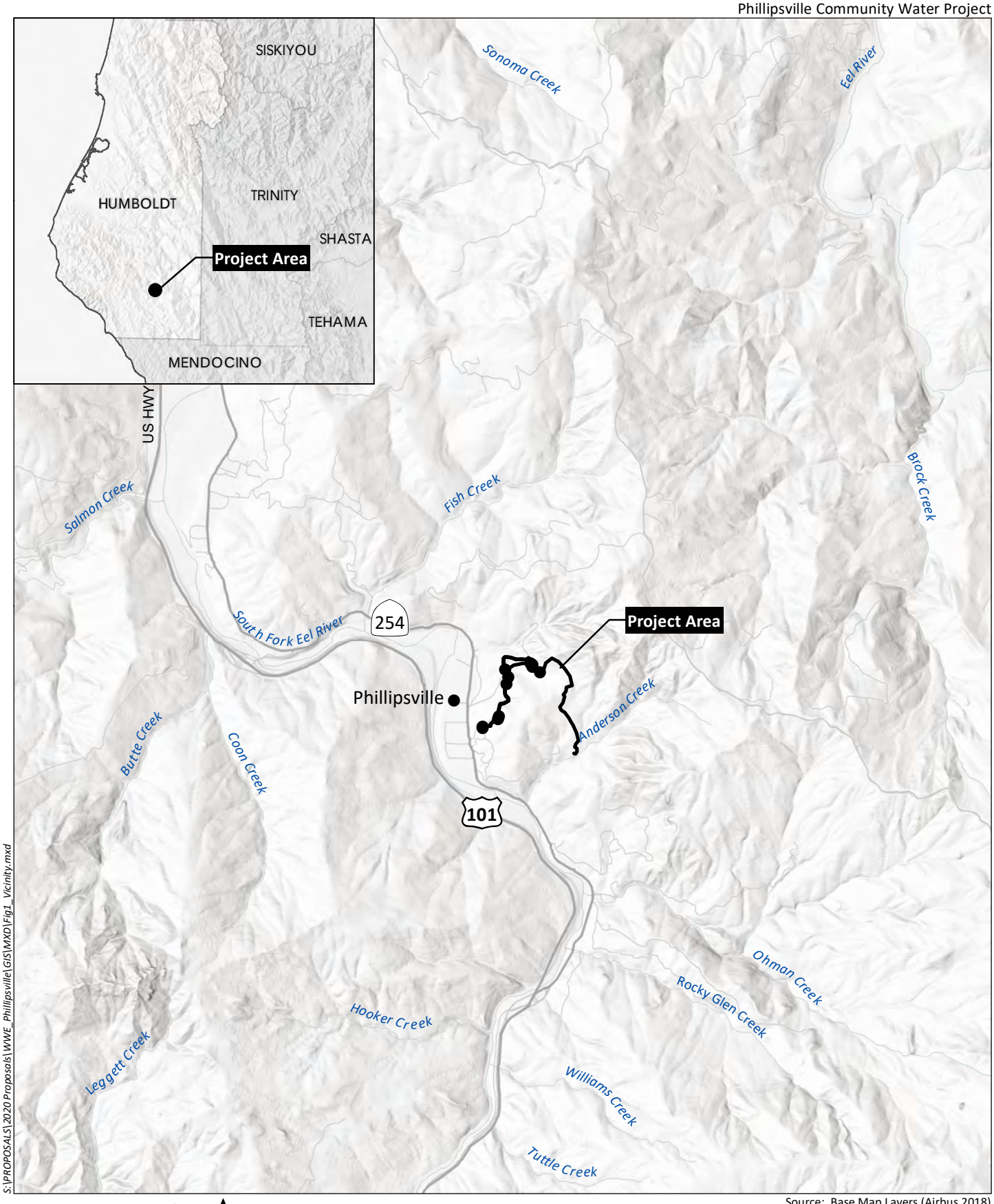
Appendix A

Figures

