PROFILE STATION 125+00 TO 146+95 CROSS SECTIONS STATION 3+70 TO 52+17 CROSS SECTIONS STATION 62+16 TO 112+15 CROSS SECTIONS 10 STATION 122+15 TO 145+71 11 PUMP STATION 107 REHABILITATION DETAILS 12 PUMP STATION 107 REHABILITATION DETAILS PROJECT 13 MISCELLANEOUS DETAILS LOCATION SECOND FIREBAUGH NEES AVE. FIREBAUGH CANAL WATER DISTRICT Firebaugh T12S T13S PANOCHE WATER DISTRICT BULLARD AVE. CANAI FIREBAUGH CANAL WATER DISTRICT OFFICE 18 ASHLAN AVE. MENDOTA SHIELDS AVE. 28 Mendota T13S | BELMONT AVE. CAUTION: OVERHEAD POWER LINES

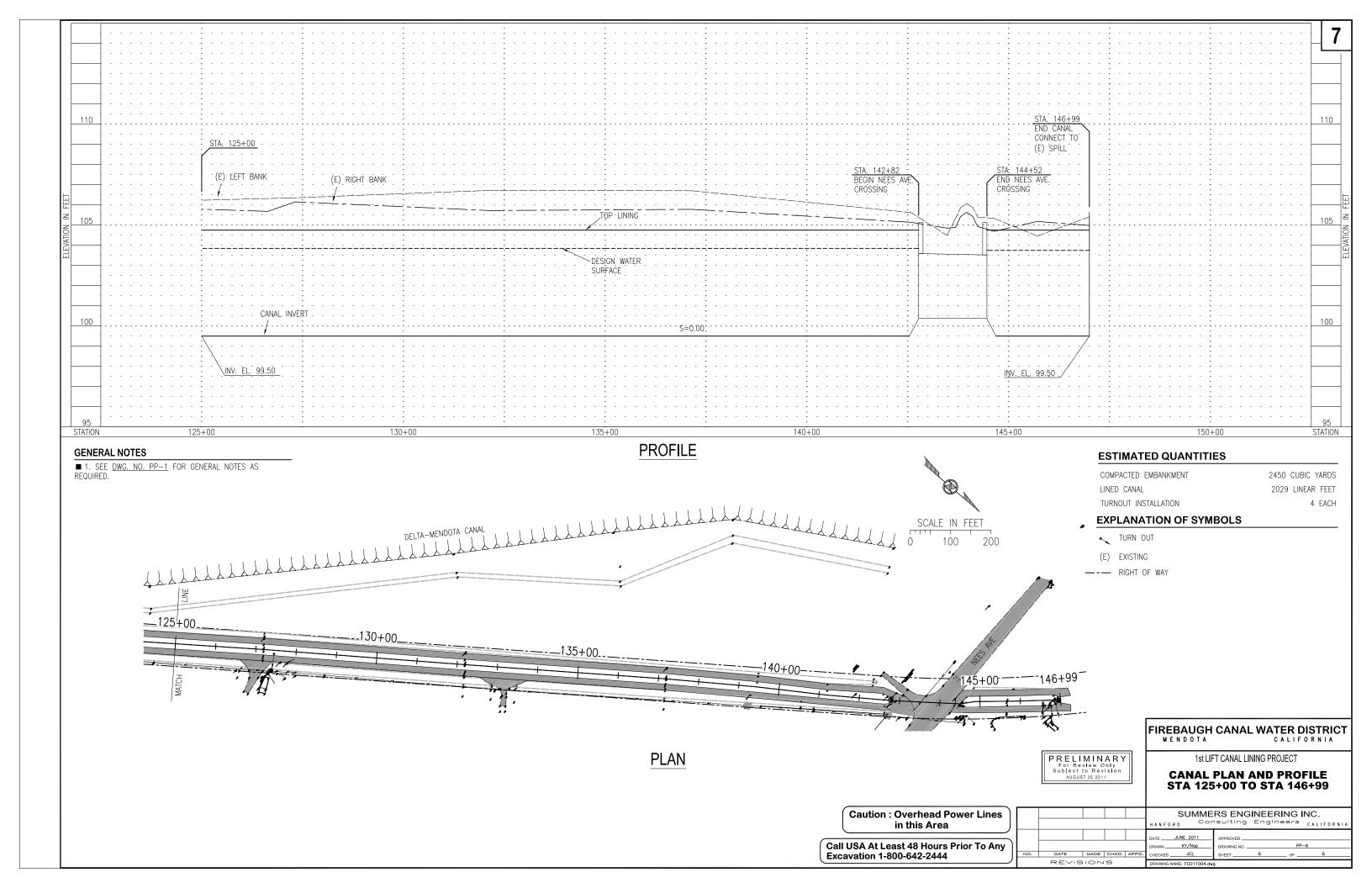


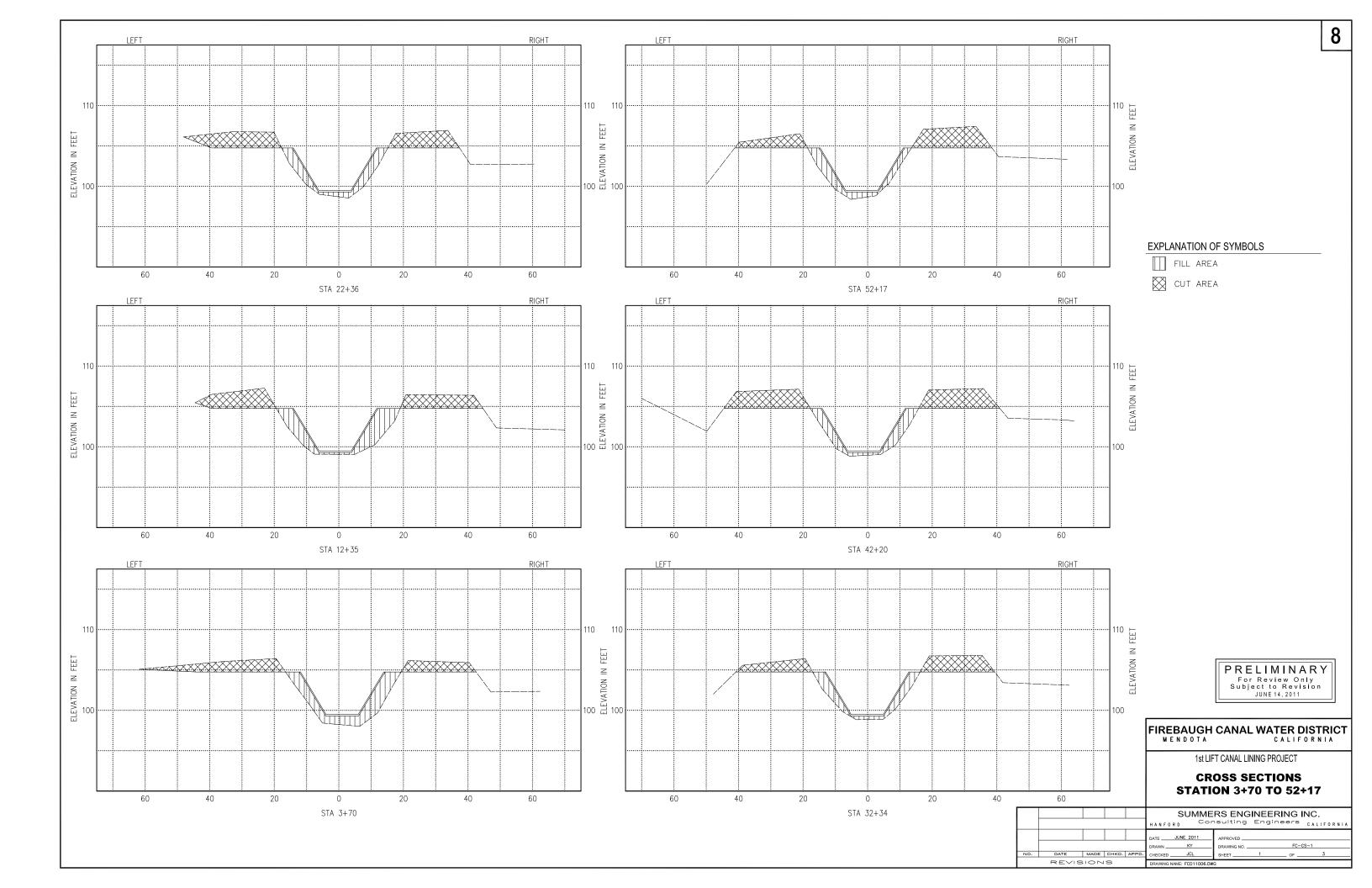


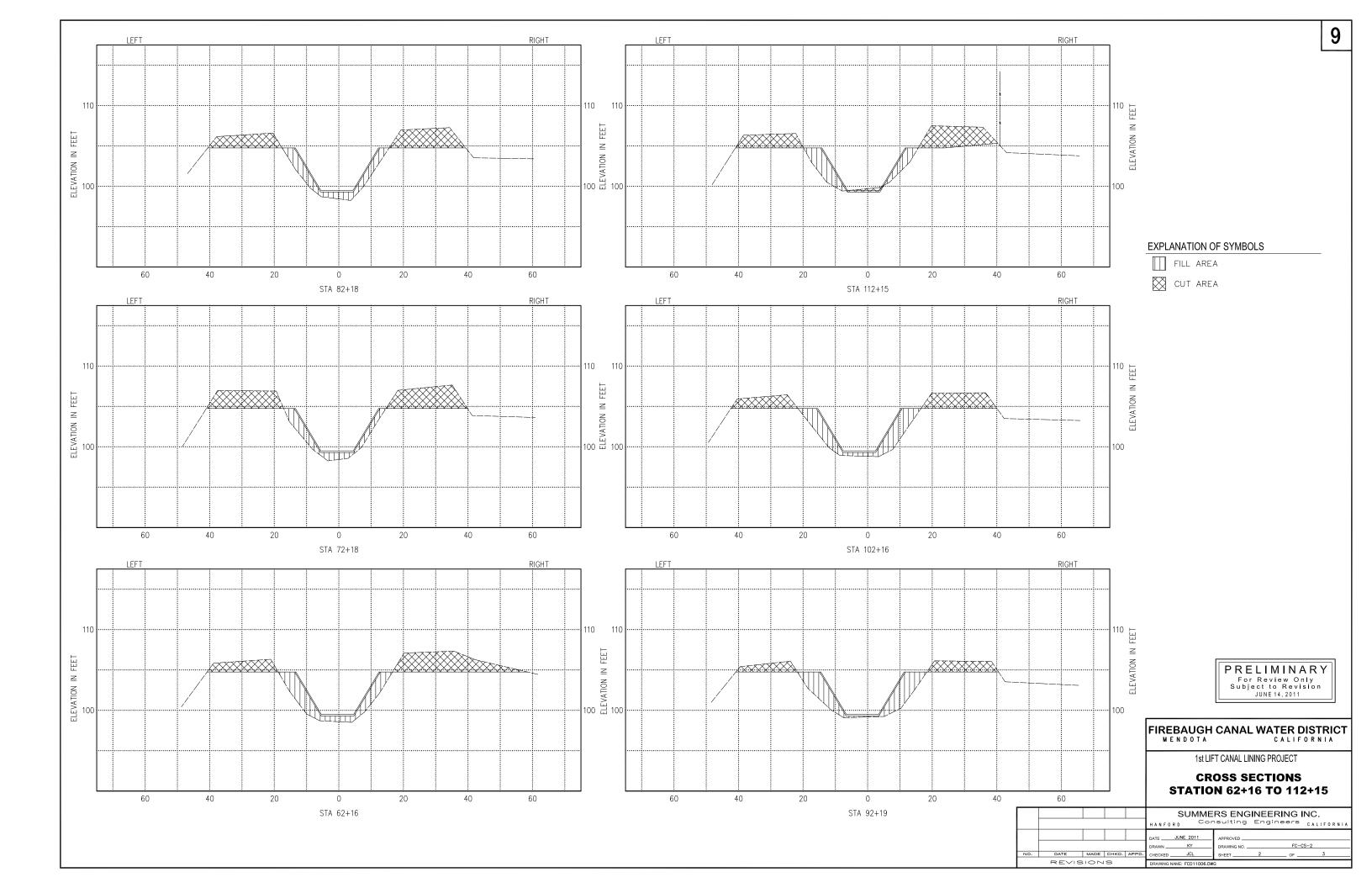


