Conceptual Design Report for:
Flow Equalization / Recycled Water Storage Facility

Final

Prepared for:

San Elijo Joint Powers Authority
2695 Manchester Avenue
Cardiff by the Sea, CA 92007-7077

March 2009

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San Elijo Joint Powers Authority
Flow Equalization/Recycled Water Storage Facility

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San Elijo Joint Powers Authority
Flow Equalization/Recyled Water Storage Facilities

Executive Summary

Introduction

The San Elijo Joint Powers Authority (SEJPA) owns and operates the San Elijo Water Reclamation Facility (SEWRF), a 5.25 million gallons per day (MGD) wastewater treatment and 2.48 MGD water reclamation facility. The SEJPA also owns and operates nineteen miles of recycled water (RW) distribution pipelines, one booster pump station, and two off-site recycled water reservoirs, co-owns and operates the San Elijo Ocean Outfall with the City of Escondido, and operates eight wastewater lift stations for the cities of Encinitas and Solana Beach. The San Elijo Ocean Outfall is a 25.5 MGD rated system that extends 8,000 ft into the pacific ocean, discharging through 200 diffuser ports at an average sea depth of 150 ft. The ocean outfall serves the SEJPA (5.35 MGD) and the City of Escondido (20.15 MGD). As stated in the 2006 Wastewater Treatment and Disposal Facilities Capacity Study for the City of Escondido, the city has reached its flow capacity limits within the structure and that corrective actions are recommended. Furthermore, the SEJPA's RW program, which has experienced steady growth since its inception, could benefit from additional summer water storage. This has led the SEJPA to consider possible projects that could serve both programs. Similar work was completed between the City of Carlsbad and the Encina Wastewater Authority for the construction of a joint use facility for storing recycled water in the summer and for outfall flow equalization in the winter.

Purpose and Scope of the Conceptual Design Report (Design Report)

To meet existing and forecasted challenges with the RW and ocean outfall systems, the SEJPA is exploring various solutions to help ease existing operational strains, meet projected future demands, and economize both systems' operation. This design report was prepared as a planning level study to evaluate projects that work towards these goals. The primary focus was on analyzing storage options at the SEWRF that would jointly benefit the RW and ocean outfall programs. This included evaluating constructing new facilities as well as modifying existing facilities to meet these goals.

Project Description and Location

Infrastructure Engineering Corporation (IEC) pursued two solutions that would help address current deficiencies: (1) increase water storage capacity at the SEWRF, and (2) modernize the RW pumping system. With these solutions in mind, two potential projects were identified and evaluated. Project Option No. 1 proposes to construct a new onsite recycled water storage tank and pump station and adapt existing underutilized tank to store secondary effluent. Project Option No. 2 proposes to adapt the existing underutilized tanks to store recycled water and secondary effluent and modify the existing pumping configuration. Each project would be located at the SEWRF located at 2695 Manchester Avenue, Cardiff by the Sea, CA 92007; see the location map in Figure 1.

Project Benefits (SEJPA & City of Escondido)

Project Option No. 1 consists of constructing new storage tank, constructing a new RW pump station, and utilizing existing underutilized tanks to store up to 215,000 gallons of the City of Escondido's secondary effluent. Project Option No. 1 can be beneficial to the SEJPA, the City of Escondido, and the community in the following ways:

- Increases storage capacity, 3.5 to 5 million gallons (MG), which allows more recycled water to be beneficially used in the cities of Encinitas, Solana Beach and Del Mar;
- Allows the City of Escondido up to 2,000 gallons per minute of additional flow capacity to the ocean outfall system for up to 41 hours, which may ease short-term capacity issues; and

- Allows up to 215,000 gallons of Escondido secondary effluent to be stored at the SEWRF during high flow or surge events on the land outfall, which would provide an additional 1,400 gpm to be diverted from the land outfall to the SEWRF for 2.5 hours.

Project Option No. 2 focuses on using existing underutilized tanks at the SEWRF as storage options for the RW and ocean outfall systems. This option is less costly than Project Option No. 1 but may only be an interim solution as it provides significantly less water storage. Project Option No. 2 can be beneficial to the SEJPA, the City of Escondido, and the community in the following ways:

- Increases storage capacity to 453,000 gallons which allows more recycled water to be beneficially used in the cities of Encinitas, Solana Beach and Del Mar;
- Allows the City of Escondido up to 2,000 gallons per minute of additional flow capacity to the ocean outfall system for up to 3.7 hours; and
- Allows up to 215,000 gallons of Escondido secondary effluent to be stored at the SEWRF during high flow or surge events on the land outfall, which would provide an additional 1,400 gpm to be diverted from the land outfall to the SEWRF for 2.5 hours.

Project Implementation Plan for Project Options 1 and 2

The table below compares the timeline anticipated for both options. For details refer to Technical Memorandum 7.

Phase	Option 1	Option 2
Conceptual Design[1]	6 months	3 months
Final Design	8 months	6 months
Environmental Documentation[2]	18 months	45 days
Bid Award	3 months	3 months
Project Construction	18 months	8 months
Total	**45 months (3 yrs, 9 mo)**	**20 months (1 yr, 8 mo)**

[1]*This phase is currently being performed and will be completed with the finalization of the design report*
[2]*If an EIR is required the timeline can be revised to 24-months.*

Planning Level Project Costs

The table below compares the planning level costs for both options. For details refer to Technical Memorandum 8.

Options	Total Range (millions)
Project Option No. 1a (3.5 MG Tank & PS)	$7.8 - $8.4
Project Option No. 1b (5 MG Tank & PS)	$9.7 - $10.5
Project Option No. 2	$2.0 - $2.2

Conclusions

Project Option No. 1 potentially provides a long-term solution to both the SEJPA's RW storage needs and Escondido capacity issues in the ocean outfall. However, this project is significantly more expensive than Project Option No. 2 and may not be financially feasible at this time.

Project Option No. 2 takes advantage of SEJPA's underutilized facilities and is expected to have a shorter timeline, less permitting requirements, and a lower total cost. However, this project provides significantly less storage and flow equalization than Option No. 1.

Both options improve the SEJPA's existing recycled water distribution pump stations and would realize long-term energy savings.

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San Elijo Joint Powers Authority
Flow Equalization / Recycled Water Storage Facility

PROJECT LOCATION

FIGURE

1

Flow Equalization/Recylced Water Storage Facility

TECHNICAL MEMORANDUM NO. 1

Date: September 2008 – **First Draft**
October 2008 **– Second Draft**
January 2009 – **Third Draft**
March 2009 – **Final**

Subject: **PROJECT BACKGROUND INFORMATION**

Prepared By: Dolores Ventura, P.E.
Reviewed By: Preston H. Lewis, P.E. / James G. Ashcraft, P.E.

PURPOSE

The purpose of this technical memorandum is to discuss the background of the San Elijo Joint Powers Authority (SEJPA) Flow Equalization/Recycled Water Storage Facility Project. This technical memorandum summarizes the overall goals and objectives for the project. In addition, this technical memorandum summarizes previous studies, geotechnical investigations, and project data collection to discuss the history of the project.

PROJECT BACKGROUND & GOALS

One of the main goals for this project is to explore ideas to help minimize Escondido's overflow issues. Two concepts that are explored in this design report are (1) divert a portion of Escondido's effluent to the plant for either storage or reclamation (2) find ways to remove SEJPA's flows from the ocean outfall and allow Escondido the full capacity of the ocean outfall.

Another goal is to increase the recycled water pumping efficiency and save energy. Currently the SEJPA has one recycled water pump station, which is located at the chlorine contact tank's forebay. The recycled water enters the forebay at a maximum rate of 1,720 gpm and is pumped from the forebay out to the distribution system at a rate of 2,100 gpm via constant feed pumps. For this reason, the existing pump station frequently starts and stops in order to meet the demand in the distribution system. Various concerns that arise when operating the pumps in this manner include: reduced life expectancy of the pump motors, pressure transients in the distribution system causing stress to the pipelines, and energy spikes due to the pump starting during peak demands.

The solutions that are evaluated in this design report include (1) modifying the existing recycled water pump station to include variable frequency drives (2) upgrading the existing recycled water pump station to convey water to an onsite storage location (Project Option 1 constructs a new tank and Project Option 2 utilizes an existing aeration basin) (3) adding a new recycled water pump station to serve the distribution system from an onsite storage unit with more capacity than the chlorine contact tank's forebay. Options 1 and 2 include installing a new pump station that serves the north and south distribution systems.

Currently Trussell Technologies, Inc is assisting the SEJPA by evaluating an advance water treatment system to help lower the TDS of their recycled water and to increase the tertiary treatment system to 3.0 mgd. By improving the water quality and increasing production

capabilities, the SEJPA will be able to service additional customers. Ultimately, the SEJPA's goal is to recycle 100% of the wastewater coming into the plant to maximize the full potential of this important local water supply.

PREVIOUS STUDIES

Table 1 below provides a list of the references used to develop this technical memorandum. The references are included in the Appendices portion of the design report.

Table 1 – List of References

Contact/Author	Description/Title	Project Number	Date Published
Tetra Tech, Inc 10815 Rancho Bernardo Road Suite 200 San Diego, CA 92127 (858) 673-5505	Final Preliminary Design Report Reclaimed Water Demineralization Facility and Conveyance System Improvements		February 2002
Geocon, Inc 6960 Flanders Drive San Diego, CA 92121 (858) 558-6900	Preliminary Geotechnical Investigation San Elijo Reclamation Plant 2695 Manchester Ave Cardiff by the Sea, CA 92007	07100-42-01	July 8, 2003
PBS&J 175 Calle Magdalena Encinitas, CA 92024 (760) 753-1120	Recycled Water Optimization and Expansion Study	620491.01 5000	July 2005

Final Preliminary Design Report Reclaimed Water Demineralization Facility and Conveyance System Improvements

The purpose of this study was to evaluate different treatment processes in order to generate, store, and distribute approximately 500,000 gallons per day of 500 mg/l total dissolved solids of tertiary treated demineralized water to service the Rancho Santa Fe Golf Course.

The study proposed to store 1.2 million gallons (MG) of tertiary water in a reservoir located at the northern end of the water reclamation plant. It was proposed that the reservoir be of an earthen berm design with a plastic bottom liner and a mechanically tensioned floating cover.

Preliminary Geotechnical Investigation San Elijo Reclamation Plant

The purpose of these investigations was to evaluate the existing soil and geologic conditions at the proposed tertiary water storage reservoirs located on the northern end of the water reclamation plant.

The investigations discovered that undocumented fill materials are stockpiled at the site. The depth of the undocumented fill ranged as follows: boring SB-1 was 4-feet deep, SB-2 was 9-feet deep,

and SB-3 was 11-feet deep. The conclusion was that the undocumented fill was unsuitable for the support of structures and will have to be removed if the reservoirs are placed at this location. The investigations also encountered groundwater at approximately 37-feet deep in SB-1 and SB-2.

Recycled Water Optimization and Expansion Study

The purpose of this study was to evaluate the recycled water system both from a financial and technical standpoint. The study determined that the recycled water system is capable of producing and distributing up to 1,600 AFY with the addition of system improvements (including storage) and recommended increasing recycled water sales to improve the program. The way to achieve this was proposed by the following ways:

Phase I – Improvements include upgrading the filter feed pump station and filter influent channel to increase recycled water production
Phase II – Improvements include upgrading filter feed pump station capacity and upgrading the filters.
Phase III – Improvements include increasing the filtration capacity and adding on-site recycled water storage

DATA COLLECTION

At this stage in the project, the existing records such as mapping, existing utilities, and topography were provided by the SEJPA in electronic format. This information was compiled from various past projects and has not been field verified, surveyed, or confirmed. The mapping for the undocumented fills stated in the *Preliminary Geotechnical Investigation San Elijo Reclamation Plant* prepared by Geocon, Inc July 28, 2003 was provided by Nathan Nash, C.E.G., from Geocon, Inc.

During final design, surveying and mapping will need to be performed in order to prepare the Contract Documents. In addition, utility research will need to include obtaining USA Dig Alert design tickets to obtain system mapping and conducting field visits to verify existing utilities. Ensuring that existing utilities are identified and protected will need to be be accomplished by sending out copies of milestone submittals to the utility owners during each stage accordingly.

Flow Equalization/Recylced Water Storage Facility

TECHNICAL MEMORANDUM NO. 2

Date: September 2008 – **First Draft**
January 2009 – **Second Draft**
March 2009 – **Final**

Subject: **ULTIMATE RECYCLED WATER STORAGE GOALS**

Prepared By: Scott Humphrey, P.E. (C64206)
Reviewed By: Preston "Skip" Lewis, P.E. (C45927) / James G. Ashcraft, P.E. (C22642)

PURPOSE

The purpose of this technical memorandum is to develop the recommended minimum and maximum recycled water storage sizing. The tank sizing will be used to develop a conceptual-level design of the proposed recycled water storage tank for the San Elijo Joint Powers Authority (SEJPA) Flow Equalization/Recycled Water Storage Facility Project. Based upon an analysis of minimum, average, and maximum recycled water demands combined with capacity ownership in the ocean outfall, IEC is recommending a minimum tank size of 3.5 MG and a maximum tank size of 5.35 MG.

BACKGROUND

In 1992, the San Elijo Water Reclamation Facility (SEWRF), which consists of wastewater treatment and water reclamation, was upgraded to its current average day capacity of 5.25 MGD. Currently, the average daily flow into the plant is 3.0 MGD. Based upon the last 5 years of historical recycled water demand data, monthly recycled demands average 1.1 MGD with a maximum month averaging 1.9 MGD and a minimum month averaging 0.4 MGD.

MINIMUM TANK SIZING

It is recommended that the minimum size tank be sized to allow the SEJPA time to respond to short-term emergencies or outages within the plant that may affect the recycled water treatment and distribution facilities. Typically, these short-term emergencies can be rectified within 3 days. Therefore, it is recommended that 3 days of average day demand be used as the minimum tank sizing criteria. Using historical recycled water demands for the past 5 years (i.e. 2003 to 2008), 3 days of average day demand ranges from 2.9 MGD to 3.5 MGD, with an average of 3.2 MGD. Table 1 summarizes 3 days of average day demands for each year and the associated equivalent days of storage during maximum demand and minimum demand periods.

Table 1 - Existing Monthly Demands and Minimum Tank Sizing

	Monthly Demand				Equivalent Days of Storage	
Year	Average (mgd)	Maximum (mgd)	Minimum (mgd)	3 days of Average day demands	Maximum Demands	Minimum Demands
2003/2004	1.2	1.8	0.6	3.5	1.9	6.3
2004/2005	1.0	1.8	0.2	2.9	1.7	16.6
2005/2006	1.2	1.8	0.6	3.5	2.0	6.3
2006/2007	1.0	1.9	0.2	2.9	1.6	16.6
2007/2008	1.1	2.0	0.4	3.3	1.7	8.8
Average	***1.1***	***1.9***	***0.4***	***3.2***	***1.7***	***8.8***

From Table 1, it can be seen that during the years 2003/2004 and 2005/2006, 3 days of average day demands equated to 3.5 MG. IEC is recommending that the minimum size tank be 3.5 MG. This will give the SEJPA between 1.6 days and 16.6 days of storage, depending upon seasonal demands.

MAXIMUM TANK SIZING

The maximum recommended size for the proposed recycled water storage tank is based upon the SEJPA's capacity share in the San Elijo Ocean Outfall System. The existing ocean outfall has a peak capacity of 25.5 MGD. The City of Escondido currently leases 79% of the capacity of the ocean outfall, or approximately 20.15 MGD. The remaining 21%, approximately 5.35 MGD, is the SEJPA's capacity share. In an effort to maximize the benefit to both the ocean outfall and the recycled water system, the recommended maximum tank size is 5.35 MG. A tank size of 5.35 MG would effectively remove the SEJPA's peak flows from the ocean outfall during a peak wet weather event, maximizing the peaking capacity for the City of Escondido. A 5.35 MG tank also gives the SEJPA approximately 3 days of storage during maximum demand conditions and equates to roughly 1 day of the maximum capacity of the plant. Assuming a maximum tank size of 5.35 MG, Table 2 illustrates the equivalent days of storage that the SEJPA can expect to have based upon existing historical recycled water demands.

Table 2 - Equivalent Days of Storage based upon 5.35 MG Reservoir

	Equivalent Days of Storage		
Year	Average	Maximum	Minimum
2003/2004	4.5	3.0	8.9
2004/2005	5.4	3.0	26.8
2005/2006	4.5	3.0	8.9
2006/2007	5.4	2.8	26.8
2007/2008	4.9	2.7	13.4
Average	***4.9***	***2.8***	***16.3***

From Table 2, the SEJPA can expect between 2.8 days and 26.8 days of storage, depending on seasonal demands, with an average of 4.9 days of storage.

Flow Equalization/Recylced Water Storage Facility

TECHNICAL MEMORANDUM NO. 3

Date: September 2008 – **First Draft**
October 2008 **– Second Draft**
January 2009 – **Third Draft**
March 2009 – **Final**

Subject: **PROJECT OPTION NO. 1 – NEW ON-SITE RECYCLED WATER STORAGE TANK AND PUMP STATION ALTERNATIVE ANALYSIS**

Prepared By: Dolores Ventura, P.E.
Reviewed By: Preston Lewis, P.E. / James G. Ashcraft, P.E.

PURPOSE

The purpose of this technical memorandum is to present the alternatives for constructing a recycled water storage tank for the San Elijo Joint Powers Authority (SEJPA) Flow Equalization/Recycled Water Storage Facility Project. This technical memorandum considers concrete and steel tank alternatives and compares costs of the tank and earthwork construction only.

CRITERIA

The design criteria used for the development of the project alternatives is based on discussion with the SEJPA staff, existing site conditions, and reasonable design assumptions based on past experience.

Type of Tank:	Circular Prestressed Concrete Tank (AWWA D-110, Type I)
	Steel Tank (AWWA D-100)
HWL:	89-feet (East); 92-feet (West)
LWL (Floor):	57-feet (East); 60-feet (West)
Diameter:	164-feet (for 5 MG); 138-feet (for 3.5 MG)
Water Depth:	32-feet
Free Board:	2-feet
Temp/Perm Cut Slopes:	1:1
Permanent Fill Slopes:	2:1

The *Preliminary Geotechnical Investigation, San Elijo Reclamation Plant* report prepared by Geocon, July 8, 2003 does not provide recommendations for temporary or permanent cut slopes. Therefore, the slopes assumed in this report will need to be verified by a geotechnical engineer once the preferred alternative is selected. Once the slopes are finalized the grading may need to be updated in the event that the recommended slopes differ from those used in this conceptual study.