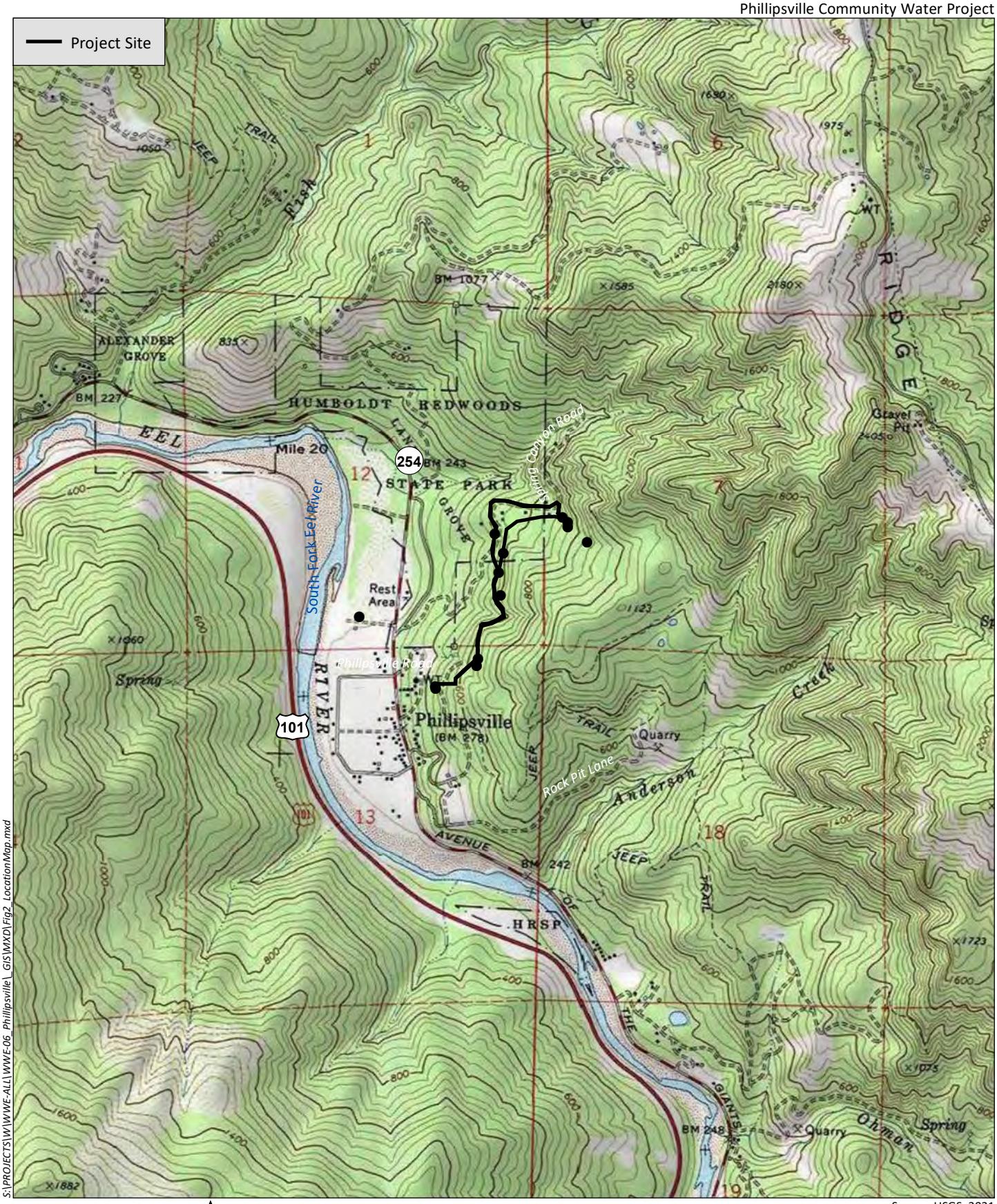


Source: Base Map Layers (Airbus 2018)