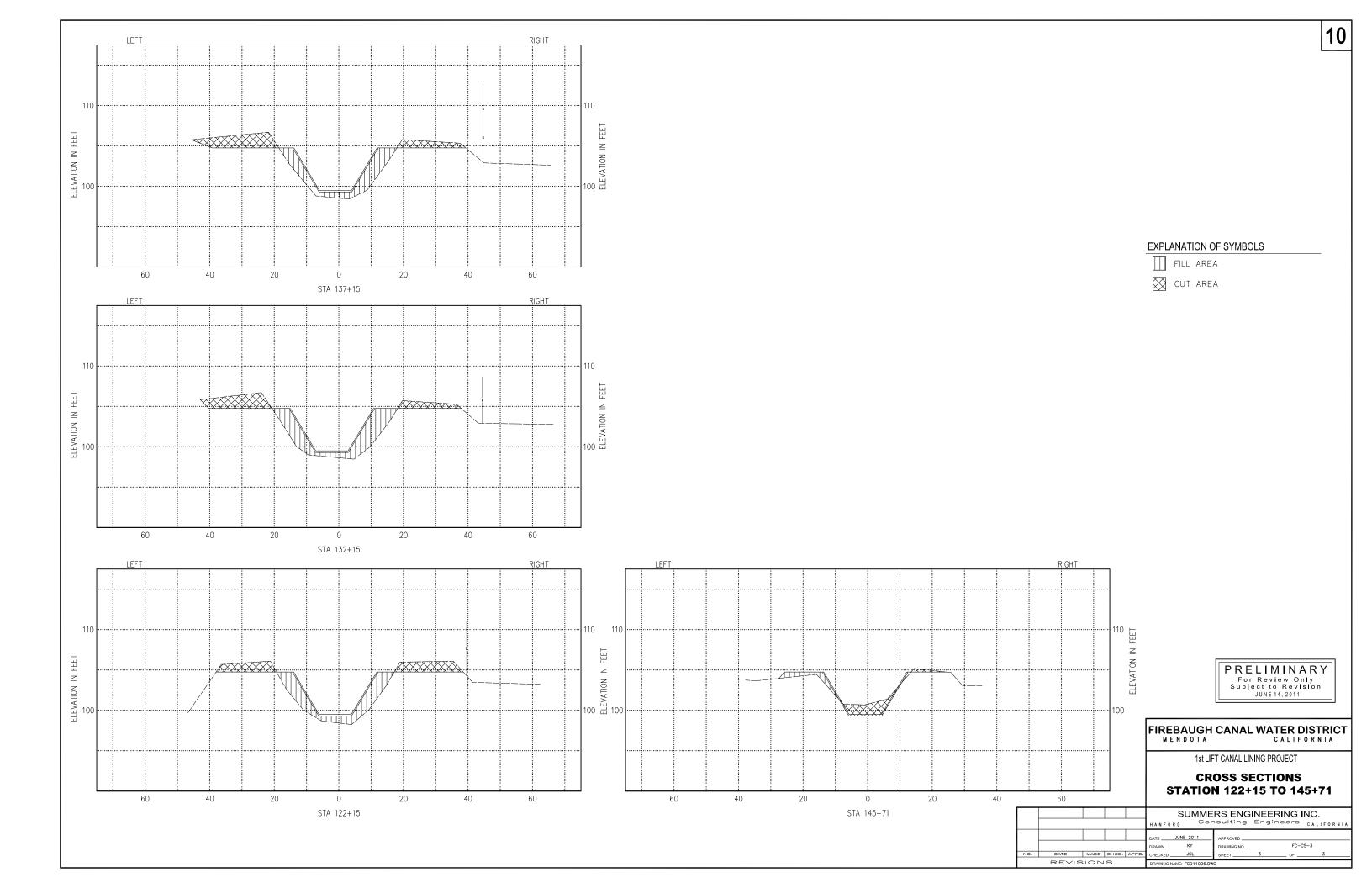












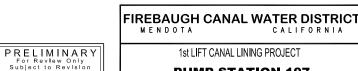
#### **GENERAL NOTES**

- 1. PROVIDE ALL SHEETING, SHORING, BRACING, SLOPING, OR OTHER METHODS REQUIRED FOR WORKER SAFETY AND PROTECTION.
- 2. SEE <u>DWG. NO. PP-1</u> FOR GENERAL NOTES AS REQUIRED.
- 3. ALL STEEL PIPE AND FITTINGS (AWWA C-200) TO HAVE 4" WALL. PIPING AND FITTINGS SHALL BE COATED BOTH INTERIOR AND EXTERIOR BY FUSION BONDED EPOXY (AWWA C-213). ALL EXPOSED PIPE SHALL BE COATED WITH 2 OR MORE COATS OF HIGH-SOLIDES EPOXY IN ACCORDANCE WITH AWWA C-210. COLOR TO BE DESERT SAND.
- 4. THE 24" POLYVINYL CHLORIDE (PVC) PIPE SHALL BE PIP CLASS 100 WITH A DIMENSION RATIO OF 41.