CURRENT SITE CONDITIONS

Existing facilities at the San Elijo Water Reclamation Facility (SEWRF) include wastewater and recycled water treatment facilities, access roads, maintenance yard and buildings, open areas, existing underground and overhead utilities, and a concrete drainage channel. When various wastewater facilities were constructed, the excess excavated soils were deposited in the northeast portion of the plant site. Two (2) of the tank alternatives lie within the limits of the fill placement. According to the preliminary geotechnical investigations, this fill is undocumented and placed without compaction. Due to potential differential settlement in this area the fill material must be removed and the tank shall be placed either on the original ground or on even depth of recompacted fill.

The fill material at the site was previously located by Geocon and three borings were performed to obtain the depth of the fill material. Since the original ground contours are not available, the depths of fill material indicated by the borings were used to establish the bottom of the floor slab elevation. Based on the geotechnical report, the deepest fill is approximately 11-feet deep.

Excess material will be placed in other areas of the plant therefore this is considered a balanced site and exporting of material is not anticipated. The fill areas will be re-vegetated to match existing conditions.

STEEL TANK

One steel tank (AWWA D-100) alternative was included in the analysis. Refer to Figure 3.1 for a plan view and Figure 3.2 for section views. The roof is assumed to be an aluminum dome but can be a conventional steel tank roof as well. Steel tanks with an aluminum dome roof do not require columns, which is very beneficial during routine maintenance. The steel tank has the same dimensions as the concrete tank for comparison purposes.

The estimated cost for the steel tank alternative, Alternative 1, is in shown in Table 1 below. For the steel tank, a lifecycle cost analysis was performed based on a structure life of 75 years, interior paint life of 15 years, which is considered adequate since the tank will store recycled water, and exterior paint life of 10 years due to the close proximity to the coast. The cost shown is the total present worth, which equals the initial tank cost (including coatings) plus the investment needed today in order to meet all future repainting costs over the life of the tanks at an interest rate of 4%. The costs for the tank construction and recoating were obtained by taking the higher value received from Chicago Bridge and Iron, a steel tank manufacturer, and Spiess Construction Company, a contractor who specializes in steel tank construction.

The costs represent the tank construction (including coatings) and earthwork only and were used to compare the magnitude of costs of each alternative. Other costs for piping, valve vaults, pump station, access roads, landscaping, environmental mitigation, etc are considered roughly equivalent for each alternative.

Table 1 – Alternative 1 – 5 MG Unburied Circular Steel Tank

Description	Unit	Quantity	Unit Price	Total
Tank Construction	EA	1	$5,500,000	$5,500,000
Temporary Stockpiled Excavation	CY	0	$12	$0
Tank Backfill	CY	0	$17	$0
Excavation & On-Site Disposal (Balanced)	CY	12,319	$10	$123,190
			Subtotal	$5,623,190
			Contingency @ 20%	$1,124,638
			Grand Total	$6,747,828
			USED FOR COMPARISON PURPOSES	$6,700,000

CIRCULAR PRESTRESSED CONCRETE TANK

Two circular prestressed concrete tank (AWWA D-110 Type I) alternatives were included in the analysis and both are partially buried. Alternative 2 is located on the east side, refer to Figures 3.3 and 3.4 for the plan view and 5 for section views; and Alternative 3 is located on the west side, refer to Figures 3.6 and 3.7 for the plan view and 8 for section views. The roof will be supported by columns 20-feet on center. The tank alternatives are assumed to a have a roof designed to AASHTO H-10 (non-vehicle bearing). The tank is 164-feet in diameter with a 34-foot wall height (32-foot water depth and 2-feet of freeboard).

The estimated costs for the circular prestressed concrete tank alternatives are shown below in Tables 2 and 3, accordingly. The costs represent the tank construction and earthwork only and were used to compare the magnitude of costs of each alternative. Other costs for piping, valve vaults, pump station, access roads, landscaping, environmental mitigation, etc are considered roughly equivalent. The cost per gallon for the tank construction only was obtained by taking the higher value received from DYK Incorporated, a contractor who specializes in concrete tanks, and Simon Wong Engineering, a structural engineering company with concrete tank design experience.

Table 2 – Alternative 2 – 5 MG Partially Buried Circular Prestressed Concrete Tank (East)

Description	Unit	Quantity	Unit Price	Total
Tank Construction	EA	1	$3,400,000	$3,400,000
Temporary Stockpiled Excavation	CY	9,483	$12	$113,796
Tank Backfill	CY	9,483	$17	$161,211
Excavation & On-Site Disposal (Balanced)	CY	2,836	$10	$28,360
			Subtotal	$3,703,367
			Contingency @ 20%	$740,673
			Grand Total	$4,444,040
			USED FOR COMPARISON PURPOSES	$4,500,000

Table 3 – Alternative 3 – 5 MG Partially Buried Circular Prestressed Concrete Tank (West)

Description	Unit	Quantity	Unit Price	Total
Tank Construction	EA	1	$3,400,000	$3,400,000
Temporary Stockpiled Excavation	CY	14,379	$12	$172,548
Tank Backfill	CY	14,379	$17	$244,443
Excavation & On-Site Disposal (Balanced)	CY	13,614	$10	$136,140
			Subtotal	$3,953,131
			Contingency @ 20%	$790,626
			Grand Total	$4,743,757
			USED FOR COMPARISON PURPOSES	$4,800,000

In order to provide the SEJPA a range of construction costs for the new recycled water storage tank at this site, the minimum tank size was evaluated only in the prestressed concrete option. The steel tank option was not evaluated due to the SEJPA's preference to build the lowest life-cycle cost option. The minimum tank size required is 3.5 MG as discussed in Technical Memorandum 2. The layout is

similar to Figures 3.6 & 3.7 since concrete tank can be partially buried. Table 4 below summarizes the estimated costs for Alternative 4.

Table 4 – Alternative 4 – 3.5 MG Partially Buried Circular Prestressed Concrete Tank (West)

Description	Unit	Quantity	Unit Price	Total
Tank Construction	EA	1	$2,500,000	$2,500,000
Temporary Stockpiled Excavation	CY	7,894	$12	$94,728
Tank Backfill	CY	7,894	$17	$134,198
Excavation & On-Site Disposal (Balanced)	CY	1,994	$10	$19,940
			Subtotal	$2,748,866
			Contingency @ 20%	$549,773
			Grand Total	$3,298,639
			USED FOR COMPARISON PURPOSES	$3,300,000

COMPARATIVE ANALYSIS

The results of the comparative analysis are summarized in Table 5 below. The table includes the results of the earthwork quantity take-offs, total earthwork cost, tank construction cost and total cost for tank and earthwork.

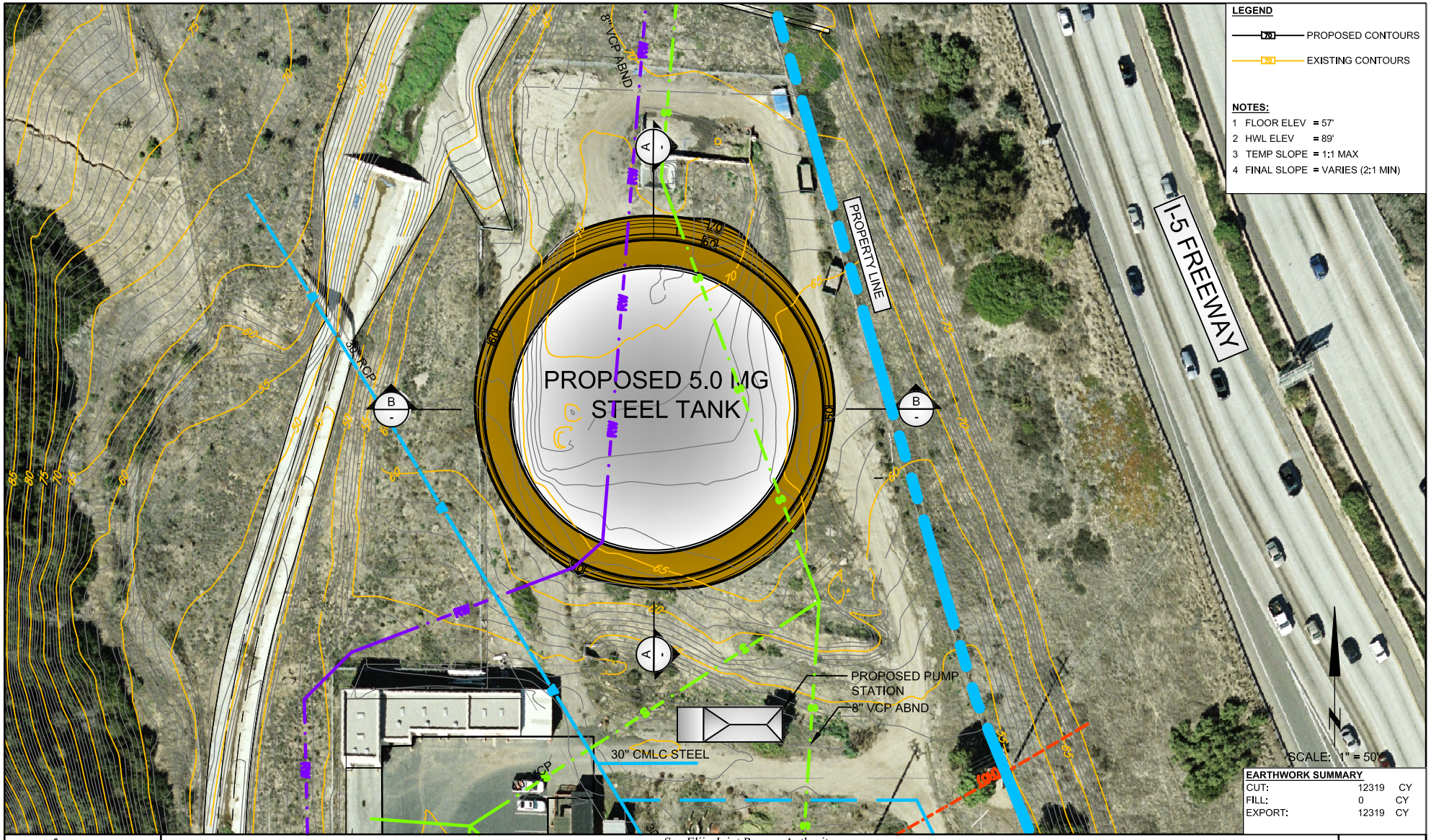
Table 5 – Summary of Comparative Costs

Alt	Description	Temporary Stockpiled Excavation (CY)	Tank Backfill (CY)	Excavation & On-Site Disposal (Balanced) (CY)	Total Earthwork Cost	Total Tank Cost	Total Cost[1]	Cost /per Gallon
1	5 MG Unburied Circular Steel Tank	0	0	12,319	$123,190	$5,500,000	$6,700,000	$1.34
2	5 MG Partially Buried Circular Prestressed Concrete Tank (East)	9,483	9,483	2,836	$303,367	$3,400,000	$4,500,000	$0.90
3	5 MG Partially Buried Circular Prestressed Concrete Tank (West)	14,379	14,379	13,614	$553,131	$3,400,000	$4,800,000	$0.96
4	3.5 MG Partially Buried Circular Prestressed Concrete Tank (East)	7,894	7,894	1,994	$248,866	$2,500,000	$3,300,000	$0.94

[1] *Total cost includes 20% contingency*

CONCLUSION

Per the results in Table 4 it can be seen that the lowest cost alternatives are the partially buried circular prestressed concrete tanks. Items to consider when selecting the final tank alternative are issues such as aesthetics/visual impacts, structural performance, bidding/competition, funding availability, and the SEJPA's preferences.



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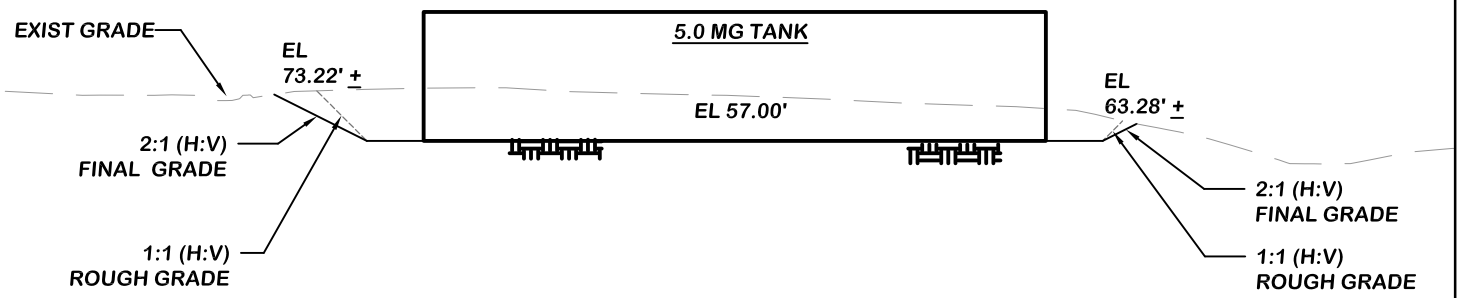
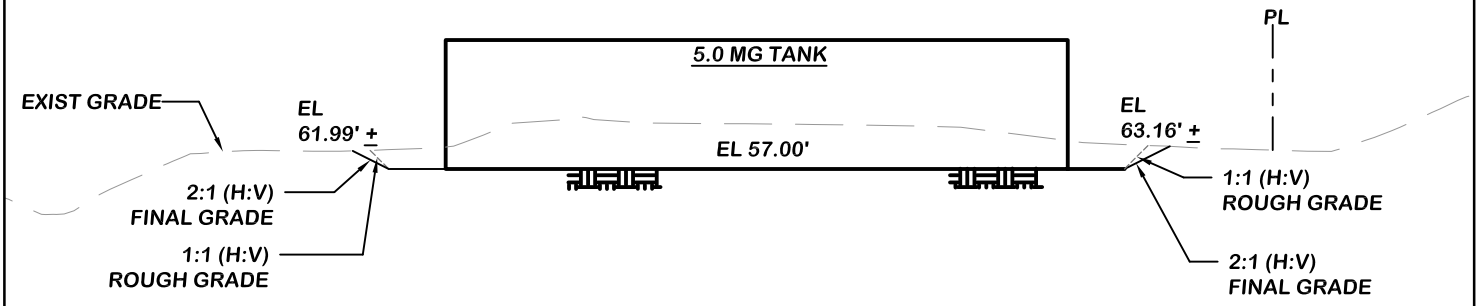
PROJECT OPTION 1: ALTERNATIVE 1- 5MG UNBURIED CIRCULAR STEEL TANK

FIGURE 3.1



TANK SECTION LOOKING EAST (A / -)
SCALE: NTS



TANK SECTION LOOKING NORTH (B / -)
SCALE: NTS

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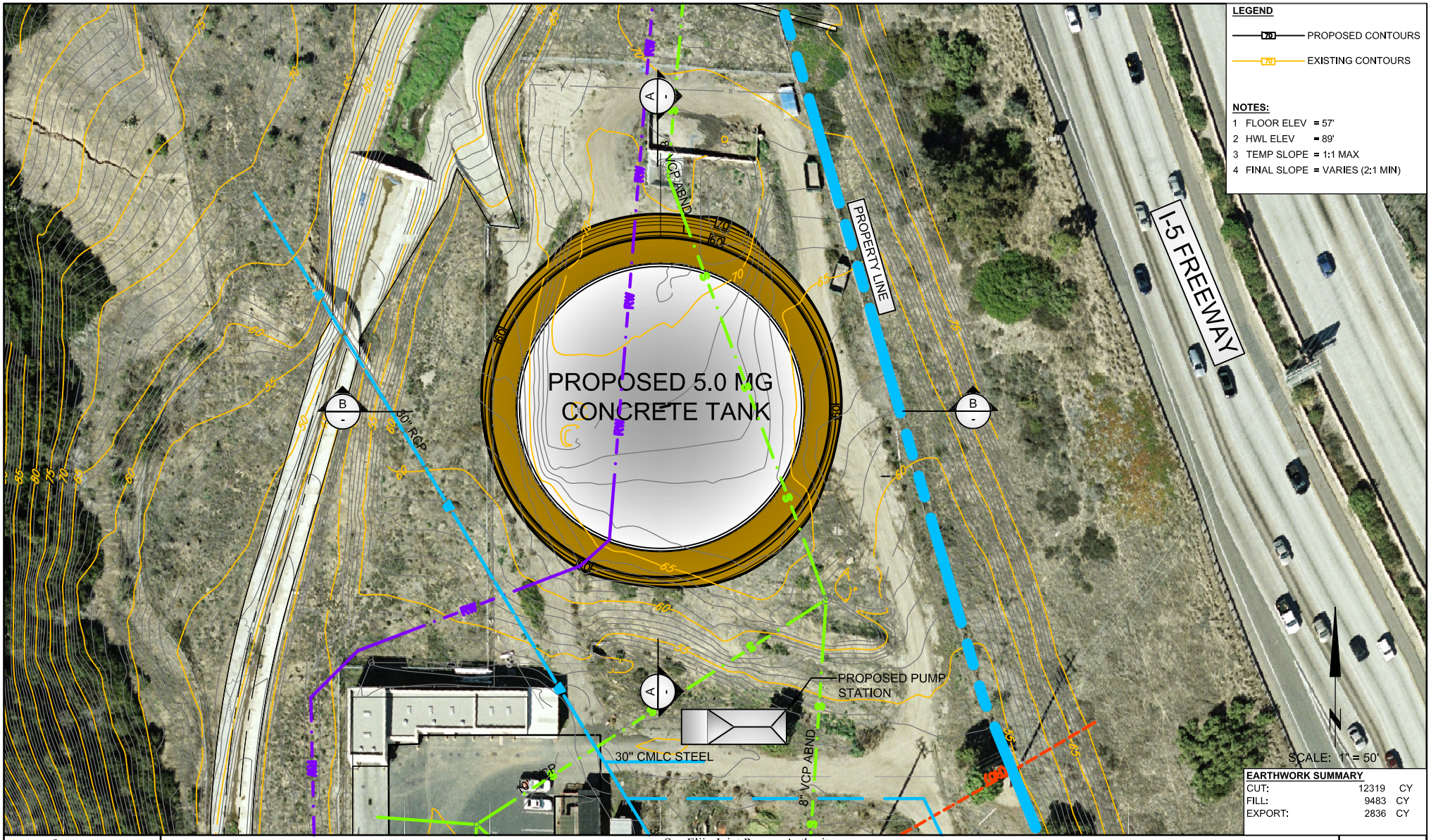
ALTERNATIVE 1 - TYPICAL CROSS SECTION
5MG UNBURIED CIRCULAR STEEL TANK