HELIX Environmental Planning

Vicinity Map

Figure 1



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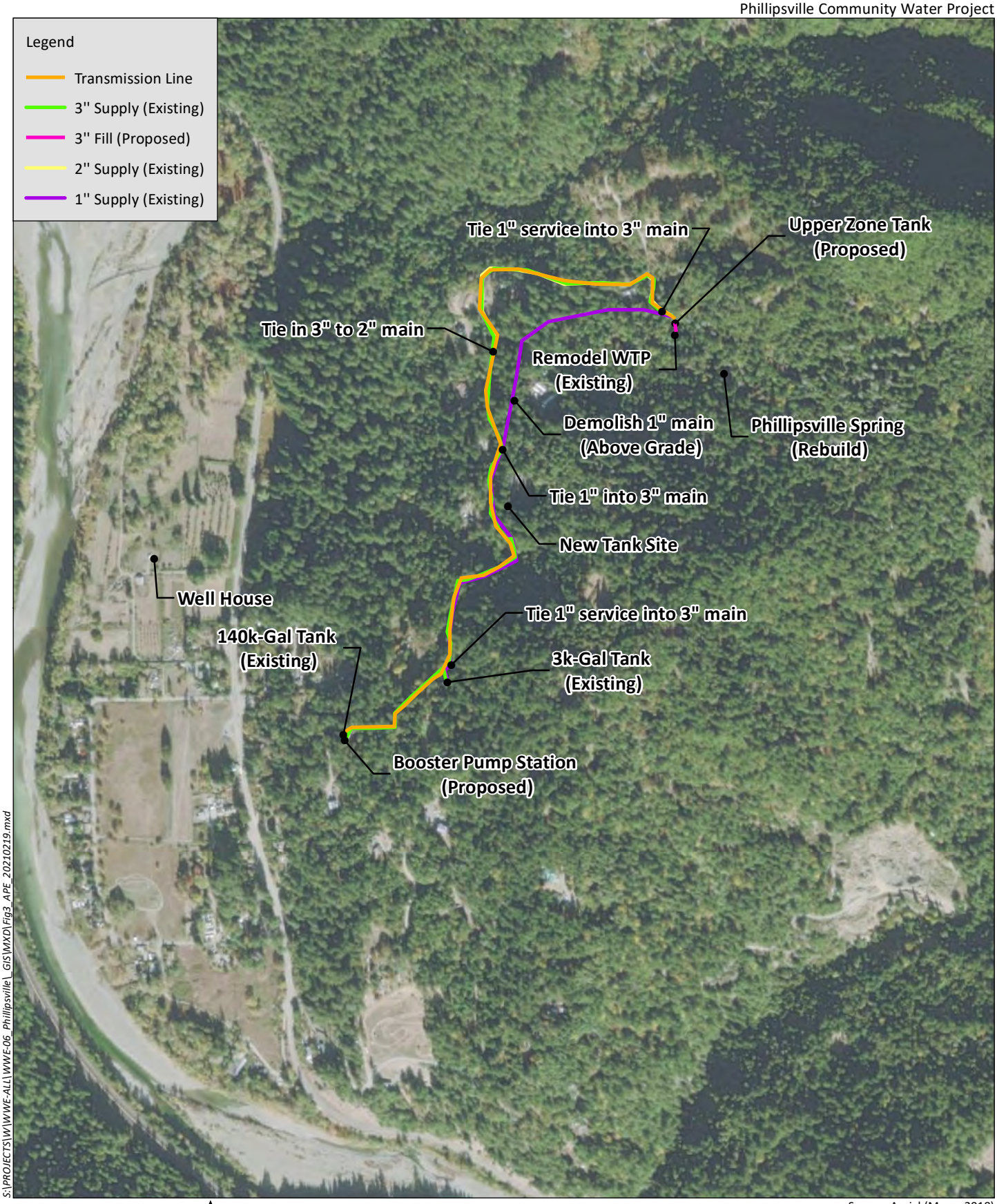
0 2,000 Feet

Source: USGS, 2021

HELIX Environmental Planning

Project Location Map

Figure 2



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0 800 Feet

Source: Aerial (Maxar 2018)

HELIX Environmental Planning

Site Plan

Figure 3

Appendix B

Preliminary Engineering Report
(Water Works Engineers 2021)

Phillipsville Community Services District
Water Quality, Supply, and Distribution Improvements
Preliminary Engineering Report

Date: February 19, 2021
Prepared by: Sheila Magladry, P.E.
Reviewed by: Tim Durbin, P.E.
Sami Kader, P.E.