- **EXISTING**
- (RA) TO REMAIN
- TO BE REMOVED
- NEW GRADE N.G.
- 0.G. ORIGINAL GRADE
- $\bigcirc$ AIR RELEASE VALVE. SEE DWG. NO. PS-1
- FLANGED COUPLING ADAPTER
- 24" OPEN FLOW METER. SEE GEN. NOTE NO. 4.
- 24" MECHANICAL COUPLING AND JOINT HARNESS. SEE DWG. NO. PS-1
- 24" POLYVINYL CHLORIDE (PVC) PIPE
- #6 PERIMETER BAR 7 3" CL. FROM OPENING
- 12" LAYER OF 12"± ROCK
- 24" STEEL PIPE. SEE GEN. NOTE NO. 2.
- (W)METER HEADWALL

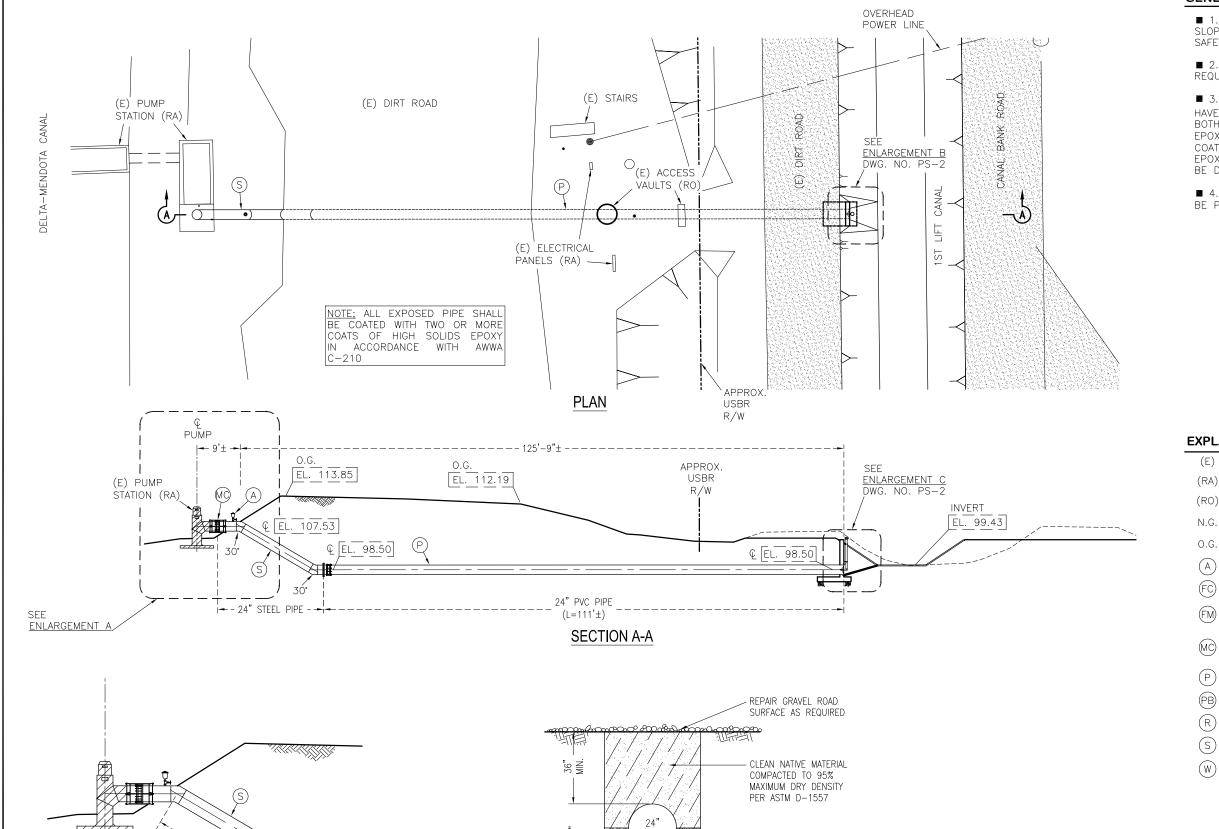
AUGUST 31, 2011



**PUMP STATION 107 REHABILITATION DETAILS** 

**DMC MP 107L** SUMMERS ENGINEERING INC.

MADE CHKD. APP CHECKED . JCL REVISIONS



**HDPE** CONSOLIDATED PEA GRAVEL TO PIPE SPRING-LINE

#### **BACKFILL DETAIL**

WITHIN USBR RIGHT-OF-WAY

**ENLARGEMENT A** 

**Caution: Overhead Power Lines** in this Area

Call USA At Least 48 Hours Prior To Any Excavation 1-800-642-2444

#### **GENERAL NOTES**

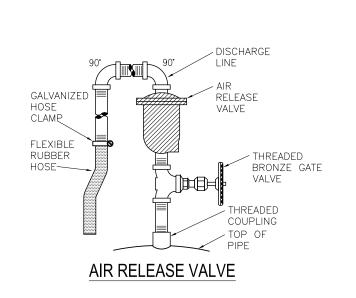
- $\blacksquare$  1. SEE <u>DWG. NOs. PP-1</u> & <u>PS-1</u> FOR GENERAL NOTES AS REQUIRED.
- 2. AIR RELEASE VALVE SHALL BE MODEL EAV GTR-2T.
- 3. ALL NUTS, BOLTS, AND WASHERS TO BE STAINLESS UNLESS NOTED OTHERWISE.