FIGURE
3.2



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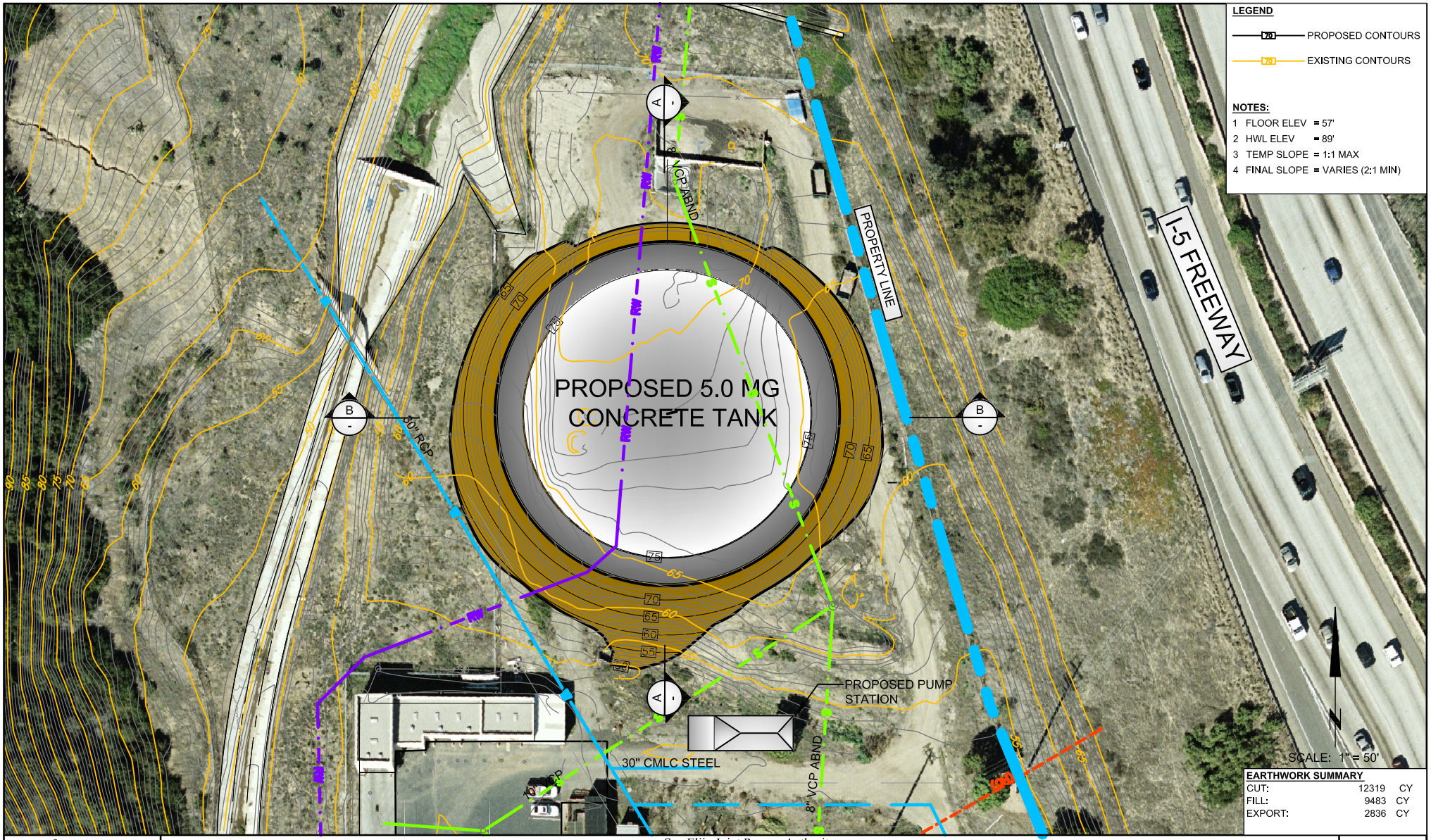
PROJECT OPTION 1: ALTERNATIVE 2- 5MG PARTIALLY BURIED CIRCULAR CONCRETE TANK - ROUGH GRADING

FIGURE 3.3



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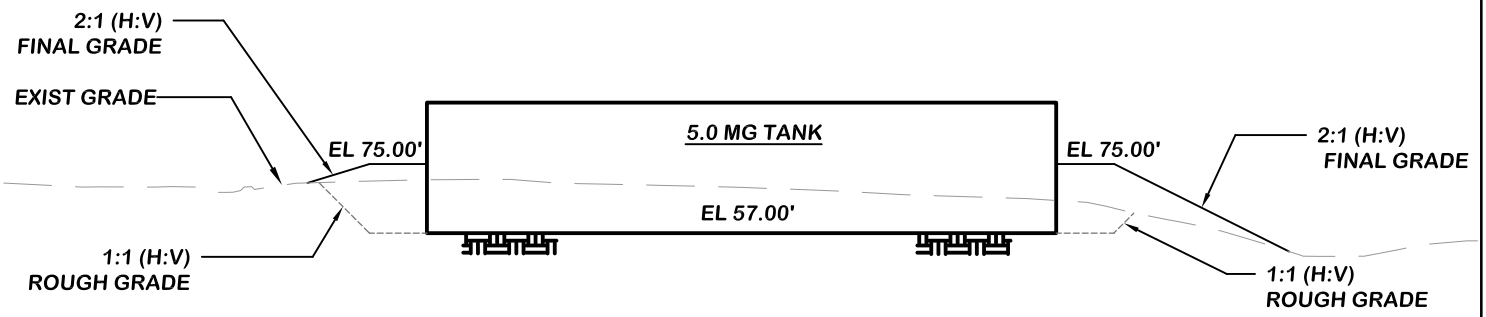
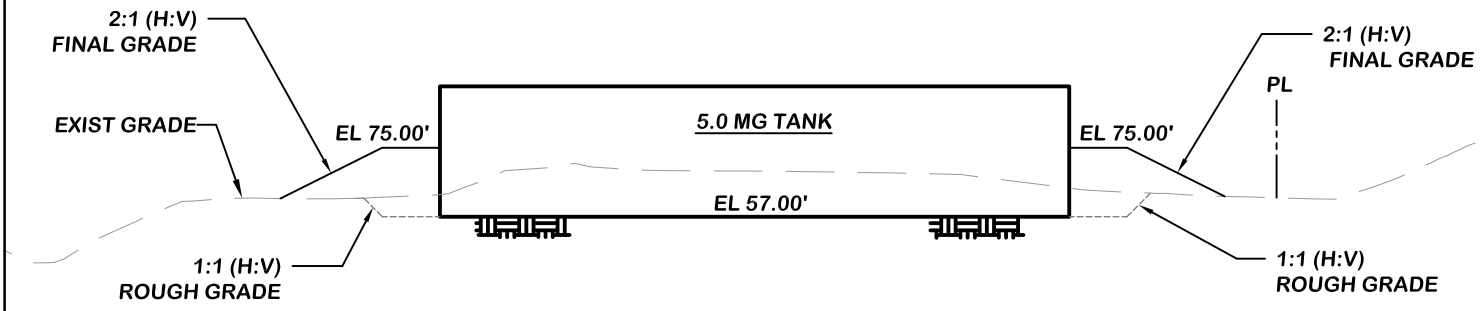
PROJECT OPTION 1: ALTERNATIVE 2- 5MG PARTIALLY BURIED CIRCULAR CONCRETE TANK - FINAL GRADING

FIGURE 3.4



TANK SECTION LOOKING EAST — A / -
SCALE: NTS



TANK SECTION LOOKING NORTH — B / -
SCALE: NTS

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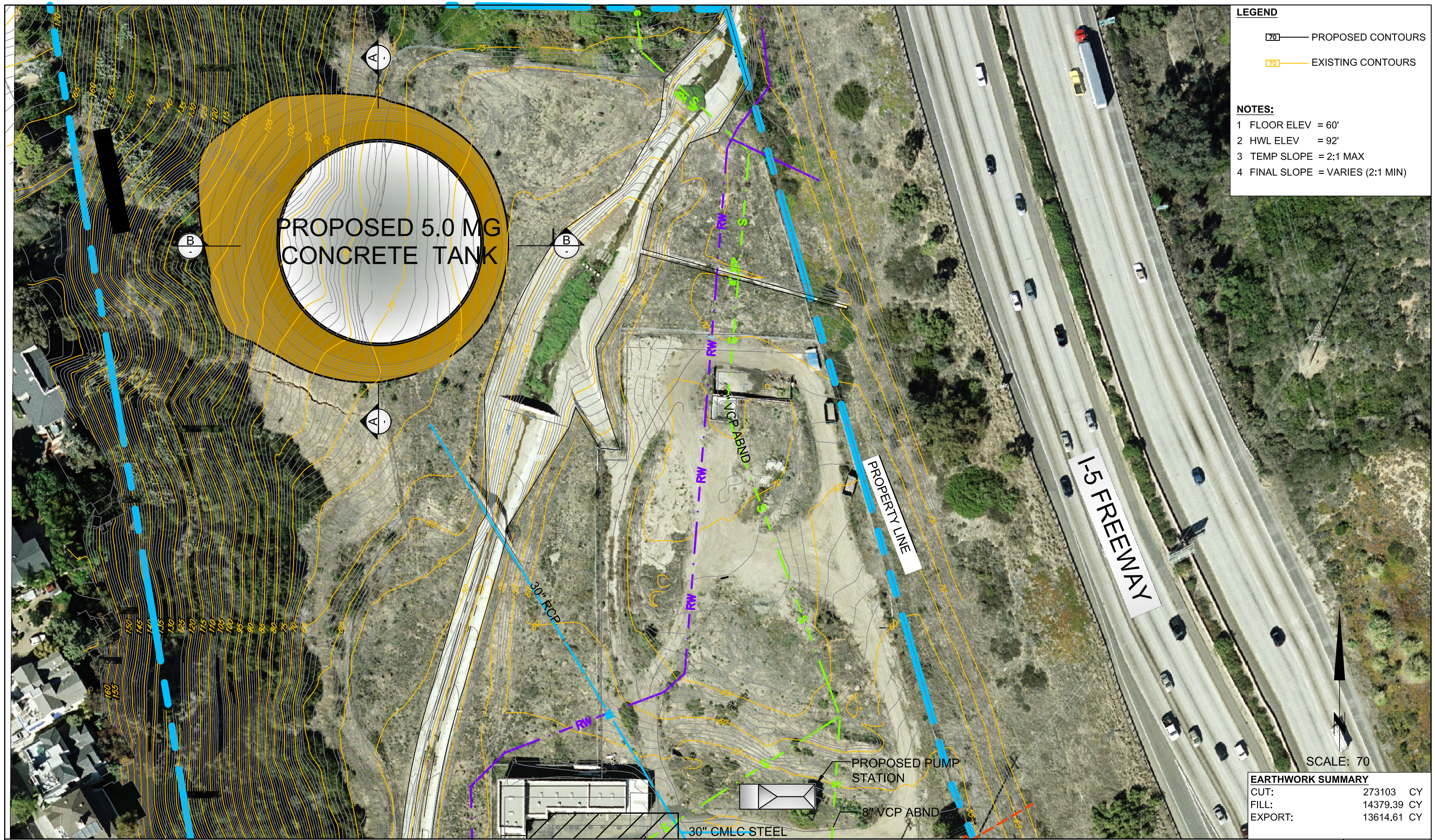
ALTERNATIVE 2 - TYPICAL CROSS SECTION
5MG PARTIALLY BURIED CIRCULAR CONCRETE TANK

FIGURE
3.5



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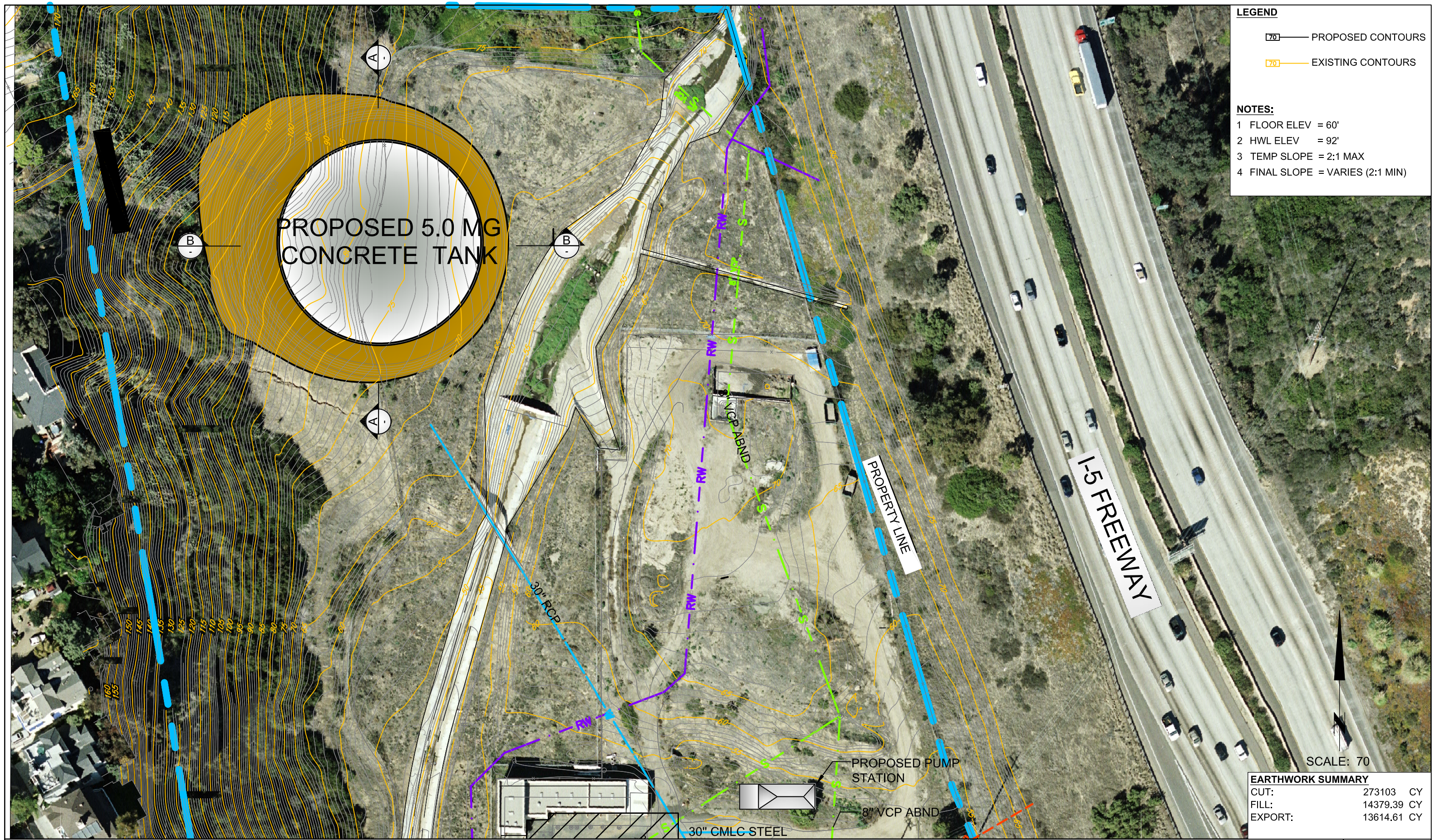
PROJECT OPTION 1: ALTERNATIVE 3- 5MG PARTIALLY BURIED CIRCULAR CONCRETE TANK ROUGH GRADE

FIGURE
3.6



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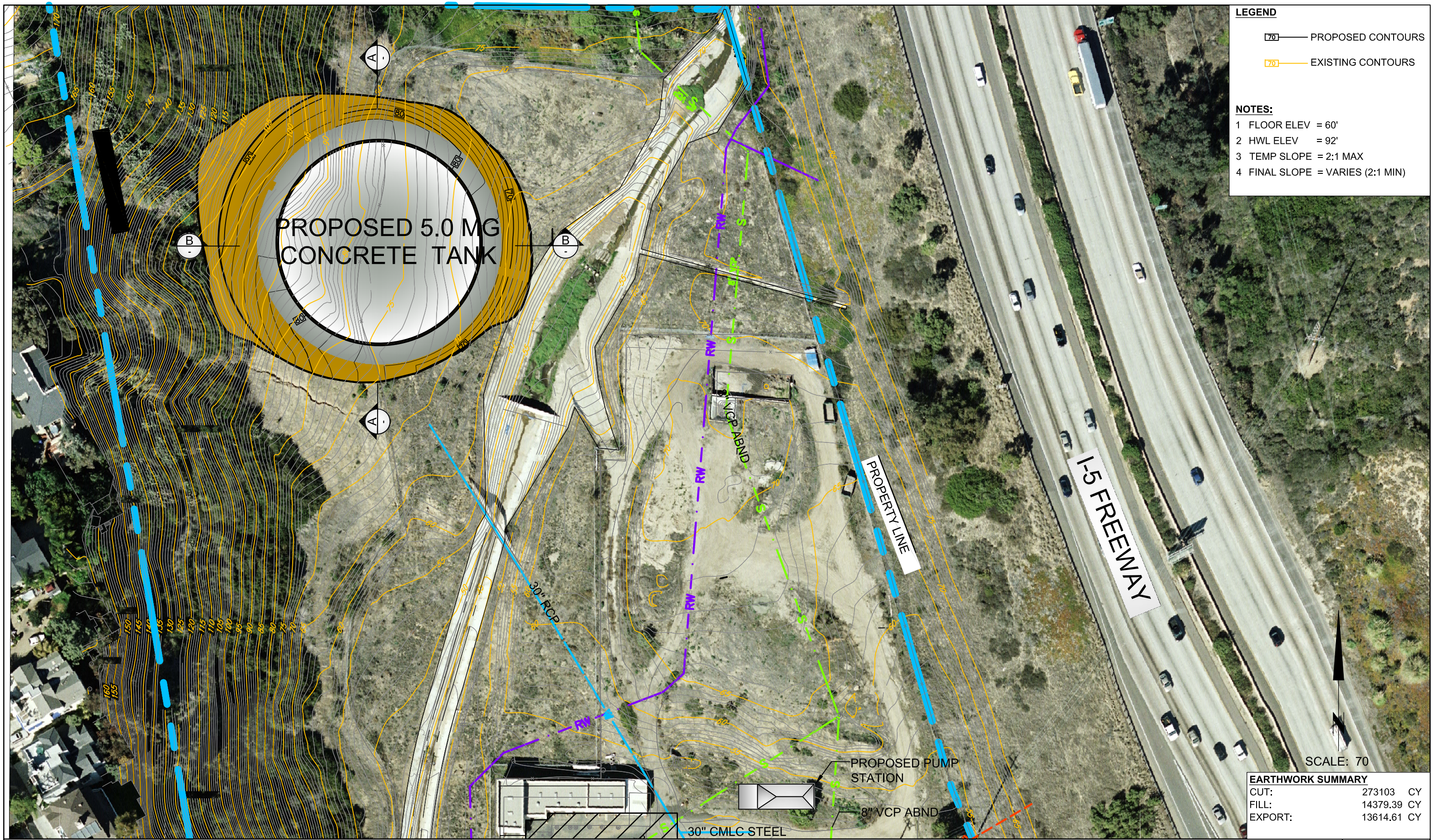
PROJECT OPTION 1: ALTERNATIVE 3- 5MG PARTIALLY BURIED CIRCULAR CONCRETE TANK ROUGH GRADE