WATERWORKS ENGINEERS

Phillipsville Community Services District
Water Quality, Supply and Distribution Improvements
Preliminary Engineering Report

Date: February 19, 2021
Prepared by: Sheila Magladry, P.E.
Checked by: Tim Durbin, P.E.
Sami Kader, P.E.

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1 Project Background

Phillipsville Community Services District (PCSD, the District) is located along highway 101 in southern Humboldt County in Northern California, as shown in Figure 1. The central town area contains mostly permanent resident and vacation home type customers. A USGS Quadrangle map is included as Appendix A to show the proposed project areas and overall study area. The proposed project will improve services for existing customers and will not expand the service area.

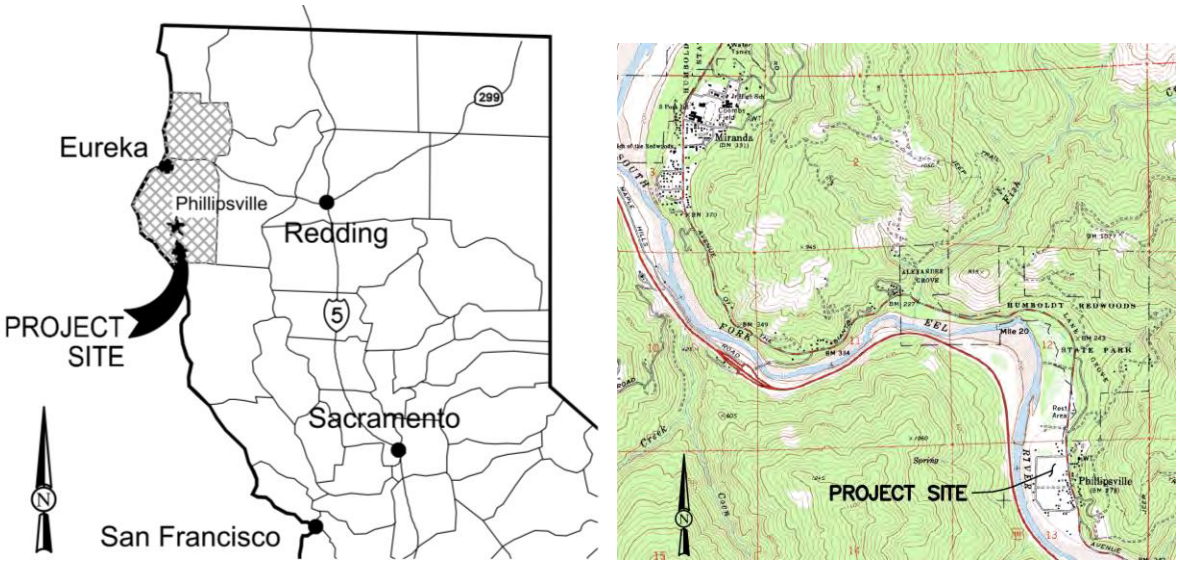


Figure 1: Project Location

PCSD was formed from the Phillipsville Mutual Water Association in 2005. The board is an independent special District that is governed by five Board of Director positions, all elected residents of Phillipsville. PCSD's operations are regulated by the State Water Resources Control Board, Division of Drinking Water (SWRCB DDW). PCSD serves approximately 140 residents through 66 service connections. PCSD has two water sources – a spring and a well – and the service area is divided into three pressure zones: upper, middle, and lower. The 12 customers in the upper zone and 5 customers in the middle zone are served by the spring source. The remaining 45 connections in the lower zone are supplied by the well source.