- 4. THE OPEN FLOW METER SHALL BE WATER SPECIALTIES MODEL OF-12 WITH FLOW INDICATOR IN CFS AND TOTALIZER IN ACRE-FT.
- 5. REINFORCED CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI. THE CEMENT SHALL BE PORTLAND CEMENT, TYPE II, AND SHALL CONFORM TO ASTM DESIGNATION C-150. A MINIMUM OF 5½ SACKS OF CEMENT TO EACH CUBIC YARD OF CONCRETE SHALL BE USED. THE NET WATER-CEMENT RATIO SHALL NOT EXCEED 0.52 BY WEIGHT. MAXIMUM SLUMP SHALL NOT EXCEED 4-INCHES.
- 6. REINFORCING STEEL SHALL CONFORM TO DESIGNATION A-706 GRADE 60 FOR DEFORMED AND PLAIN BILLET STEEL BARS FOR CONCRETE REINFORCEMENT. ALL REINFORCING BAR BENDS SHALL HAVE A MINIMUM RADIUS OF SIX BAR DIAMETERS AND SPLICES SHALL BE LAPPED FORTY BAR DIAMETERS. 180° HOOKS SHALL HAVE A MINIMUM EXTENSION LENGTH OF 4 BAR DIAMETERS, BUT NOT LESS THAN 2½", AT FREE END OF BAR.



- N.G. NEW GRADE
- O.G. ORIGINAL GRADE
- (A) AIR RELEASE VALVE
- FM 24" OPEN FLOW METER. SEE GEN. NOTE NO. 4 FOR DETAILS
- (P) 24" POLYVINYL CHLORIDE PIPE (PVC)
- PB) #6 PREIMETER BAR 7 3" CL. FROM OPENING
- (R) 1½" ROCK 12" THICK
- (S) 24" STEEL PIPE
- (W) METER HEADWALL

PRELIMINARY
For Review Only
Subject to Revision

AUGUST 31, 2011



TOP BANK &

# DETAIL A JOINT HARNESS INSTALLATION

SEE ENLARGEMENT A

180° (TYP.)