FIGURE
3.6



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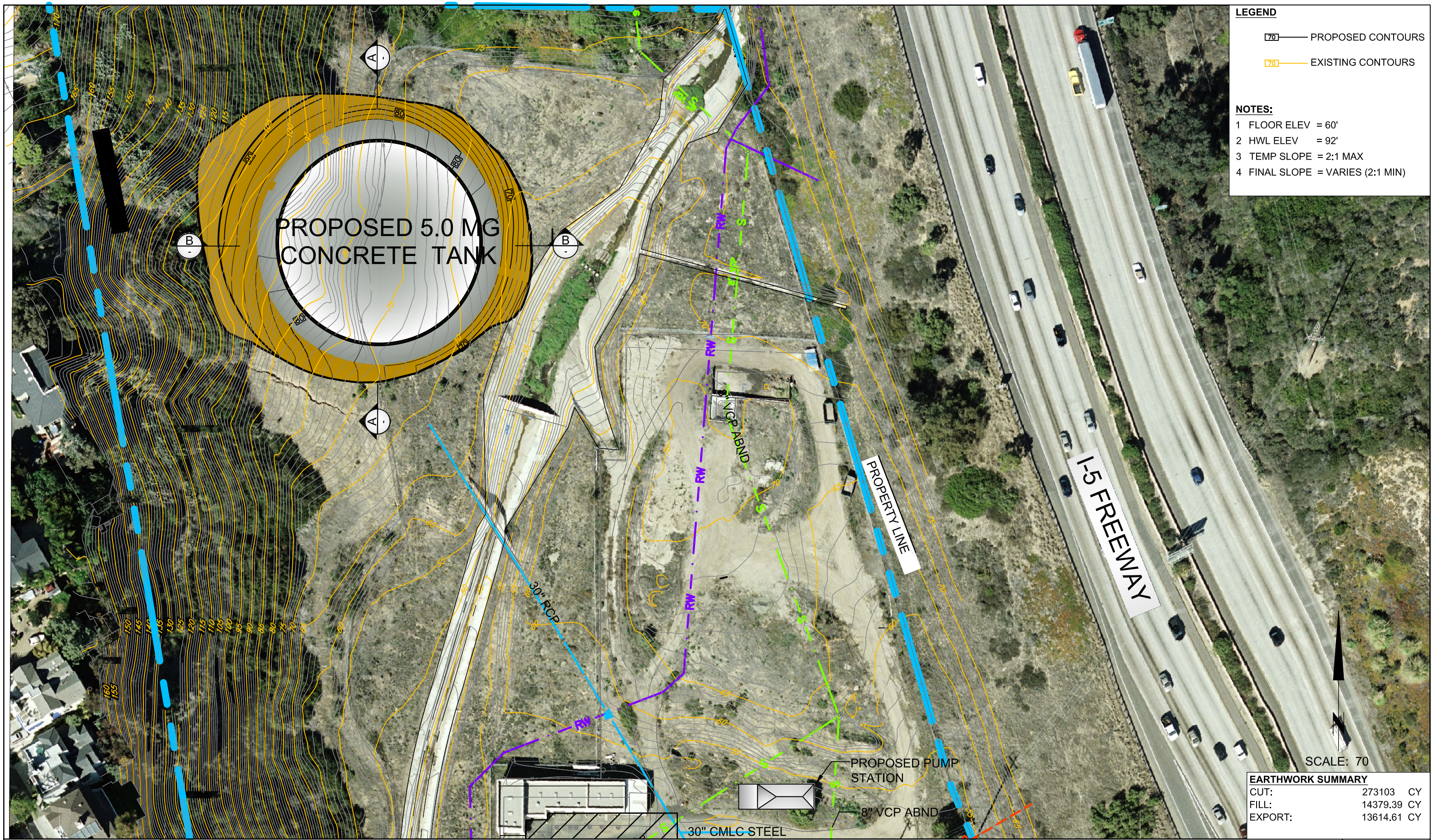
PROJECT OPTION 1: ALTERNATIVE 3- 5MG PARTIALLY BURIED CIRCULAR CONCRETE TANK FINAL GRADE

FIGURE 3.7



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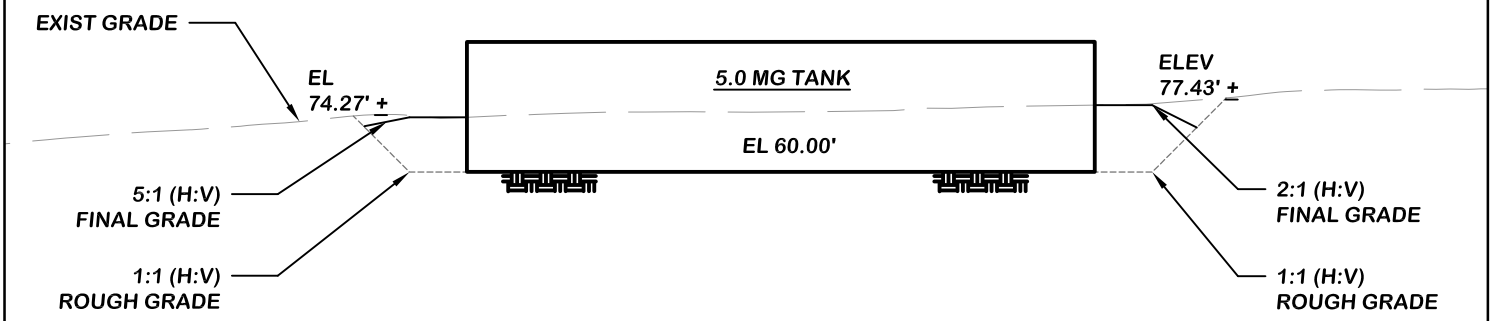
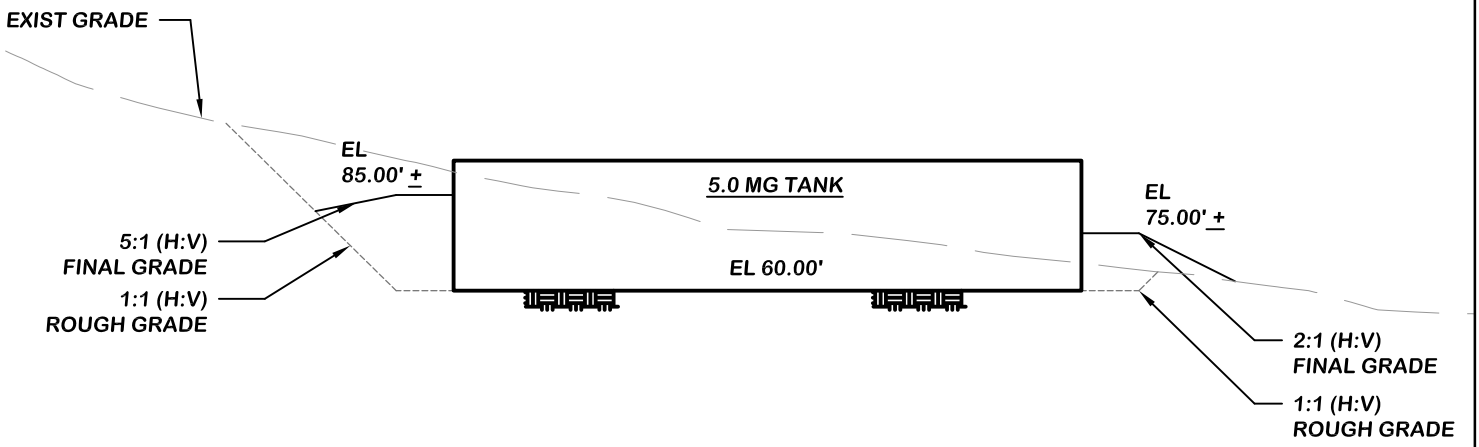
PROJECT OPTION 1: ALTERNATIVE 3- 5MG PARTIALLY BURIED CIRCULAR CONCRETE TANK FINAL GRADE

FIGURE 3.7



TANK SECTION LOOKING WEST — A-2

SCALE: NTS — -



TANK SECTION LOOKING NORTH — B-2

SCALE: NTS — -

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ALTERNATIVE 3 - TYPICAL CROSS SECTION
5MG CIRCULAR CONCRETE TANK

FIGURE
3.8

Flow Equalization/Recylced Water Storage Facility

TECHNICAL MEMORANDUM NO. 4

Date: October 2008 – **First Draft**
January 2009 – **Second Draft**
March 2009 – **Final**

Subject: **PROJECT OPTION NO. 1 – NEW ON-SITE RECYCLED WATER STORAGE TANK AND PUMP STATION SITE LAYOUT**

Prepared By: Dolores Ventura, P.E.
Reviewed By: Preston Lewis, P.E. / James G. Ashcraft, P.E.

PURPOSE

The purpose of this technical memorandum is to provide a conceptual tank, pump station, and site layout for the San Elijo Joint Powers Authority (SEJPA) Flow Equalization/Recycled Water Storage Facility Project. Once the layouts are approved by the SEJPA, this memorandum will serve as the basis for final design.

CRITERIA

Based on a meeting held with the SEJPA on September 16, 2008, the preferred option was Alternative 2. This alternative was selected due to the following reasons:

1. Most economical; lowest cost per gallon
2. Minimal long-term maintenance
3. Significantly reduced impacts to potentially environmentally sensitive habitat
4. Minimized mass grading
5. Reduced tank visibility by partially burying the tank
6. Improved drainage patterns by partially backfilling the tank

The Recycled Water Storage Facilities will be designed in accordance with California Health Laws Related to Recycled Water "The Purple Book", California Water Code, Title 22 of the California Code of Regulations (22 CCR), and Title 17 of the California Code of Regulations (17 CCR), State Department of Public Health, and San Diego County Department of Environmental Health.

CIRCULAR PRESTRESSED CONCRETE (AWWA D-110, TYPE I) TANK LAYOUT

Alternative 2 tank configuration can be seen on the overall site map in Figure 4.1. The circular tank will be 164-feet in diameter and will have walls 34-feet high (32-foot water depth and 2-feet of freeboard). The total storage capacity will be 5.0 million gallons (MG). The high water level will be 89-feet. The floor and roof of the tank will slope upward at approximately 2% towards the center of the tank.

PUMP STATION LAYOUT

The pump station will be located to the south of the tank adjacent to an existing dirt road for accessibility. There are various options for pump stations, such as packaged pump station, enclosed customized pump station, or exposed customized pump stations. For the purposes of this study, it was assumed that enclosed pump station is preferred.

CIVIL SITE IMPROVEMENTS

The site improvements include grading the site to improve drainage and allow the SEJPA's crews to easily access the tank site. The access road around the tank perimeter and leading to the pump station will be paved with asphalt concrete for maintenance and accessibility.

The plant site is currently enclosed by a fence for security. The proposed tank and pump station will be equipped with intrusion alarms that will be connected to and monitored by the SEJPA's Supervisory Control and Data Acquisition (SCADA) system.

UTILITY RELOCATIONS

During design, the existing utilities will need to be potholed to confirm horizontal and vertical location. Based on preliminary investigations, there are various utilities that will need to be abandoned and/or removed. These include an existing abandoned sewer, an existing sewer (approximately 270-LF), and the existing recycled water line that feeds the Oak Crest Reservoir. The existing sewer will be relocated to the east and will be approximately 340-LF with new manholes as required.

PIPING CONFIGURATION AND DESIGN CRITERIA

The new pipelines will be concrete mortar lined and coated welded steel in accordance with the American Water Works Association (AWWA) Manual of Water Supply Practices, Steel Pipe – A Guide for Design and Installation M11. The steel pipe wall thickness will be a minimum of 0.25 inches with minimum cover of three (3) feet. Calculations will be performed to confirm the steel plate thickness during final design.

Other design considerations will include minimizing low and high points in the pipeline, utilizing the best hydraulic profile, minimizing head losses, and cost efficiency. The size of blowoffs and airvacs will be calculated and designed in accordance with AWWA Standards.

The following lists the proposed one-site piping modifications.

Tank Inlet – 12-inch CML&C Steel Pipe
Tank Overflow – 18-inch CML&C Steel Pipe (routed to on-site sewer system)
Tank Wash Down – 4-inch Schedule 80 PVC Pipe
Tank Outlet to Pump Station and to Plant – 24-inch CML&C Steel Pipe
Pump Station Discharge to Oak Crest Park Reservoir – 12-inch CML&C Steel Pipe
Pump Station Discharge to Loma Santa Fe Reservoir – 12-inch CML&C Steel Pipe

Refer to Figure 4.1, which shows the on-site pipelines. The inlet will be designed to enter the tank on the north side of the tank and the outlet will be located on the south side of the tank. This will help maintain the water quality in the tank. The existing recycled water pipeline that goes north to the Oak Crest Park Reservoir will be used as the tank inlet by adjusting the pipeline profile. A new flow meter will be installed on the tank inlet.

All connections will need to be potholed during final design. This is typically done during the 50% design phase. A pothole plan will be prepared and the SEJPA will need to approve the potholing

plan prior to any work being done. The SEJPA will need to verify all the connections to ensure proper connection locations. Connections will be designed to reduce head losses, avoid disruption (or maintain service) as dictated by the SEJPA, and to minimize construction cost. The following is a list of point of connections.

Connection No. 1 – Connect to existing 12 CML&C steel pipe (Oak Crest Park Reservoir inlet)
Connection No. 2 – Connect to existing 12-inch PVC pipe (Loma Santa Fe Reservoir inlet)

SITE DRAINAGE

Drainage will be designed to minimize erosion due to storm water run off and to ensure safe conditions for maintenance crews during a storm event. Drainage ditches will be utilized where interim drainage is required on steep and long-run slopes to minimize erosion and ensure safe slope conditions. All storm water will drain to the on-site storm drain system.

MASS GRADING

The mass grading is divided into three categories as discussed below: Rough Grading, Stockpile Grading, and Final Grading.

Rough Grading

The site will be rough graded to permit construction of the tank. The site will be graded to approximately 59-feet. The cut will be accomplished by sloping excavation assuming temporary slopes of 1:1 are verified by a geotechnical engineer. Approximately 12,319-CY of material will be excavated to place the tank at the required elevation.

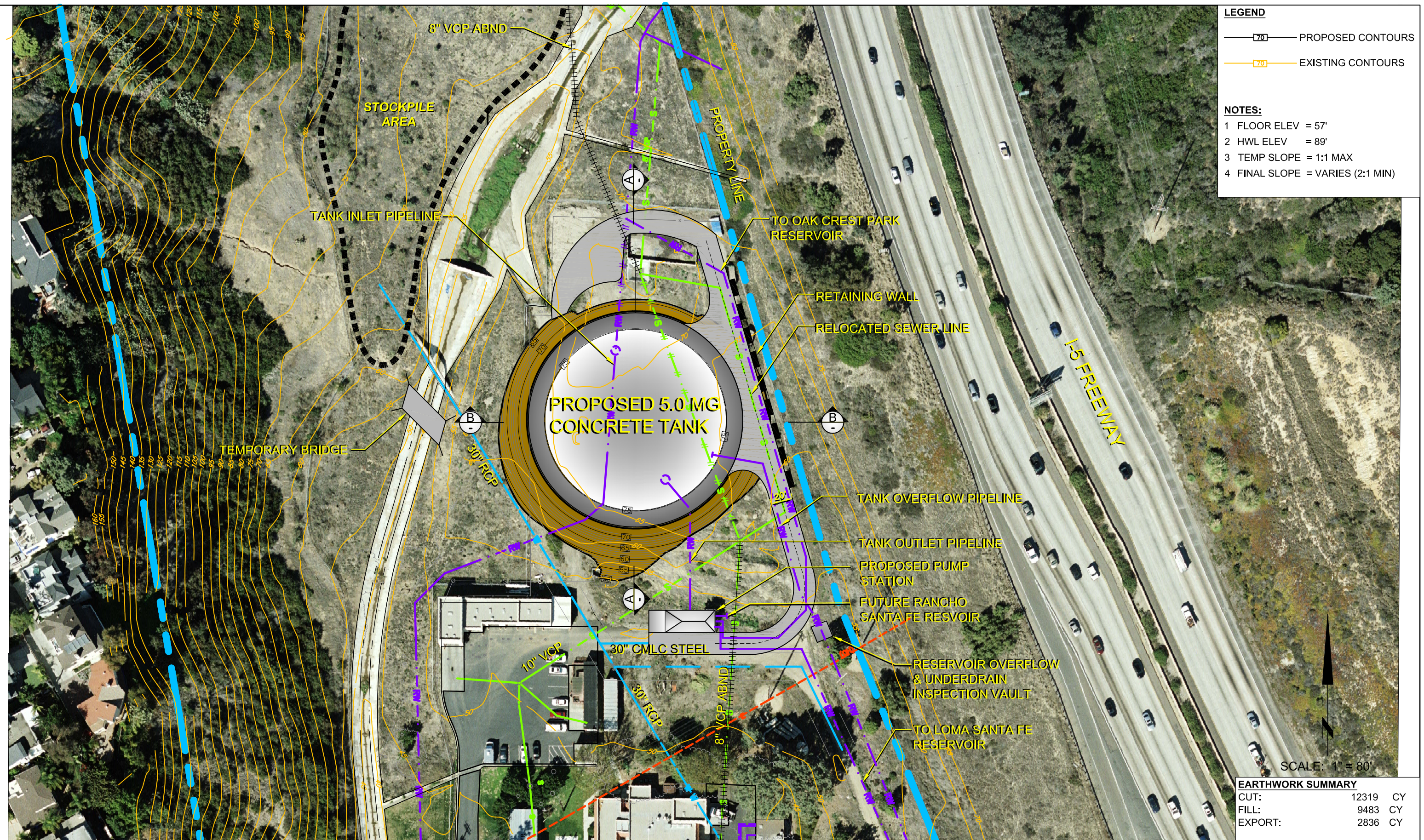
Stockpile Grading

The temporary stockpile will be located to the west side of the tank as shown in Figure 4.1. Approximately 9,483-CY of material will be stockpiled for tank and access road backfill. Temporary fill slopes will be a maximum of 2:1. The site will be designed to minimize soil erosion and to ensure that existing storm drains are protected.