The original two water sources were the spring and an agricultural well. The 2009 improvements project upgraded the spring treatment and system wide storage and distribution infrastructure. The technical engineering report for the 2009 project is included as Appendix B. At the writing of this report, the 2009 project components are eleven years old. The project elements included:

- Water treatment building and treatment systems for the spring source.
- Online turbidity and chlorine analyzers at the treatment plant and a chlorine analyzer at the well house
- Three 5,000-gallon plastic upper zone storage tanks
- One 3,000-gallon plastic middle zone storage tank

- 2” HDPE pipeline to supply the upper zone customers
- 3” HDPE pipeline to supply the middle zone and lower zone storage tanks from the upper zone tank site
- 1 ½” HDPE pipeline to supply the middle zone customers from the middle zone tank
- 140,000-gallon welded steel lower zone storage tank
- 6” DIP and PVC C900 lower zone distribution main with fire hydrants

In June of 2017, the original irrigation well was replaced with a new 140-foot deep well with a 29-foot sanitary seal and a 60-gpm well pump. The well completion report is included as Appendix C. At the writing of this report, the well is 3.5 years old. The well water treatment plant (WTP) houses the flow meter and chlorine analyzer. Chlorine equipment is stored in a shed next to the well WTP.

The spring, spring water treatment plant, and upper zone storage tanks are on PCSD property. The lower zone tank, pipelines, and well are installed on public easements. The 3,000-gallon tank is located on private property.

Figure 2 shows a map of the existing service area, facilities, and approximate distribution pipeline alignments. The pipelines are color coded by size: 6” is green, 3” is red, 2” is pink, and 1.5” is blue.