SECTION D-D

TYPICAL TIE ROD PLACEMENT FOR 12" JOINT HARNESS

SECTION C-C

MIN

SECTION B-B

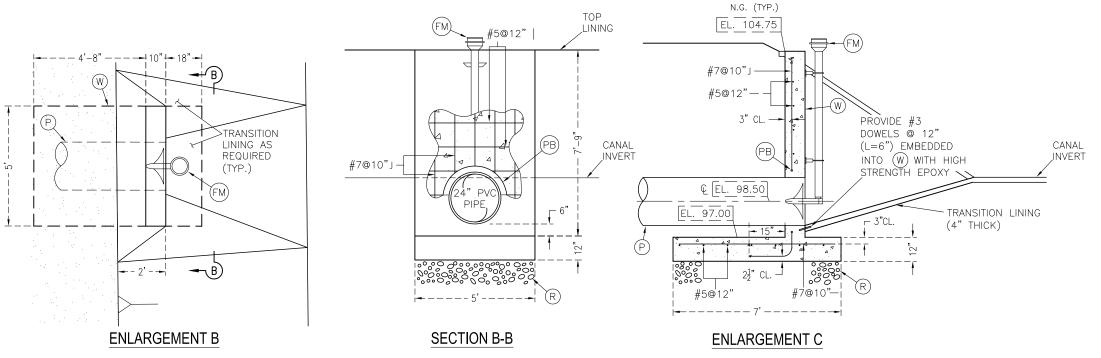
**ENLARGEMENT A** 

TIE ROD.

MECHANICAL COUPLING

NUT EACH END.

TIE ROD WITH DOUBLE



PROVIDE HOLE TO

RECEIVE TIE BOLT

FIREBAUGH CANAL WATER DISTRICT

1st LIFT CANAL LINING PROJECT

PUMP STATION 107 REHABILITATION DETAILS DMC MP 107L

Caution : Overhead Power Lines in this Area

Call USA At Least 48 Hours Prior To Any Excavation 1-800-642-2444

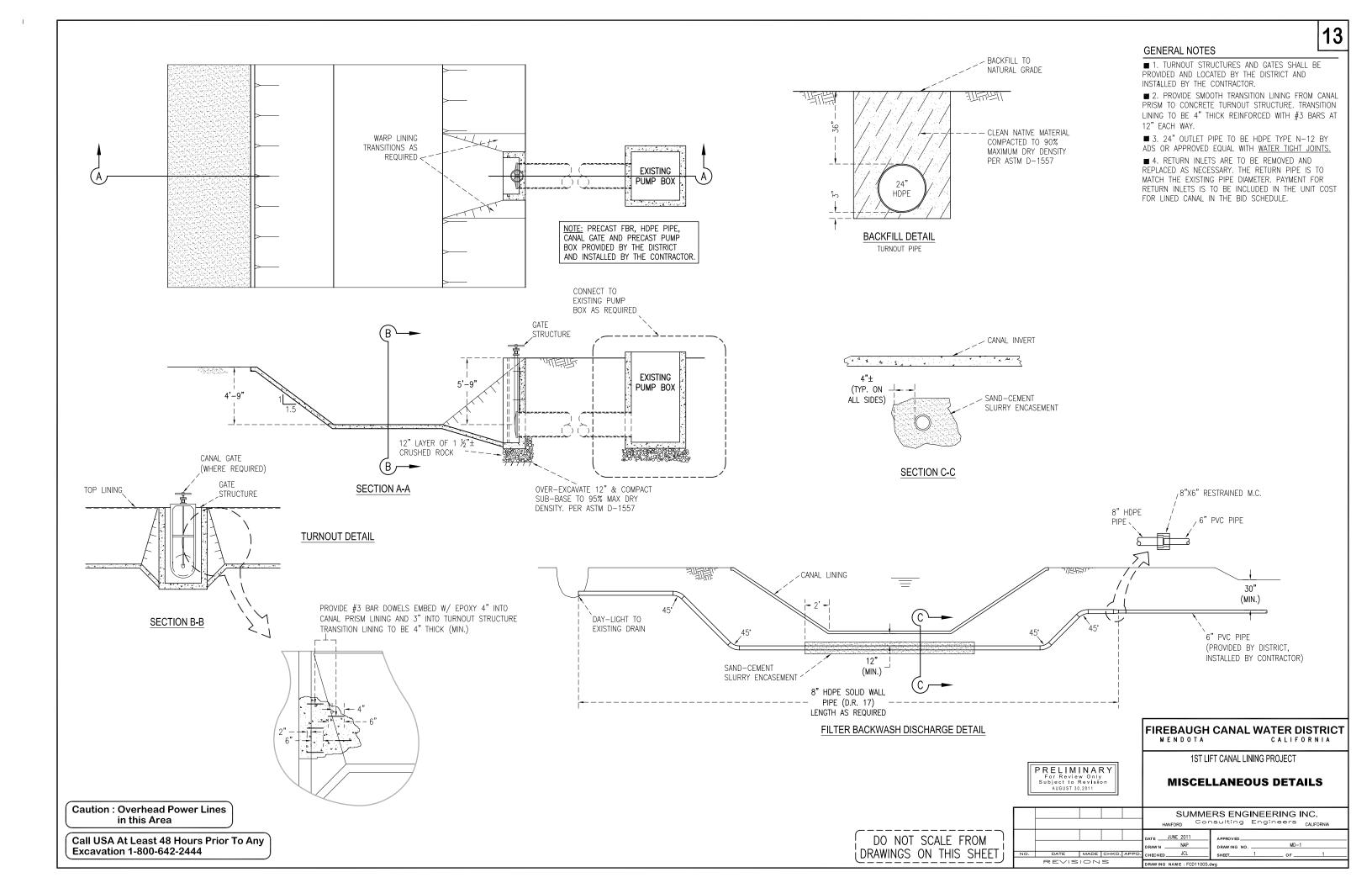
SUMMERS ENGINEERING INC.