Final Grading

The tank will be partially backfilled with the final grade at 75-feet. There will be an access road around the perimeter of the tank.

The export material, approximately 2,836-CY will be placed on the north side of the proposed tank. The material will be contour graded to blend into the existing site as shown in Figure 4.1. The landscaping will be designed to promote quick re-growth to minimize erosion.



LEGEND

70 PROPOSED CONTOURS

70 EXISTING CONTOURS

NOTES:

1 FLOOR ELEV = 57'
2 HWL ELEV = 89'
3 TEMP SLOPE = 1:1 MAX
4 FINAL SLOPE = VARIES (2:1 MIN)

EARTHWORK SUMMARY

CUT:	12319	CY
FILL:	9483	CY
EXPORT:	2836	CY

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San Elijo Joint Powers Authority
Flow Equalization / Recycled Water Storage Facility

PROJECT OPTION 1: FINAL SITE LAYOUT

FIGURE 4.1

Flow Equalization/Recylced Water Storage Facility

TECHNICAL MEMORANDUM NO. 5

Date: October 2008 – **First Draft**
January 2009 – **Second Draft**
March 2009 – **Final**

Subject: **PROJECT OPTION NO. 1 – NEW ON-SITE RECYCLED WATER STORAGE TANK AND PUMP STATION FACILITY OPERATIONS**

Prepared By: Dolores Ventura, P.E.
Reviewed By: Preston Lewis, P.E. / James G. Ashcraft, P.E.

PURPOSE

The purpose of this technical memorandum is to provide a description of the tank and pump station proposed operation features for the San Elijo Joint Powers Authority (SEJPA) Flow Equalization/Recycled Water Storage Facility Project. Once the features are approved by the SEJPA, this memorandum will serve as the basis for final design. Figure 5.1 shows how the new tank and pump station are incorporated into the existing system.

CRITERIA

The criteria for the tank, pump station, valve vault, and inspection facilities will be designed to generally operate in an unattended mode with control and monitoring from a remote location via the SEJPA's Supervisory and Data Acquisition (SCADA) system.

Typical operation activities for the tank will include the following:

1. Visual examination of the exterior of the access hatches to identify any damage, deterioration, or signs of unauthorized access
2. Visual examination of the drain lines to detect the presence of any unexpected flow from the under drains, thereby potentially signaling a leak
3. Visual inspection of the tank vent structure and piping to evaluate for potential blockages or other damage and deterioration
4. Opening of the access hatches to test hatch function and intrusion switch and alarm operation and signal back to the central control location
5. Visual inspection of the tank exterior
6. Visual inspection of ladders, stairways, gratings, and landings
7. Testing of interior wash down system
8. Visual inspection of tank interior (by divers when tank is in use)
9. Draining of tank and cleaning of the interior

It is expected that for the most part these activities will be performed by a one to two person SEJPA crew utilizing a small maintenance truck (pickup or equivalent).

TANK OPERATIONAL CRITERIA

Based on the *Recycled Water Optimization and Expansion Study* prepared by PBS&J, July 2005, the current recycled water plant has a flow rate of 1,720 gpm (or 2.48 MGD).

The tank overflow elevation will be set at 89-feet and will be designed to discharge into the on-site sewer system. Since this tank will store recycled water the tank overflow can not drain into the storm drain system.

TANK APPURTENANCES

Tank appurtenances will be in accordance with the AWWA D-110 Section 3.11. The tank will have access hatches to enable maintenance crews to clean and maintain the tank. The access hatches will be secured with locks and have watertight seals. The tank roof will have two (2) access hatches equipped with a staircase, ladder, and landing. Maintenance crew will be able to access the inside of the tank via a stainless steel staircase that goes down to a landing and stainless steel ladder equipped with safety climbing features that continues to the bottom of the tank. The tank roof will have one (1) hatch to allow maintenance crews to visually inspect the tank overflow weir. Each tank roof hatch will be equipped with intrusion alarms that will be connected to the SEJPA's Supervisory Control and Data Acquisition (SCADA) system.

The tank will have an adequate roof vent to allow the exchange of air when the water level in the tank is changing. The roof vent opening will be covered with stainless steel insect screens.

A PVC wash down pipe with stainless steel hose connections will be constructed around the inside perimeter of the tank to facilitate cleaning the tank.

WALL DRAIN AND UNDERDRAIN SYSTEM

A footing drain will be provided around the perimeter of the tank wall footing. An underdrain system will also be provided under the tank. This will divert tank leakage and groundwater that may accumulate to drain away from the tank. The water will be diverted to an inspection vault to identify and help quantify leakage. For this purpose, the drainage system will be partitioned so that by inspection a specific area can be identified for examination. The underdrain will be connected to the onsite storm drain system.

MODIFICATIONS TO THE EXISTING RECYCLED WATER PUMP STATION (FOREBAY)

Currently the SEJPA has one recycled water pump station, which is located at the chlorine contact tank's forebay. In order to convey the recycled water to the new tank location, this existing recycled water pump station located will need to be modified. The capacity of the recycled water forebay is 25,000-gallons. The recycled water enters the forebay at a maximum rate of 1,720 gpm and is pumped from the forebay out to the north and south distribution systems at a rate of 2,100 gpm via constant feed pumps. For this reason, the existing pumps frequently start and stop in order to meet the demand in the distribution system. Various concerns that arise when operating the pumps in this manner include: reduced life expectancy of the pump motors, pressure transients in the distribution system causing stress to the pipelines, and energy spikes during peak demands.

Since the pump station needs to be modified to accommodate the new tank location, the pumps will be upgraded to have variable frequency drives (VFD). The pumps will be sized to match the flow rate of recycled water production. The use of VFDs is recommended because they provide flexibility when flow rates or hydraulic conditions need to be adjusted to meet seasonal flows or future modifications. This flexibility will also help reduce the amount of energy used.

The piping will be modified to convey the water from the pump station directly to the new recycled water tank for storage. The pump station will include one duty pump and one standby for a total of two (2) pumps.

Parameters for the Modified RW Pump Station (Forebay)

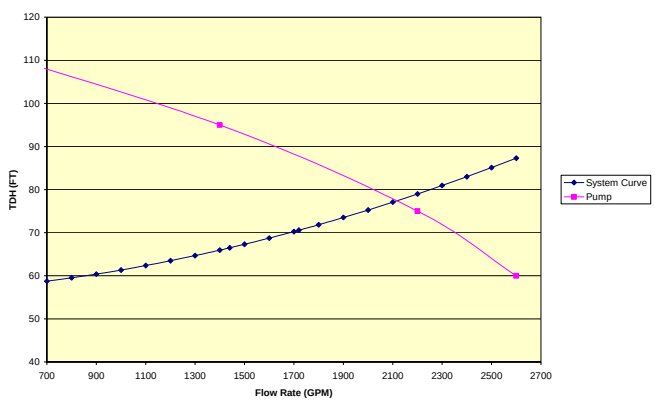
- Variable flow – maximum 2,100 gpm
- Estimated TDH 77-feet
- Total estimated pipeline length 2,000-feet
- Discharge Pipeline Diameter 12-inches

New Recycled Water Tank (assuming 5 MG storage capacity)

- 164-foot diameter concrete tank
- 5,000,000 gallon capacity
- High water level 89-feet

The pump is sized according to the pump and system head curves included in Graph 1 below. System head curves will need to be finalized and pumps shall be selected during final design.

Graph 1 – Modified Recycled Water Pump Station (Forebay)



In summary, the modified pump requirements are as follows:

Description	*Flow Rate*	*Horsepower*	*Type*	*No. of Pumps*
Existing RW PS (Forebay)	2,100 gpm	60 hp	VFD	2

NEW RECYCLED WATER PUMP STATION – DISTRIBUTION SYSTEM

The new ultimate recycled water pump station will need to service two (2) existing recycled water distribution systems and one (1) future system. Each system will have one duty pump and one standby pump. Therefore, the pump station will be designed to accommodate six (6) pumps. At this time, the maximum flow rate was determined based on filling the tanks during an 8-hour period instead using the

pipe velocity threshold. The existing piping is old and differing in size throughout the system. For this purpose, a 12-inch diameter was assumed, which resulted in approximately 3.7-fps at a maximum flow of 1,300 gpm. The use of VFDs is recommended because they provide flexibility when flow rates or hydraulic conditions need to be adjusted to meet seasonal flows or future modifications. This flexibility will also help reduce the amount of energy used.

The distribution systems include the following:

Parameters for the New Pump Station for the North Distribution System (Existing Oak Crest Park Reservoir)

- Variable flow – maximum 1,300 gpm (filling tanks in an 8-hr period)
- Estimated TDH 410-feet
- Total estimated existing pipeline length 18,750-feet
- Existing 90-foot diameter steel tank
- Existing 660,000 gallon capacity
- Existing High water level 418-feet

Parameters for the New Pump Station for the South Distribution System (Existing Loma Santa Fe Reservoir)

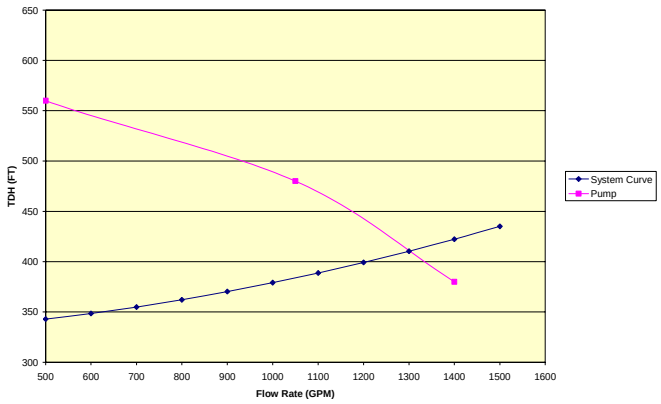
- Variable flow – maximum 1,300 gpm (filling tanks in 8-hr period)
- Estimated TDH 321-feet
- Total estimated existing pipeline length 18,290-feet
- Existing 100-foot diameter concrete tank
- Existing 650,000 gallon capacity
- Existing High water level 331-feet

Future East Distribution System – Rancho Santa Fe Golf Course

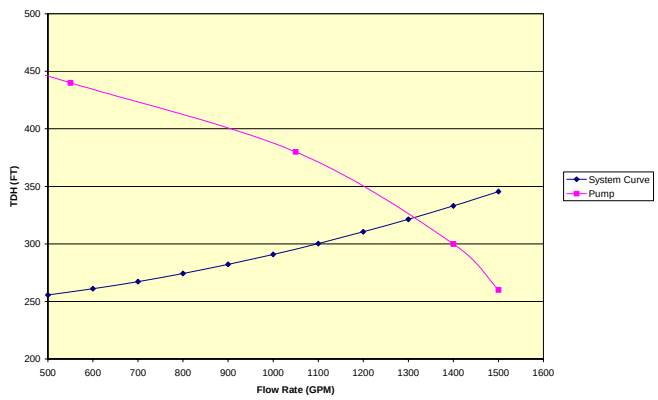
- Parameters will be determined in the future

The pumps have been sized based on the assumptions stated and the system head curves are included in Graphs 2 and 3 below. System head curves will need to be finalized and pumps shall be finalized during design.

Graph 2 – North Distribution System to Oak Crest Park Reservoir



Graph 3 – South Distribution System to Loma Santa Fe Reservoir

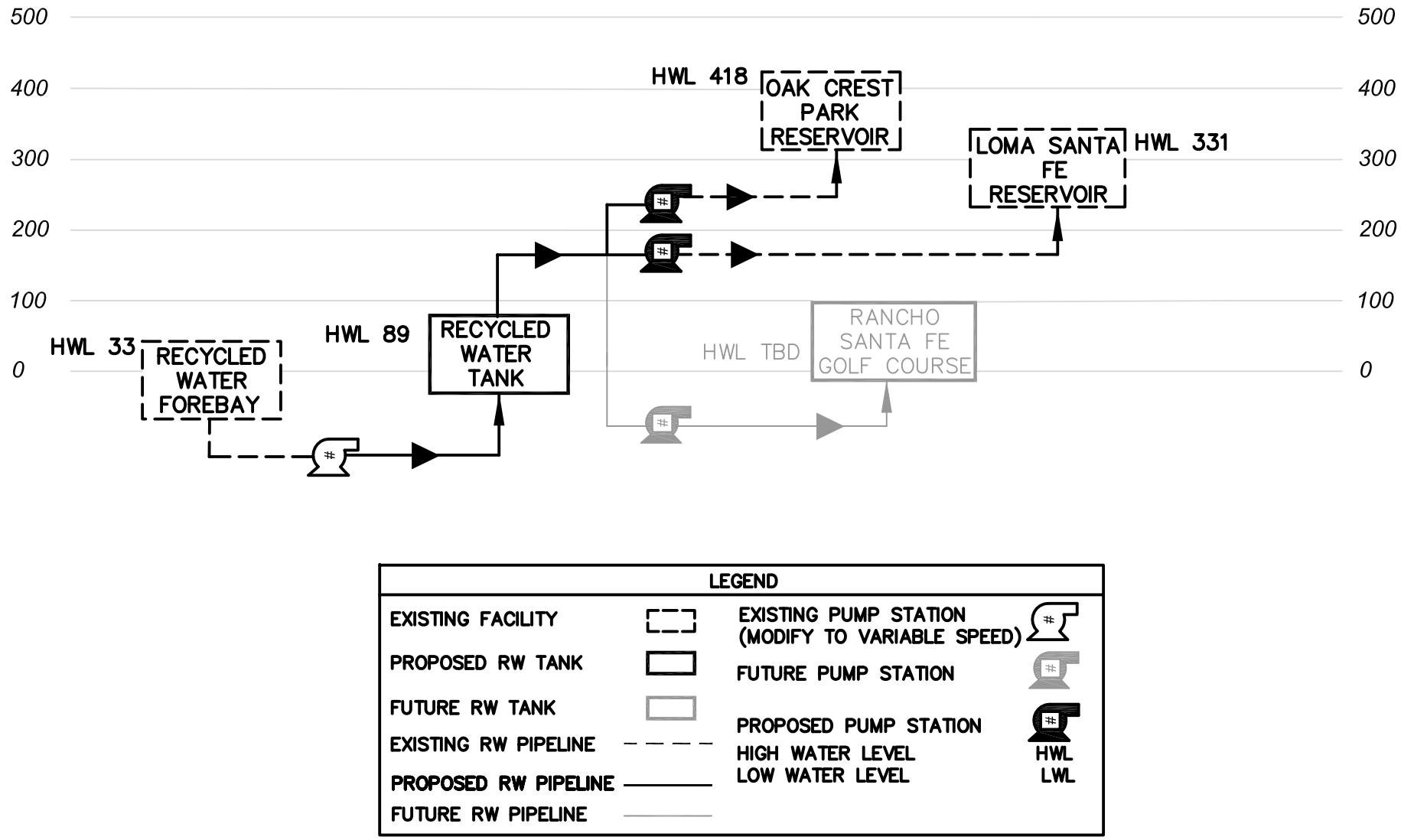


In summary, the pump station requirements are as follows:

Description	*Flow Rate*	*Horsepower*	*Type*	*No. of Pumps*
Oak Crest Park Reservoir	1,300 gpm	200 hp	VFD	2
Loma Santa Fe Reservoir	1,300 gpm	150 hp	VFD	2
Future Tank	TBD	TBD	TBD	TBD

CONCLUSION

During final design, the assumptions and features described herein will be finalized. The SEJPA will have the opportunity to tailor the facility to meet operations and maintenance requirements.



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FLOW EQUALIZATION/ RECYCLED WATER STORAGE FACILITY

PROJECT OPTION 1: FLOW DIAGRAM

FIGURE 5.1

Flow Equalization/Recylced Water Storage Facility

TECHNICAL MEMORANDUM NO. 6

Date: January 2009 – **First Draft**
March 2009 – **Final**

Subject: **PROJECT OPTION NO. 2 – ADAPT EXISTING UNDERUTILIZED TANKS TO STORE RECYCLED WATER AND/OR SECONDARY EFFLUENT AND MODIFY THE EXISTING PUMPING CONFIGURATION**

Prepared By: Dolores Ventura, P.E.
Reviewed By: Preston Lewis, P.E. / James G. Ashcraft, P.E.

PURPOSE

The purpose of this technical memorandum is to evaluate the feasibility of using underutilized facilities located at the plant to provide an interim solution to the recycled water shortage and ocean outfall capacity issues. The underutilized facilities include an aeration basin, a secondary clarifier, and extra blowers. Based on a meeting with the San Elijo Joint Powers Authority (SEJPA), these two structures are underutilized and there are no plans to upgrade the treatment plant to implement the use of these structures. Figure 6.2 shows how the existing aeration basin and pump station are incorporated into the existing system. Figure 6.2 also shows how the future recycled water tank will be incorporated into the system.

DISCUSSION

The aeration basin has a capacity of approximately 453,000 gallons, and the secondary clarifier has a capacity of approximately 215,000 gallons. There are extra blowers in the RAS/WAS Blower Building, which could possibly be eliminated, to make room for some equipment. Refer to Figure 6.1 for the location of these existing facilities.

Currently, the SEJPA monitors the effluent flows coming from the City of Escondido via a pressure/flow regulator located across the street from the plant. This facility is known as the "Escondido Regulator Vault". When Escondido reaches their designated capacity in the ocean outfall, the SEJPA may regulate the valve and Escondido's effluent backs up and may spill approximately 200,000 gallons of effluent into Escondido Creek. The concept presented in this technical memorandum is to divert the effluent to the secondary clarifier to relieve the ocean outfall and help prevent potential spills. From there, the effluent may either be sent through the reclamation facility or returned to the ocean outfall during low flow periods. This approach would be a huge benefit to the region.