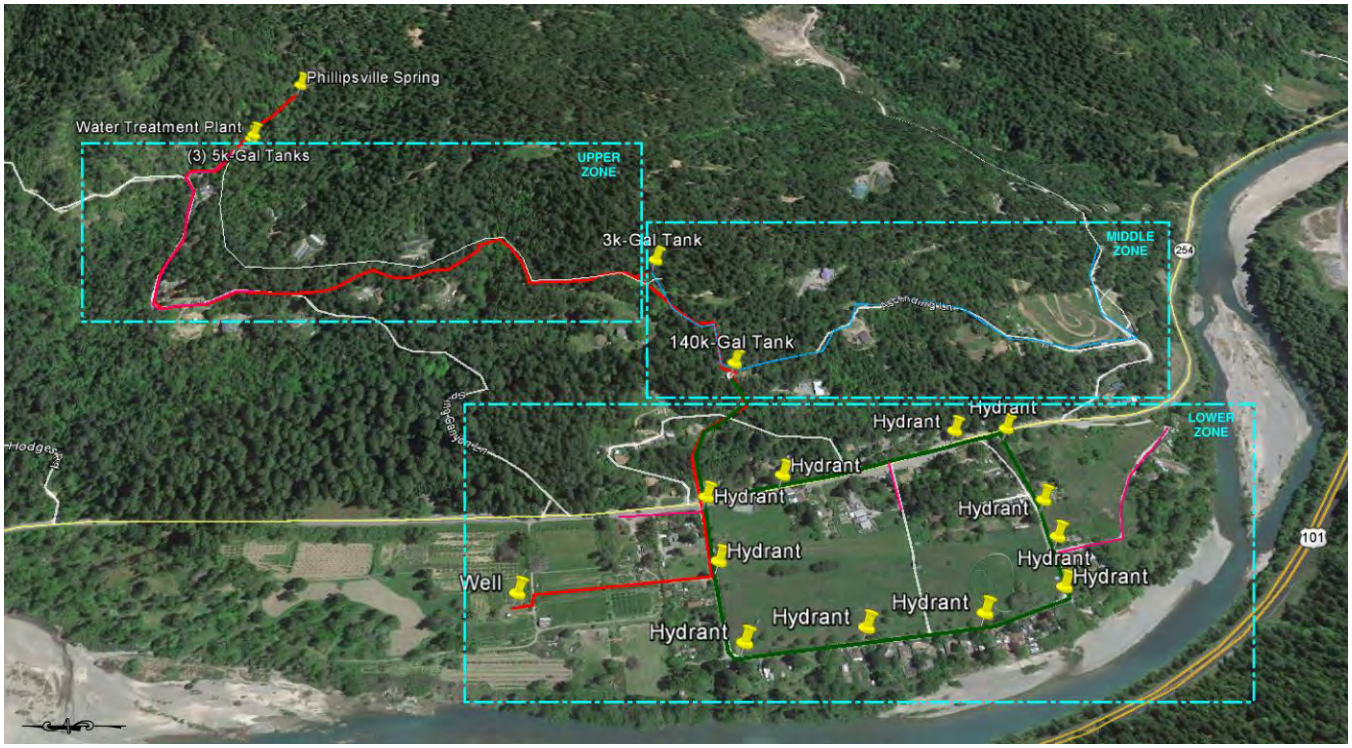


Figure 2: PCSD Facilities

1.1 Water Rates

PCSD water rates were last adopted on August 7th, 2013. The rates contain two components: fixed charges and variable charges. Fixed charges are monthly charges that remain constant and are based on PCSD’s fixed costs. Variable charges are monthly charges that vary with the customer’s water usage and are based on PCSD’s variable

costs. The variable charges are structured to consider people on fixed income and to promote water conservation. The variable rate use tiers are divided by monthly usage in units of cubic feet (cf), and use rates are charged based on a cost per 100 cubic foot. Inactive meters are charged 1/3 of the monthly base charge. Bulk water rates are $20 for every 1,000 gallons used. The fixed and variable rates are shown in Table 1. The variable rates are charged on a basis of rate per 100 cubic feet, where the usage is rounded to the nearest hundred cubic feet.

Table 1: PCSD Use Rates

Usage	2014	2015	2016	2017	2018+
Base rate	$40	$42	$44	$46	$48
0 to 500 CFT is no additional charge	$0	$0	$0	$0	$0
501 to 1000 CFT	$2.50	$2.60	$2.70	$2.81	$2.92
1001 to 1500 CFT	$3.25	$3.38	$3.52	$3.66	$3.80
1501 to 2000 CFT	$3.75	$3.90	$4.06	$4.22	$4.39
2001 to 3000 CFT	$4.25	$4.42	$4.60	$4.78	$4.97
3001 TO 5000 CFT	$4.75	$4.94	$5.14	$5.34	$5.56
5001 TO 9000 CFT	$5.25	$5.46	$5.68	$5.91	$6.14
9001 TO 999999 CFT	$6.75	$7.02	$7.30	$7.59	$7.90

1.2 Existing Geotechnical Conditions

A geotechnical report was completed in preparation for the preliminary engineering report. The geologic hazards identified during the preliminary study are landslides and possible liquefaction within the soils underlying the upper zone tank site and the entire upper and middle zone distribution system. The report recommended completing a risk assessment prior to recommending a large diameter welded steel tank installation on the upper zone tank site if such a tank was contemplated. Further monitoring of the landslide behavior at the tank site is also recommended prior to a large diameter welded steel tank installation. A copy of the report is included as Appendix D.

1.3 Current Needs

The spring source is located up a steep incline from the spring water treatment plant. The slope stability of the spring is in jeopardy of land movement as shown by recent tree fall and damages to the spring collection system. The spring source was placed under a boil water notice in February of 2018 (Appendix E) for inadequate filtration and not meeting chlorine contact time requirements. The source has been classified as groundwater under direct influence of surface water (GWUDI). The upper zone customers have no secondary source of water.