HANFORD CONSULTING Engineers CALIFORNIA

DATE JUNE 2011
DRAWN NAP
DATE MADE CHKD. APPRO.

OHECKED JCL
SHEET 2 OF 2

SHEET 2 OF 2



# **Appendix B: Seepage Analysis**

#### **SUMMERS ENGINEERING**

887 N. Irwin St. – PO Box 1122 Hanford, CA 93232

#### **MEMORANDUM**

TO: Tamara Laframboise, USBR

Sheryl Looper, USBR Jeff Briant, FCWD

FROM: Chris Linneman

DATE: September 21, 2011

SUBJECT: Firebaugh Canal Water District 1st Lift Canal Lining Project – Estimated Water

Quality Effects.

The proposed project will replace approximately 2.6 miles of an existing earthen channel with a concrete lined canal. The existing channel is one of three primary lift canals for Firebaugh Canal Water District (FCWD or District) with a capacity of 70 cubic feet per second (cfs) for this reach of the canal. Because the canal is unlined, it loses approximately 300 acre feet per year through seepage to a perched saline sink. This lost water is not only unavailable for irrigation uses, but also contributes to the discharge of saline subsurface drain water to the San Joaquin River system.

As part of the WaterSMART grant proposal, Summers Engineering estimated the potential reduction in subsurface drainage production associated with the project. This memo summarizes the assumptions and calculations used to generate that estimate.

- **Volume**. A seepage study performed on the District's 2<sup>nd</sup> and 3<sup>rd</sup> Lift canals was used to estimate the volume of water lost to seepage by the affected reach of the 1<sup>st</sup> Lift Canal at 300 acre feet per year. A pre-project seepage study will be used to refine that estimate. This seepage water will percolate downward and mingle with the saline perched water table, creating a pressure gradient that will "push" shallow groundwater into downslope drainage systems and into regional drains. Because not all of the downslope fields include drainage systems, it was assumed that only 2/3 (66%) of the seepage volume would be captured and discharged into the regional drains amounting to 200 acre feet per year. It was assumed that the proposed project would effectively eliminate all seepage and thus would reduce the produced subsurface drain water by 200 acre feet per year.
- **Drainage Load Reduction.** The perched groundwater in the vicinity of the project is highly mineralized, containing elevated levels of selenium, boron, TDS, and other constituents. Concentrations of selenium, boron, and TDS vary

throughout the District and the tile sump water quality concentration range is shown in Table 1.

Table 1: Selenium, Boron, and EC Concentration Range for FCWD Tile							
Sumps.							
Constituent	High Value	Low Value	Used for				
			Calculation				
Selenium (µg/L)	540	30	90				
Boron (mg/L)	31	4.3	8				
EC (µs/cm)	10,000	3,000	5,000				

An estimated concentration of 90  $\mu$ g/L Se, 8 mg/L B, and 3700 mg/L TDS (5000  $\mu$ s/cm EC) was used to calculate the load for each constituent. Constituent concentrations were converted into pounds per acrefoot, then multiplied by the assumed reduction in drainage production (200 af/year).

2,220

3,700

**Selenium:**  $200af/yr \times (90^2.718/1000) \#/af = 49 lbs$ 

**Boron:**  $200af/yr \times (8*2.718)\#/af = 4,348 lbs$ 

TDS (mg/L) -

ECx(0.74)

**Salt:**  $200af/yr \times (5000^*0.74^*2.718/2000) ton/af = 1,006 tons$ 

7,400

Rounded values were used in the grant proposal.