The SEJPA is also currently evaluating opportunities to install an advanced water treatment system to increase treatment capacity and to help lower the total dissolved solids (TDS) concentrations in the recycled water. The recycled water will then be conveyed to the chlorine contact tank where it will then be pumped to the aeration basin for storage, which has a capacity of approximately 453,000 gallons. Storing recycled water onsite will help equalize the recycled water demands.

MODIFICATIONS TO THE SECONDARY CLARIFIER

A connection exists between the secondary clarifier and the Escondido effluent line. During peak wet weather events, the SEJPA can open a valve to divert a portion of Escondido's effluent to the

secondary clarifier. No modifications are necessary. If the SEJPA decides to release the Escondido effluent during low flow periods, the plumbing is already in place to return the flow to the ocean outfall. In addition, the SEJPA has the option to send the effluent through their reclamation plant because the plumbing is already in place.

The secondary clarifier is currently plumbed to an existing pump station; see Figure 6.1 for the location. This pump station is currently not in use and can be modified in place. Therefore, the pump station may be improved to feed water from the secondary clarifier to the advanced water treatment (AWT) system currently being evaluated by the SEJPA. The AWT system requires 0.7 MGD (1 cfs) at a maximum of 50 psi.

Once the water is treated, the SEJPA is planning to blend both sources of recycled water at the chlorine tank. This may minimize the chlorine contact time required by the California Department of Public Health (CDPH) since the AWT system will produce a better quality of water. This will require new plumbing.

MODIFICATIONS TO THE EXISTING RECYCLED WATER PUMP STATION (FOREBAY)

Currently the SEJPA has one recycled water pump station, which is located at the chlorine contact tank's forebay. In order to convey the recycled water to the existing aeration tank for storage, the existing recycled water pump station will need to be modified. Refer to Technical Memorandum 5 for a discussion for details on the current pump station cycling issues.

It is proposed to install new variable frequency drives (VFD). The pumps will be sized to match the flow rate of recycled water production. The use of VFDs is recommended because they provide flexibility when flow rates or hydraulic conditions need to be adjusted to meet seasonal flows or future modifications. This flexibility will also help reduce the amount of energy used.

The existing piping will be used to convey the water from the modified pump station to the existing aeration basin for storage. The pump station will include one duty pump and one standby for a total of two (2) pumps.

Parameters for the Modified RW Pump Station (Forebay)

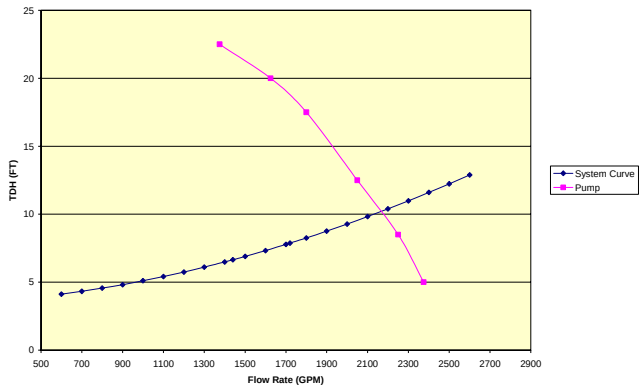
- Variable flow – maximum 2,100 gpm
- Estimated TDH 10-feet
- Total estimated pipeline length 600-feet
- Discharge Pipeline Diameter 12-inches

Existing Aeration Basin

- 22-ft by 115-ft rectangular concrete tank
- 453,000 gallon capacity
- High water level 36.5-feet

The pump is sized according to the pump and system head curves included in Graph 1 below. System head curves will need to be finalized and pumps shall be selected during final design. These pumps will need to be replaced once the new recycled water storage tank is constructed. Refer to Technical Memorandum 5 for the future pump station parameters.

Graph 1 – Modified Recycled Water Pump Station (Forebay)



In Summary, the modified pump requirements are as follows:

Description	*Flow Rate*	*Horsepower*	*Type*	*No. of Pumps*
Existing RW PS (Forebay)	2,100 gpm	15 hp	VFD	2

MODIFICATIONS TO THE AERATION BASIN

The structural modifications to the aeration basin include installing a concrete deck on top of the basin to mount the pumps and the electrical equipment. The concept is to use the existing 12-inch pipeline which services the north distribution system to convey the recycled water to the aeration basin, therefore minor pipe modifications will be required. This is shown in Figure 6.1.

Since the existing aeration basin has a hydraulic grade line (HGL) of 36.5-ft, and the future recycled water tank will have a HGL of 89-ft, the pump station will be designed to take advantage of the additional 52.5-ft of static head in the future. With a few modifications, converting the pump station to take suction from this higher elevation is feasible. Refer to Figures 6.3 and 6.4 for the modifications necessary. One disadvantage of this design is that the aeration basin must maintain a water depth of approximately 4-ft to avoid damaging the pumps. Therefore, approximately 75,000 gallons of recycled water in the aeration basin can not be utilized. A sump pump will need to be used to drain the tank during routine maintenance because the tank's existing drain line will need to be abandoned to avoid cross contamination in accordance with the State Department of Public Health (DPH).

The details for the new pump station that will be used in the interim are discussed below.

NEW INTERIM RECYCLED WATER PUMP STATION – DISTRIBUTION SYSTEM

The new interim recycled water pump station will need to service two (2) existing recycled water distribution systems and one (1) future system. Each system will have one duty pump and one standby pump. Therefore, the pump station will be designed to accommodate six (6) pumps. At this time, the maximum flow rate was determined based on filling the tanks in the distribution system during an 8-hour period instead using the pipe velocity threshold. The existing piping is old and differing in size

throughout the system. For this purpose, a 12-inch diameter was assumed, which resulted in approximately 3.5-fps at a maximum flow of 1,300 gpm. The use of VFDs is recommended because they provide flexibility when flow rates or hydraulic conditions need to be adjusted to meet seasonal flows or future modifications. This flexibility will also help reduce the amount of energy used.

The distribution systems include the following:

Parameters for the New Pump Station for the North Distribution System (Existing Oak Crest Park Reservoir)

- Variable flow – maximum 1,300 gpm (filling tanks in an 8-hr period)
- Estimated TDH 463-feet
- Total estimated existing pipeline length 18,750-feet
- Existing 90-foot diameter steel tank
- Existing 660,000 gallon capacity
- Existing High water level 418-feet

Parameters for the New Pump Station for the South Distribution System (Existing Loma Santa Fe Reservoir)

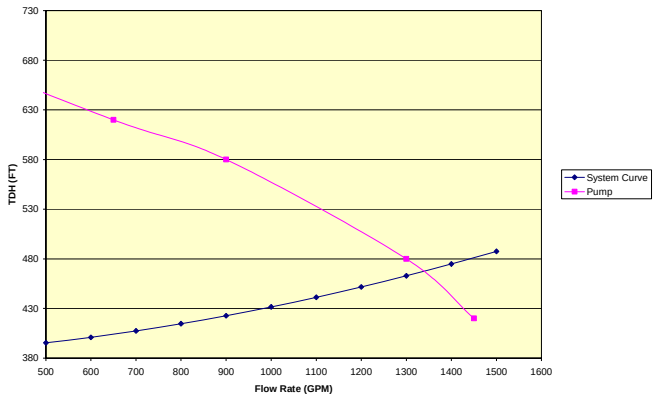
- Variable flow – maximum 1,300 gpm (filling tanks in 8-hr period)
- Estimated TDH 374-feet
- Total estimated existing pipeline length 18,290-feet
- Existing 100-foot diameter concrete tank
- Existing 650,000 gallon capacity
- Existing High water level 331-feet

Future East Distribution System – Rancho Santa Fe Golf Course

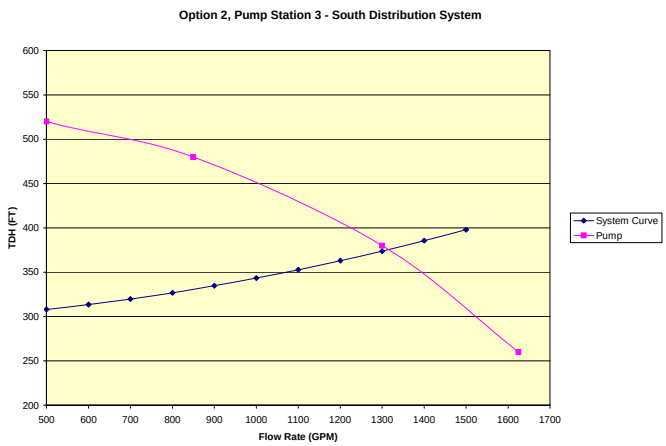
- Parameters will be determined in the future

The pump is sized according to the pump and system head curves included in Graph 2 and Graph 3 below. System head curves will need to be finalized and pumps shall be selected during final design.

Graph 2 – North Distribution System to Oak Crest Park Reservoir



Graph 3 – South Distribution System to Loma Santa Fe Reservoir

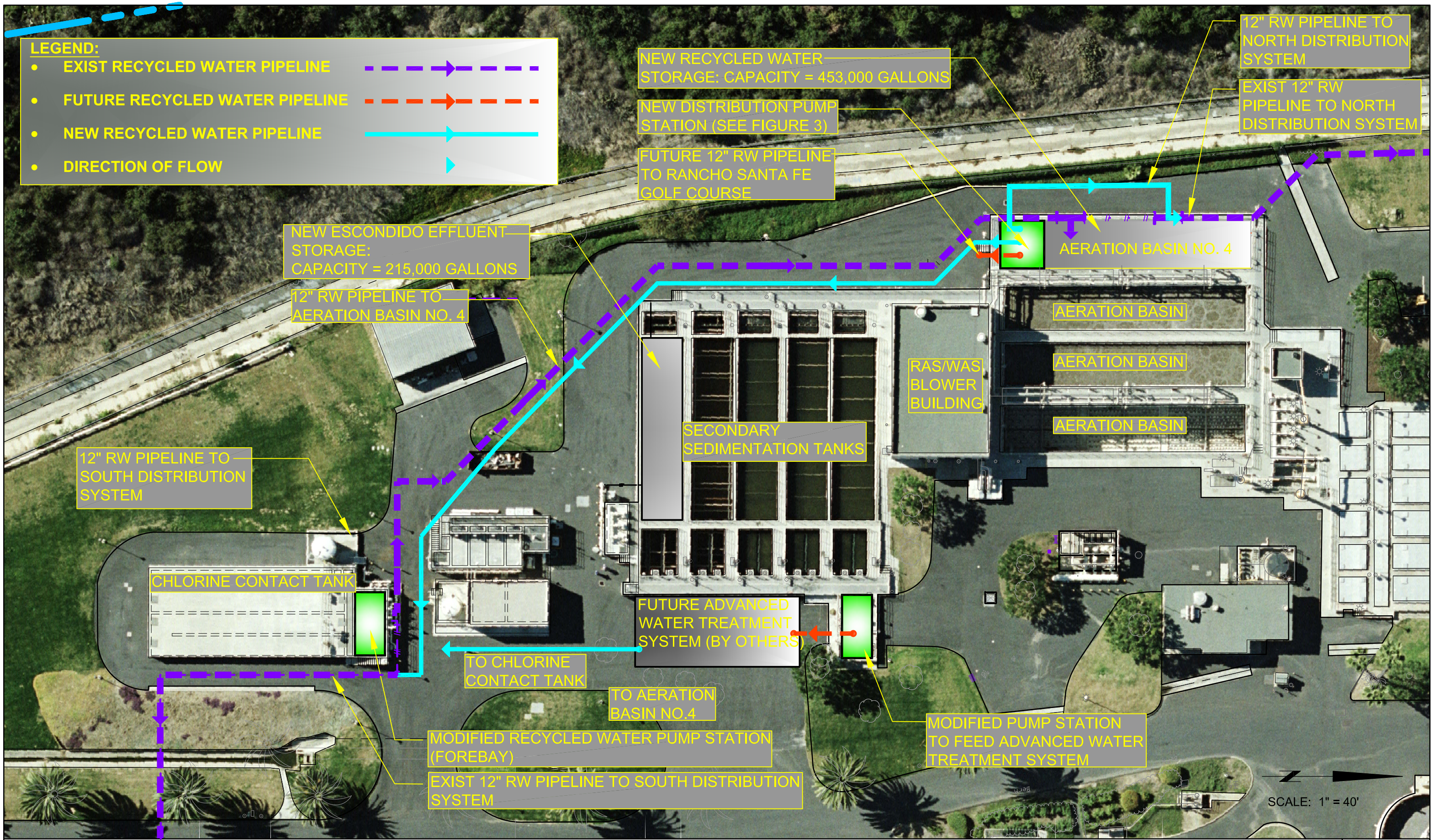


In summary, the pump station requirements are as follows:

Description	*Flow Rate*	*Horsepower*	*Type*	*No. of Pumps*
Oak Crest Park Reservoir	1,300 gpm	200 hp	VFD	2
Loma Santa Fe Reservoir	1,300 gpm	200 hp	VFD	2
Future Tank	TBD	TBD	TBD	TBD

CONCLUSION

During final design, the assumptions and features described herein will be finalized. The SEJPA will have the opportunity to tailor the facility to meet operations and maintenance requirements.



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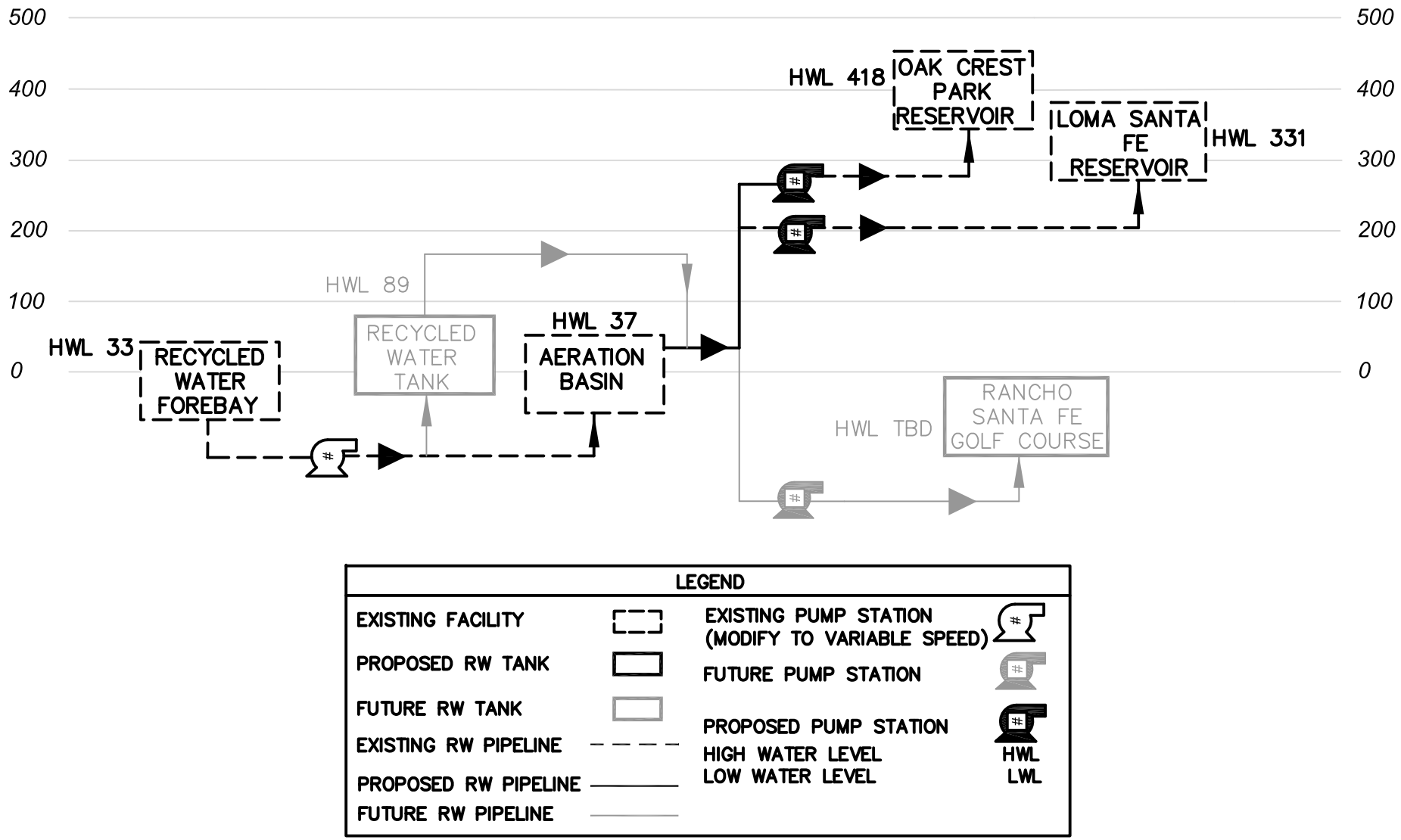
San Elijo Joint Powers Authority
Flow Equalization / Recycled Water Storage Facility

PROJECT OPTION 2: IMPLEMENTATION OPTION 2: PHASED APPROACH/UNDERUTILIZED PLANT FACILITIES

FIGURE 6.1



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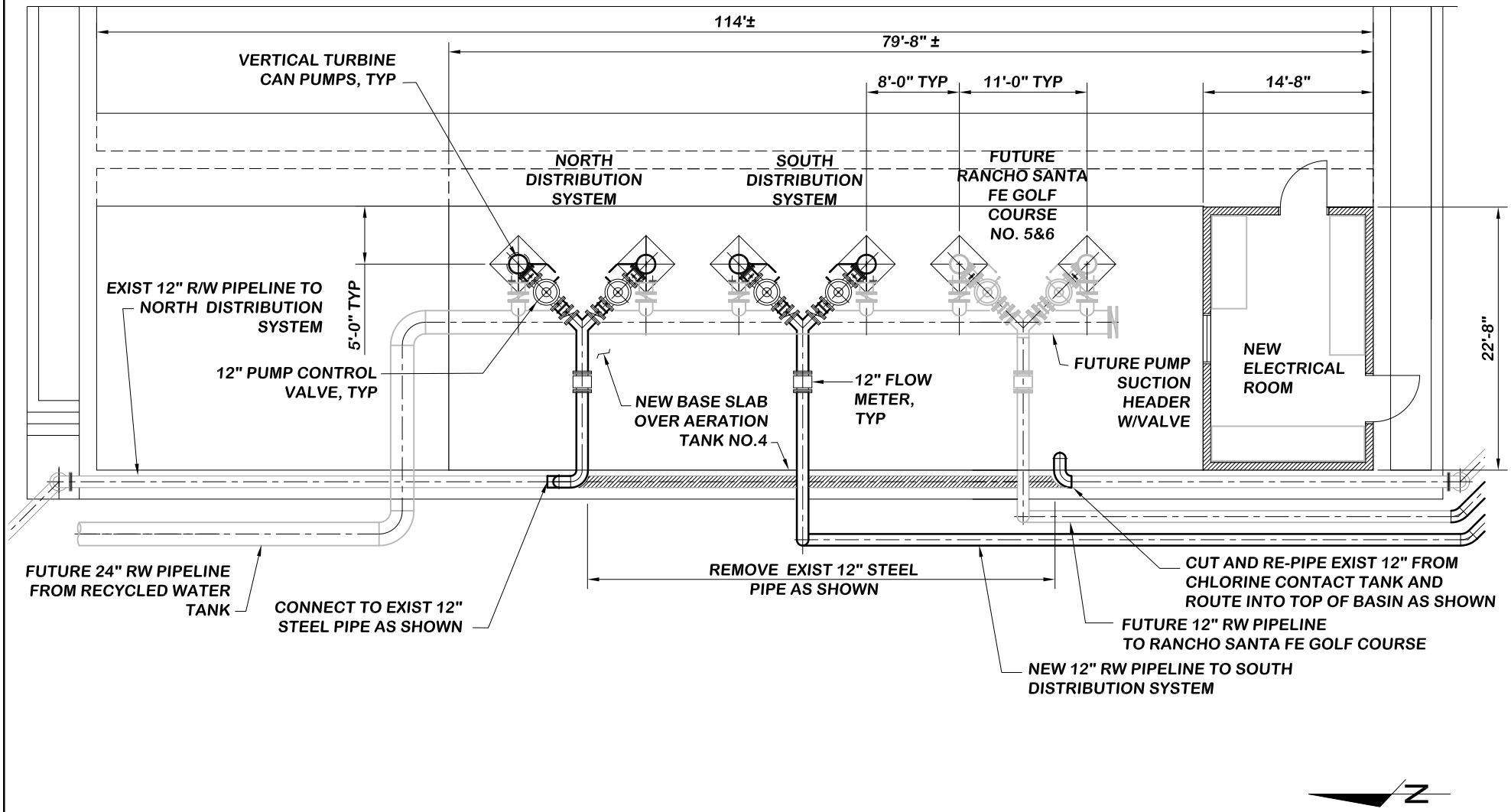
PROJECT OPTION 2: FLOW DIAGRAM

FIGURE 6.2



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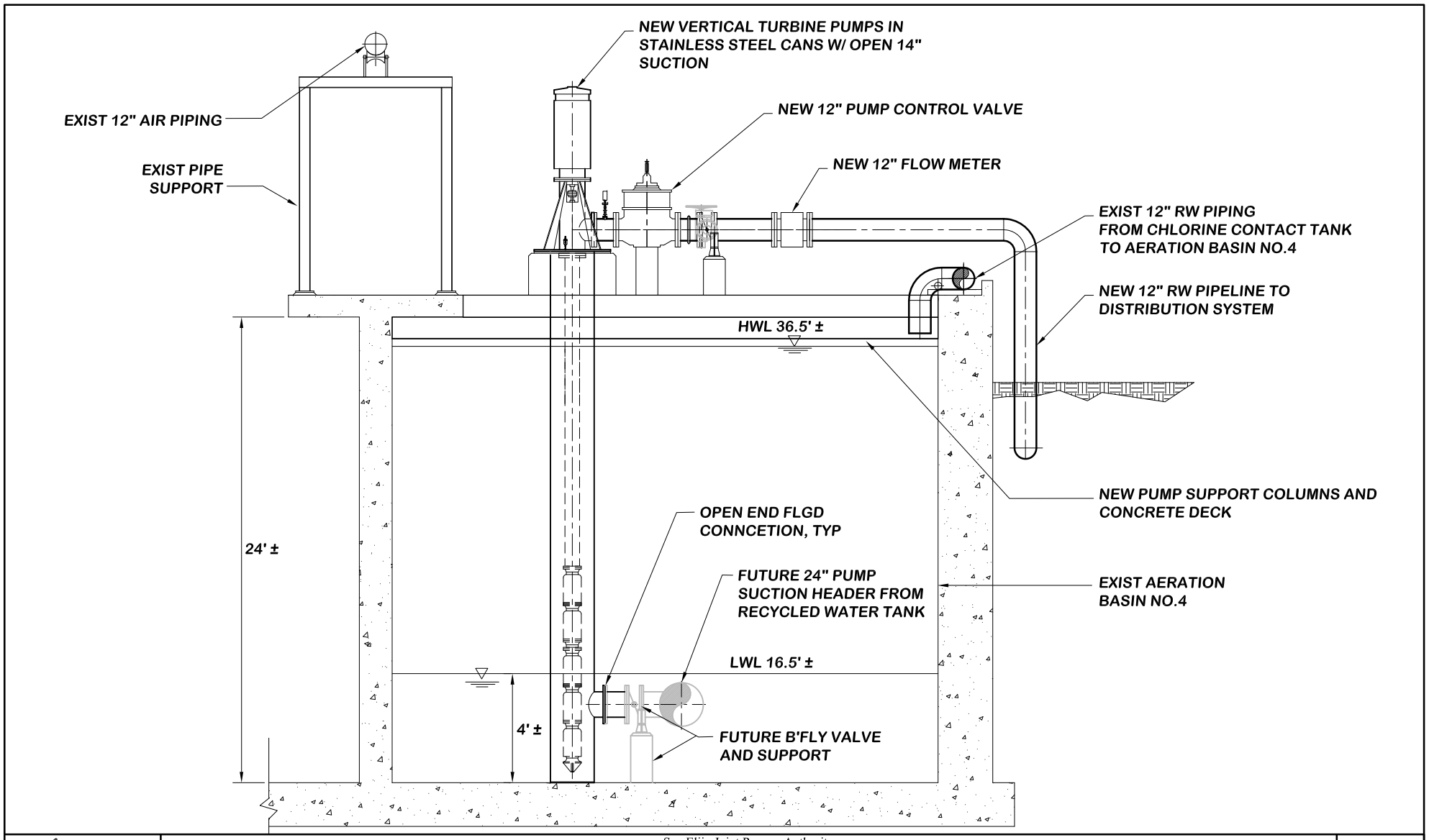
PROJECT OPTION 2: PROPOSED PUMP STATION AT EXIST AERATION BASIN NO.4

FIGURE 6.3



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PROJECT OPTION 2: PUMP IN SECTION AT EXIST AERATION BASIN NO.4

FIGURE 6.4

Flow Equalization/Recylced Water Storage Facility

TECHNICAL MEMORANDUM NO. 7

Date: October 2008 – **First Draft**
January 2009 – **Second Draft**
March 2009 – **Final**

Subject: **PROJECT IMPLEMENTATION PLAN FOR PROJECT OPTIONS NO. 1 AND NO. 2**

Prepared By: Dolores Ventura, P.E.
Reviewed By: Preston H. Lewis, P.E. / James G. Ashcraft, P.E.

PURPOSE

The purpose of this technical memorandum is to outline the next phases of the project and provide a preliminary schedule for the San Elijo Joint Powers Authority (SEJPA) Flow Equalization/Recycled Water Storage Facility Project. The scope of work described in Exhibit A can be modified depending on the option selected.

DISCUSSION

There are two different schedules outlined below that describe the next steps for both project options:

Project Option No. 1 – Construct a New On-site Recycled Water Storage Tank and Pump Station
Project Option No. 2 – Adapt Existing Underutilized Tanks to Store Recycled Water and/or Secondary Effluent and Modify the Existing Pumping Configuration

Both options will require environmental documentation in strict adherence to the California Environmental Quality Act (CEQA). A brief discussion regarding the environmental documentation that can be anticipated is included below.

PROJECT OPTION NO. 1 – CONSTRUCT A NEW ON-SITE RECYCLED WATER STORAGE TANK AND PUMP STATION

The major phases for this option include:

Description	Estimated Timeline
Phase 1 – Conceptual Design[1]	6-months
Phase 2 –Final Design	8-months
Environmental Documentation[2]	18-months (assumed MND)
Bid Award	3-months
Phase 3 – Project Construction	18-months
Total Estimated Project Duration	***45-months to 51-months***

[1]*This phase is currently being performed and will be completed with the finalization of the design report*
[2]*If an EIR is required the timeline can be revised to 24-months.*

The phases are discussed in detail in the scope of work. Environmental documentation can be performed concurrently during final design. With the exception of the stockpile area, the improvements are located within disturbed lands. Therefore, it is anticipated that Project Option No. 1 can be executed through an exemption or through a Mitigated Negative Declaration (MND). In order to ensure the project is covered in its entirety, the preparation of an Environmental Impact Report (EIR) has been included in the scope of work.

PROJECT OPTION NO. 2 – ADAPT EXISTING UNDERUTILIZED TANKS TO STORE RECYCLED WATER AND/OR SECONDARY EFFLUENT AND MODIFY THE EXISTING PUMPING CONFIGURATION

The major phases for this option include:

Description	Estimated Timeline
Phase 1 – Conceptual Design[1]	3-months
Environmental Documentation[2]	18-months (assumed negative declaration)
Phase 2 –Final Design	6-months
Bid Award	3-months
Phase 3 – Project Construction	8-months
Total Estimated Project Duration	***20-months to 38-months***

[1]*This phase is currently being performed and will be completed with the finalization of the design report*
[2]*If an EIR is required the timeline can be revised to 24-months.*

The phases are discussed in detail in the scope of work. Environmental documentation can be performed concurrently during final design. The improvements include modifications to the SEJPA's existing facilities. Therefore, it is anticipated that Project Option No. 2 can be executed through a negative declaration. However, to account for any unforeseen environmental impacts that may be brought forth by the members of this community, the scope of work includes services to prepare and process an EIR.

EXHIBIT A

Flow Equalization / Recycled Water Storage Facility

SCOPE OF WORK

CONSULTANT-FURNISHED SERVICES

Task 1 – Project Management and Administration

Consultant shall provide overall project management and administration for the duration of the project to ensure fulfillment of the scope of work within the schedule and budget.

A. Project Administration: Consultant shall prepare a detailed project schedule with tasks, durations and milestones and shall review and update the schedule monthly for the duration of the project. Consultant shall also provide progress reports to the SEJPA at each milestone.

B. Progress Meetings: Consultant shall schedule monthly progress meetings with the SEJPA and appropriate subconsultants for project coordination and plan reviews. The first thing the Consultant shall do prior to starting the project is to meet with the SEJPA and discuss the SEJPA's goals for the project, the anticipated work plan, environmental requirements, permits, and design parameters. Other progress meetings anticipated are the project kickoff, 60% design meeting, 90% design meeting, and 100% review meeting. Consultant shall prepare a meeting agenda and minutes after each meeting. Additional telephone conferences shall be scheduled on a weekly basis or more frequently if necessary to discuss the project status and project issues.

C. Presentations: Prepare and present to two (2) presentations to the SEJPA Staff, Board Members, Regulatory Agencies, or the public as required/directed by the SEJPA.

Task 2 – Data Collection & Utility Research

Consultant shall compile and review available documentation, utility plans, record drawings, reports, and survey records for the project site. It is anticipated that the information shall be obtained from agencies including but not limited to the SEJPA, SDG&E, and other agencies having utilities at or near the site. The Consultant shall prepare a base map with existing conditions to be used for design and construction of the project.

Consultant shall perform up to ten (10) utility potholes at 10-feet deep and provide a pothole plan for review and approval by the SEJPA in advance of performing the work. The Consultant shall coordinate the potholing of existing utilities per the pothole plan and shall include points of connection, existing utilities near, over, under, along, and adjacent to the new proposed work that may conflict with the construction of any portions of the Project.

Task 3 – Professional Surveying

Professional surveying services, consisting of field surveying, shall be performed to support the project design preparation and other project requirements. The survey shall be based on NAD83 State Plane Coordinate System. Horizontal and vertical control for the survey shall be consistent with established control and existing SEJPA facilities. This control shall be utilized for design of the proposed facilities and shall be the basis to establish location and elevation of the existing and proposed facilities. Easements, right-of-way, and property lines shall be mapped per record information and base mapping shall be prepared with 1-foot contour intervals, at 1"=40'.

Task 4 – Geotechnical Investigation

Consultant shall perform a geotechnical investigation of the proposed project site to evaluate subsurface conditions, over-excavation, backfill, compaction, presence of groundwater, rock removal, influence bearing capacities, expansiveness or settlement potential, and other special requirements. A geotechnical investigation report consisting of specific recommendations to support the project design, plans and specifications shall be prepared.

The evaluation shall include review of published geotechnical literature, topographic maps, geologic maps, stereoscopic aerial photographs, and available geotechnical reports, and limited subsurface explorations or surveys to evaluate soft ground conditions, expansive soils, the presence of groundwater, faulting and seismicity, liquefaction potential, rippability, caving or instability of soils during excavation, suitability of excavated materials for use as backfill, soil corrosivity, and any other geotechnical considerations that may influence the construction of the project. The report shall also provide recommendations for detailed geotechnical investigations.

The geotechnical investigation work shall consist of drilling up to four (4) exploratory borings in the project area approximately 40-feet deep.

Task 5 – Environmental Documentation

The SEJPA Staff is of the opinion that environmental work may be required and warranted for the project. Consultant shall obtain and review existing environmental information from the SEJPA Project Manager and other sources as they relate to the project. Consultant shall meet with the SEJPA and discuss the recommended approach, potential risks, benefits, deficiencies, schedule, and describe the approach prior to proceeding. Although not anticipated, for the purposes of this proposal, the Consultant shall assume an Environmental Impact Report (EIR) shall be required.

Consultant shall include the following meetings: two (2) meetings with the SEJPA's Board of Directors, two (2) meetings with the SEJPA's Staff, and two (2) community outreach meetings, two (2) meetings with the resource agencies. Consultant shall schedule meetings in conjunction with the SEJPA's Project Manager. Consultant shall develop and be prepared to give a presentation at meetings, as required. Consultant shall serve as the liaison with the resource agencies and take the lead in coordinating and scheduling meetings for the project. Following resource agency meetings, the Consultant shall prepare and distribute meeting minutes within five (5) working days.

Consultant shall prepare the necessary documentation for project approval by the SEJPA Board of Directors in conformance with the California Environmental Quality Act (CEQA) and related permitting requirements

for the project. Consultant shall include specialty studies such as cultural resources survey, visual assessment report, biological survey, and other specialty studies as required to comply with CEQA requirements.

The SEJPA shall be the Lead Agency under CEQA. Consultant shall coordinate with the SEJPA Project Manager throughout the duration of the CEQA compliance effort for the project. Consultant shall prepare the appropriate environmental document based on the CEQA requirements and as agreed to by the SEJPA's Project Manager.

Complete Specialty Studies
Consultant shall complete specific specialty studies of the proposed project area. These studies shall then be included as an appendix to the environmental document. These specialty studies shall include:

A cultural resources survey which shall incorporate a literature review and record survey, and a field survey to identify any surface indications of cultural resources on the site. This field survey shall not include significance testing of the site, or any data recovery.

A visual assessment report shall be completed for the proposed project. The visual assessment shall describe the visual character of the area as well as evaluate visual simulations of the project and alternatives and compare these with the current site conditions. The assessment shall include views from two key sites in the surrounding area. The completed visual assessment report shall be used extensively during the public outreach component of the project.

A biological survey of the project area shall be conducted to identify specific habitat types that may be impacted from the project. After the habitat mapping is conducted it shall be determined if specific sensitive species surveys need to be conducted. If it is scrub habitat then a California gnatcatcher protocol survey shall be required.

A water quality evaluation shall include: Review of available background data such as existing water quality reports, geologic maps and reports, historical aerials, and topographic maps; a one day field reconnaissance to review site, and surrounding area, conditions; evaluation of surface and groundwater quality issues at the site with respect to the Regional Water Quality Control Board Basin Plan for Region 9 and relevant city and state stormwater regulations. It should be noted that it is likely that a new Municipal Stormwater permit will be adopted by the Regional Water Quality Control Board during this project time period.

A noise and vibration study shall include a survey of the study area to identify the noise sensitive properties in the vicinity of the project site. The geometry of the site relative to the noise-sensitive properties, existing walls, structures or topography that may act as barriers to noise generated by construction a the site will be identified. The Consultant shall work with the SEJPA to develop an operational scenario for the construction activities that shall occur at the project site. Using published data for construction equipment and this operational scenario, the noise and vibration levels associated with construction activities shall be analyzed. In addition, the study shall assess the impact of the construction activities on the nearby sensitive properties relative to the County of San Diego standards. If significant impacts are identified, the study shall identify measures to reduce the noise and vibration levels below County of San Diego standards.

Consultant shall submit the following deliverables as part of this work: Cultural Resources Survey Report, Visual Assessment Report, a Biological Habitat Report, Water Quality Evaluation, Noise and Vibration Study.

Preliminary Project Description
The Consultant shall prepare a preliminary project description, which shall include the descriptions of proposed project and the current alternatives.

California Environmental Quality Act (CEQA) Compliance - Initial Study (IS)
An Initial Study (IS) shall be prepared pursuant to CEQA Statute and Guideline (15060–15065) requirements and shall (1) describe the proposed projects and related infrastructure improvements, (2) document the environmental conditions on the project site for a variety of factors, (3) determine the level of impact to onsite environmental resources, if any, (4) outline mitigation measures to reduce the level of impact to less than significant levels, if required and (5) make the CEQA mandated findings.

The Initial Study shall contain an identification of environmental effects by use of the environmental checklist. Each checked response shall be explained with factual data to document the basis for the checklist responses.

Consultant shall submit the following deliverables as part of this work: Final Project Description, Initial Study Checklist

Final Draft Initial Study
Consultant shall prepare a final Draft of the Initial Study based on comments received from the SEJPA Staff. The final Draft shall be submitted to the SEJPA Project Manager for final review. Based on the comments received from the SEJPA staff, the Consultant Team shall prepare a final Initial Study.

Consultant shall submit the following deliverables as part of this work: Fifty (50) copies of Final Initial Study

Preparation, Revision, and Distribution of Notice of Preparation (NOP)
Consultant shall prepare a draft NOP for the EIR for review by SEJPA Staff. After review and confirmation that information is correct, Consultant shall distribute up to one hundred (100) copies of the NOP, via certified mail (or equivalent), to the following: State Clearinghouse, probable local and regional responsible or trustee agencies, involved federal agencies, Community Planning Groups, and other interested parties as appropriate.

Consultant shall develop and maintain a distribution list in Microsoft Excel and provide the said list to the SEJPA upon request. Submittals made to resource agencies shall be sent via certified mailed and submittal dates shall be logged in the distribution list. The Consultant shall work with the SEJPA's Project Manager to develop and update the distribution list.

Consultant shall maintain a complete, accurate, and continuously updated computer Microsoft Word file and hard copy file of NOP mailings and responses to the NOP in order to incorporate comments into the pending draft EIR.

Consultant shall submit the following deliverables as part of this work: Draft NOP, one hundred (100) copies of final NOP to appropriate parties, responses to NOP – in Word and hard-copy format.

Preparation of Draft EIR
Consultant shall prepare a Draft EIR in conformance with the following the California Environmental Quality Act of 1970, as amended in the State CEQA Guidelines, with particular emphasis on Section 15168. Consultant shall continuously collect and assemble data, studies, reports, agreements, etc. as they become known and available and provide an assessment of the probable short-and long-term cumulative impacts associated with the project.

a. Consultant shall prepare an Executive Summary which shall summarize the content of the EIR. The summary shall contain the EIR goals and objectives, condensed project description, environmental setting, impacts and mitigation measures summary.

b. Consultant shall prepare an introduction to the EIR describing its organization, function, and uses, a description of the legal standing and authority of the SEJPA's environmental process, the function of the EIR and the availability of project for environmental review.

c. Consultant shall update and finalize the Project Description that was developed for the Initial Study. Consultant shall work closely with project designer to ensure that the Project Description is complete and shall accurately reflect the proposed project design features. In addition, the Project Description shall include information available for the project in order to comply with CEQA requirements.

d. Consultant shall prepare the Environmental Setting portion of the EIR which shall provide an overview of the local and regional environmental setting of the project that complies with CEQA Guidelines. This overview shall include the local and regional environmental setting of the water supply and delivery systems and generalized information regarding such items as natural resources and land use. This section shall also include an evaluation and conclusions of the specialty reports.

e. Consultant shall prepare an Environmental Impact Analysis and Mitigation Measures section, which shall be a comprehensive evaluation of anticipated impacts associated with the project, and the proposed alternatives, in compliance with CEQA Guidelines. It is expected that the issue areas for this project would include; Land Use, Soils/Geology, Biology, Visual, Cultural Resources, Noise/Air, and Public Services. Where it is necessary to include mitigation and/or monitoring plans or programs as a component of the any monitoring and/or mitigation program, the measure shall specify performance standards and demonstrate the SEJPA's commitment to implement the measure as it is intended.

f. Consultant shall discuss, in compliance with CEQA Guidelines, in general terms, uses of nonrenewable resources during the initial (construction) and continued (operation) phases of the project and the associated commitment of future generations to similar uses. The potential for irreversible damage from environmental accidents shall also be discussed. Evaluate the irretrievable commitment of resources to assure that current consumption is justified.

g. Consultant shall describe, in compliance with CEQA Guidelines, any significant impacts identified in the EIR, including those, which can be mitigated but not reduced to a level below significance. If any impacts cannot be avoided without imposing an alternate arrangement of facilities, the implications shall be described.

h. Consultant shall, in the Project Alternatives section, in compliance with CEQA Guidelines discuss the required No Project alternative, as well as the two additional project alternatives, identified by SEJPA personnel. Alternatives shall concentrate on defining features of the project, which could potentially avoid, reduce or alleviate adverse environmental effects of the project. Feasibility and potential impacts of such alternatives, compatibility with proposed nearby projects, cost effectiveness, possible future options, and reasons for rejecting any alternative shall be discussed. The selection of alternatives and discussion shall be developed in coordination with the SEJPA's Project Manager.

i. Consultant shall discuss, in compliance with CEQA Guidelines, potential significant cumulative effects on the project construction in combination with other past, present, and future projects causing related impacts.

j. Consultant shall discuss, in compliance with CEQA Guidelines, the possible ways the project could encourage or accommodate growth directly or indirectly for the local economy, population, and housing along with potential impacts on resources and consistency with regional and local land use planning.

k. Consultant shall prepare, consistent with CEQA Guidelines, a section listing the preparers of the EIR, references cited, agencies, organizations, and individuals consulted shall be included in the EIR.

Consultant shall submit ten (10) copies of the screencheck Draft EIR to the SEJPA's Project Manager for staff review and comment. The Consultant shall meet with the SEJPA's Project Manager and staff to receive comments on the screencheck Draft EIR and shall revise the Draft EIR incorporating the SEJPA's comments and submit ten (10) copies of the final draft of the screencheck Draft EIR for SEJPA staff review and comment.

Consultant shall submit the following deliverables as part of this work: ten (10) copies of the first screen check Draft EIR, ten (10) copies of the final draft of the screen check Draft EIR.

Draft EIR
Consultant shall incorporate staff comments and prepare the final Draft of the EIR. Consultant shall prepare a total of one hundred (100) copies of the Draft EIR, and submit one hard copy master version to the SEJPA's Project Manager.

Consultant shall submit the following deliverables as part of this work: one hundred (100) copies of the Draft EIR, one (1) hard copy, master version of the Draft EIR, one (1) electronic copy, EIR.

Prepare Notice of Completion (NOC) and Distribute Draft EIR
Consultant shall prepare, consistent with CEQA Guidelines, the NOC and the distribution list of interested persons, entities, and agencies developed in consultation with the SEJPA's Project Manager to include local and regional offices or responsible, trustee, and involved federal agencies. The Consultant shall submit for SEJPA Project Manager's review and comment, the NOC and perform any revisions requested or required. Consultant shall send ten (10) copies of the Draft EIR and final NOC to the State Clearinghouse (SCH) with a formal transmittal letter authorizing distribution to state agencies, mail up to eighty (80) copies of the Draft EIR to the addresses on the distribution list, and submit the remaining ten (10) copies of the SEJPA's Project Manager. Consultant shall prepare, consistent with CEQA Guidelines, a notice of availability suitable for publication in various local newspapers, file the notice of availability with the San Diego County clerk, and submit the notice to the identified newspapers for publication

Prepare Mitigation and Monitoring Program and Findings
Consultant shall prepare a mitigation and/or monitoring and reporting program, consistent with the requirements of CEQA Guidelines, for mitigation measures recommended in the EIR. The program shall outline any impacts identified in the EIR and mitigation for it, as well as the party responsible for monitoring and reporting, the responsible party for assuring monitoring or reporting is accomplished, and the checkpoints in project development at which monitoring and reporting must be implemented. The Mitigation and Monitoring Program shall be submitted to the SEJPA's Project Manager for review and comment.

Consultant shall use a format for the preparation of findings which strictly follow the requirements and outline of the California Public Resources Code, the California Administrative Code, and of the CEQA Guidelines. The process shall be an interactive one the SEJPA's Project Manager and must take into consideration concerns raised and addressed during the EIR public review period.

The findings shall be prepared in three sections: (1) Those environmental effects of the project which shall be mitigated by measures incorporated into the project, (2) Those impacts which are within the jurisdiction of another agency, (3) Those impacts which for social, economic, or other considerations shall make mitigation measures or project alternatives infeasible.

If significant unmitigated impacts are identified, a statement of overriding considerations shall be prepared, relying on existing SEJPA policies and standard procedures to the extent feasible. Subsequent to SEJPA staff review, revisions to the findings shall be prepared based on SEJPA staff comments.

Prepare Draft Responses to Comments on Draft EIR
Consultant shall prepare draft responses to written and oral comments received on the Draft EIR, in cooperation with the SEJPA Project Manager. This scope of work assumes that a maximum of fifteen (15) comment letters shall be received on the Draft EIR. Consultant shall submit ten (10) copies of the written and oral comments along with the draft responses to the SEJPA Project Manager for review and comment.

Final Responses to Comments on Draft EIR
Consultant shall prepare revisions to the responses to comments based upon SEJPA review and comments to the draft responses and submit the final draft comments to the SEJPA Project Manager for final review and approval. Consultant shall finalize written responses incorporating SEJPA staff comments.

Prepare Final EIR
Consultant shall produce the Final EIR including the Draft EIR with text revisions, comments and responses to comments, a list of the persons, organizations and public agencies that commented on the Draft EIR, the mitigation monitoring and reporting program, and copies of notices. Consultant shall prepare and distribute up to a total of ninety (90) copies of the EIR to agencies, organizations, and individuals who commented in writing on the Draft EIR. Submit ten (10) copies of the Final EIR to the SEJPA Project Manager. In addition, one unbound master Final EIR suitable for reproduction shall be provided to the SEJPA Project Manager.

Prepare Notice of Determination (NOD)
Consultant shall prepare the NOD and submit to the SEJPA Project Manager after adoption of the EIR by the SEJPA Board of Directors.

Consultant shall ensure that the Contract Documents incorporate the required environmental mitigation and monitoring measures as may develop as the project CEQA requirements are established.

Task 6 – Preparation of Contract Documents

Consultant shall prepare a complete set of biddable contract documents including technical plans, specifications, cost estimates, calculations, and related support materials for the project. Contract documents shall be prepared based on the SEJPA front-end documents and technical specifications shall be prepared utilizing Construction Specifications Institute (CSI) format. Progress submittals shall be provided at the 60%, 90%, and 100%, and one final set of documents as requested by the SEJPA. The Contract Documents shall address the following major elements:

A. A complete set of project plans shall be prepared to indicate construction elements, including the tanks, grading, piping, valve vault(s), pump stations, access roads, drainage facilities, utility relocations, electrical and instrumentation, corrosion protection, and structural design. Plans shall be prepared on "D" size 24"x36" sheets prepared at scales of 1"=40' (horizontal) and 1"=4' (profile).

B. A construction cost estimate shall be provided at each milestone deliverable. The cost estimate shall be based on the anticipated items of work as presented in the Contract Documents.

C. The Consultant Project Manager shall be a Civil Engineer registered in the state of California and the Engineer of Record for the project. The Project Manger shall sign and seal each original final mylar sheet of the plan set. In addition, the Project Manager shall sign and stamp the title page of the specifications to be included in the Contract Documents. Where different disciplines are represented in the drawing set, these drawings shall be signed and sealed by an Engineer registered in the State of California according to the discipline appropriate to the drawing. The Engineer of Record shall also sign and seal the design calculations for the project.

D. Once comments and questions from the SEJPA on the 90% design package have been addressed, the Consultant shall provide original signed mylars and specifications to the SEJPA for bidding purposes. The final deliverables shall also include three copies of calculations, reports, and back-up information in addition to a CD containing the contract drawings in AutoCAD format, latest edition.

E. A Quality Assurance/Quality Control (QA/QC) program shall be initiated at the onset of the project and implemented throughout the project duration.

Task 7 – Construction Contract Bidding

The Consultant shall assist the SEJPA Project Manager during the bidding period to resolve technical discrepancies and/or interpretations of the Contract Documents. The Consultant shall draft addenda for the SEJPA's review and approval to amend and/or clarify the Contract Documents.

Task 8 – Construction Phase Services

Consultant shall attend and participate in the pre-construction conference. Consultant shall answer questions and resolve discrepancies related to technical interpretation of the Contract Documents, commonly referred to as a Request for Information (RFI). Consultant shall review the Contractor's shop drawing and other submittals for design intent and general compliance with the Contract Documents. Consultant shall prepare the necessary drawings, sketches, and specifications required to make changes to the design, as approved by the SEJPA's staff, due to changed conditions encountered during construction or as a result of a RFI or clarification from the Contractor and/or material suppliers, to resolve discrepancies. Consultant shall attend and participate in construction progress meetings with the SEJPA's staff and the Contractor at the construction site and/or the SEJPA's offices at the request of the SEJPA's Project Manager.

Flow Equalization/Recylced Water Storage Facility

TECHNICAL MEMORANDUM NO. 8

Date: October 2008 – **First Draft**
January 2009 – **Second Draft**
March 2009 – **Final**

Subject: **PLANNING LEVEL PROJECT COSTS**

Prepared By: Dolores Ventura, P.E.
Reviewed By: Preston H. Lewis, P.E. / James G. Ashcraft, P.E.

PURPOSE

The purpose of this technical memorandum is to provide an overall planning level cost for the San Elijo Joint Powers Authority (SEJPA) Flow Equalization/Recycled Water Storage Facility Project.

DISCUSSION

There are two different planning level cost estimates shown below presenting both project options:

Project Option No. 1 – Construct a New On-site Recycled Water Storage Tank and Pump Station
Project Option No. 2 – Adapt Existing Underutilized Tanks to Store Recycled Water and/or Secondary Effluent and Modify the Existing Pumping Configuration

PROJECT OPTION 1 – CONSTRUCT A NEW ON-SITE RECYCLED WATER STORAGE TANK AND PUMP STATION

As described in Technical Memorandum 3, two tank sizes were evaluated to provide the JPA with a range in costs for planning purposes when considering a 3.5 MG tank versus a 5 MG tank. Table 1 and 2 summarizes our opinion of the planning level project costs for a 3.5 MG and 5 MG recycled water storage tank and pump station, respectfully. The cost presented below is for Alternative 2 as described in Technical Memorandum 3 and 4.

Table 1 – Opinion of Planning Level Costs (Project Option 1a, 3.5 MG tank)

DESCRIPTION	QTY[4]	UNITS[4]	UNIT PRICE	TOTAL	
Mobilization, Bonds, Permits, and Demobilization	3	%		$150,900	
Clearing and Grubbing	1	LS	$20,000.00	$20,000	
Tank and Mass Grading	1	LS	$3,300,000	$3,300,000	
Pump Station Modifications (Forebay)	1	LS	$40,000	$40,000	
New Pump Station (Distribution System)	1	LS	$1,000,000	$1,000,000	
Pump Station Modifications (AWT System)	1	LS	$40,000	$40,000	
Flow Control Vault	1	LS	$200,000	$200,000	
Utility Relocations	1	LS	$50,000	$50,000	
New Pipelines	1	LS	$200,000	$200,000	
Site Improvements	1	LS	$150,000	$150,000	
Storm Water Pollution Prevention Plan (SWPPP)	1	LS	$30,000	$30,000	
Subtotal				$5,180,900	
Contingency	25%			$1,295,225	
Construction Costs			**Subtotal**	**$6,476,125**	
Environmental[1]	5%-10%			$323,806	$647,613
JPA Administration[2]	5%			$323,806	
Engineering and CM[3]	10%-15%			$647,613	$971,419
			Total Range	**$7,771,350**	**$8,418,963**
			ROUNDED TOTAL	**$7,800,000**	**$8,400,000**

Table 2 – Opinion of Planning Level Costs (Project Option 1b, 5.0 MG Tank)

DESCRIPTION	QTY[4]	UNITS[4]	UNIT PRICE	TOTAL	
Mobilization, Bonds, Permits, and Demobilization	3	%		$187,800	
Clearing and Grubbing	1	LS	$50,000.00	$50,000	
Tank and Mass Grading	1	LS	$4,500,000	$4,500,000	
Pump Station Modifications (Forebay)	1	LS	$40,000	$40,000	
New Pump Station (Distribution System)	1	LS	$1,000,000	$1,000,000	
Pump Station Modifications (AWT System)	1	LS	$40,000	$40,000	
Flow Control Vault	1	LS	$200,000	$200,000	
Utility Relocations	1	LS	$50,000	$50,000	
New Pipelines	1	LS	$200,000	$200,000	
Site Improvements	1	LS	$150,000	$150,000	
Storm Water Pollution Prevention Plan (SWPPP)	1	LS	$30,000	$30,000	
Subtotal				$6,447,800	
Contingency	25%			$1,611,950	
Construction Costs			**Subtotal**	**$8,059,750**	
Environmental[1]	5%-10%			$402,988	$805,975
JPA Administration[2]	5%			$402,988	
Engineering and CM[3]	10%-15%			$805,975	$1,208,963
			Total Range	**$9,671,700**	**$10,477,675**
			ROUNDED TOTAL	**$9,700,000**	**$10,500,000**

[1] The range in environmental costs is related to the range in effort required to prepare a Mitigated Negative Declaration (MND), or an Environmental Impact Report (EIR)
[2] The range in the administration efforts is related to the SEJPA's staff availability
[3] The range in consultant/engineering services is related to the fluctuation in industry, qualification based selection, and consulting firm's availability
[4] LS=Lump Sum; QTY=Quantity

IMPLEMENTATION OPTION 2 – ADAPT EXISTING UNDERUTILIZED TANKS TO STORE RECYCLED WATER AND/OR SECONDARY EFFLUENT AND MODIFY THE EXISTING PUMPING CONFIGURATION

As described in Technical Memorandum 6, there are various components of the existing plant that are underutilized and can be modified to store recycled water and to divert Escondido effluent to the plant during peak flows. The costs that are not included in the estimate shown below are the costs to modify the pump station at the chlorine contact tank's forebay in the future when the new recycled water storage tank is constructed. Refer to Technical Memorandum 6 for the details on the modifications required.

Table 3 summarizes our opinion of the planning level project costs for Project Option 2.

Table 3 – Opinion of Planning Level Costs (Project Option 2)

DESCRIPTION	QTY[4]	UNITS[4]	UNIT PRICE	TOTAL	
Mobilization, Bonds, Permits, and Demobilization	3	%		$35,850	
Pump Station Modifications (Forebay)	1	LS	$100,000	$100,000	
New Pump Station (Distribution System)	1	LS	$1,000,000	$1,000,000	
Pump Station Modifications (AWT System)	1	LS	$40,000	$40,000	
New Pipelines	1	LS	$100,000	$100,000	
Site Improvements	1	LS	$50,000	$50,000	
Storm Water Pollution Prevention Plan (SWPPP)	1	LS	$5,000	$5,000	
Subtotal				$1,330,850	
Contingency	25%			$332,713	
Construction Costs			**Subtotal**	**$1,663,563**	
Environmental[1]	5%-10%			$83,178	$166,356
JPA Administration[2]	5%			$83,178	
Engineering and CM[3]	10%-15%			$166,356	$249,534
			Subtotal Range	**$1,996,275**	**$2,162,631**
			ROUNDED TOTAL	**$2,000,000**	**$2,200,000**

[1] The range in environmental costs is related to the range in effort required to prepare an exemption, Negative Declaration (MND), or an Environmental Impact Report (EIR)
[2] The range in the administration efforts is related to the JPA's staff availability
[3] The range in consultant/engineering services is related to the fluctuation in industry, qualification based selection, and consulting firm's availability
[4] LS=Lump Sum; QTY=Quantity