The spring source can be tied into the lower zone storage; however, the intertie is currently valved off to prevent the lower zone customers from being placed on the boil water notice. If the upper and middle zone storage tanks reach capacity, treated water from the upper zone tanks overflows at the upper zone tank site.

Four customers in the upper zone are served by above grade small diameter high density polyethylene (HDPE) piping. This exposed piping is subject to damage. Leaks resulting from damage in the wooded area where the exposed pipeline is located are very difficult to inspect. Customers in the upper and lower zones have issues with inadequate flows and pressure.

Multiple customers in the upper and middle zones have private storage tanks. Unregulated tank fill schedules negatively impact the storage volume allowance for other customers. A backflow prevention method is required at the fill line for each tank; an air gap is an acceptable method of backflow prevention. The district should confirm each customer with a private storage tank has the required backflow prevention prior to completion of the project.

PCSD does not have any fire suppression infrastructure to serve the upper and middle zones. The small diameter pipelines that serve this area cannot provide adequate fire flows.

The well pump capacity has slowly reduced from 60 gpm to 35 gpm since the well installation in 2017. PCSD has verified the issue is not an electrical problem. The reduced capacity has increased the operating time and cost of the well source.

PCSD maintains a pad-mounted propane generator at the well water treatment plant. The generator requires an operator to manually switch to generator power during a power outage. There is no standby power at the spring water treatment plant (WTP).

1.3.1 Project Objectives

The project will address the issues presented above. The main goals of this project are to:

1. Restore the spring to protect it from surface water influence
2. Stabilize the hillside around the spring to prevent treefall onto spring
3. Upgrade the spring WTP to meet treatment criteria for GWUDI
4. Provide adequate storage capacity for the system as a whole and in each pressure zone
5. Plan for fire flow protection for the upgradient residences
6. Assess existing distribution piping infrastructure and recommend piping improvements
7. Assess distribution hydraulics and recommend system operational changes to remedy hydraulic issues
8. Investigate the well pump issue and recommend a solution
9. Provide adequate water supply sources for dry summer months when spring flow is reduced
10. Upgrade all facilities with electrical requirements with transfer switches to standby power.

2 Overall System Description

PCSD is comprised of three distinct pressure zones: the upper, middle, and lower zones. The upper and middle zones are served by the spring source while the lower zone is served by the well source. The spring source system includes the spring, the spring WTP, three 5,000-gallon storage tanks for the upper zone, and one 3,000-gallon storage tank for the middle zone. The upper and middle zone customers are fed by gravity from the storage tanks.

The lower zone system includes the well and the lower zone tank. The well pumps to the 140,000-gallon tank, which serves the lower zone by gravity. The 2009 Improvement Project design drawings show the well pump discharge can be valved to pump to the 3,000-gallon tank, but the system has never been operated in this way.

A schematic of the entire PCSD system is shown in Figure 3. The following sections describe the facilities in detail.

FEET

KEY

- ELEVATION SCALE BREAK
- TANK NAME AND SIZE
- TRANSMISSION PIPING AND FLOW DIRECTION
- FLOAT VALVE
- PRESSURE REGULATING VALVE
- PRESSURE ZONE BREAK

900
850
775
750
725
700
685
660
550
525
500
475
250
225
200
100

SPRING BOX
ELEVATION: 905
2" HDPE
OVERFLOW ELEVATION: 900
2" HDPE
WYE-STRAINERS (INTERNAL STRAINERS REMOVED)
SPRING WTP
ELEVATION: 755
TANK A 5,000-GAL
TANK B 5,000-GAL
TANK C 5,000-GAL
3" PVC
3" PVC
2" PVC
MAX ELEVATION: 750
FLOOR ELEVATION: 740
2" PVC
3" HDPE
1" HDPE
1" HDPE
2" HDPE
1" HDPE
TO 1 CUSTOMER
ELV 680
UPPER ZONE
2" HDPE
1" HDPE
1" HDPE
3" HDPE
1" HDPE
3,000-GAL TANK
3" PVC
1" HDPE
TO 7 UPPER ZONE CUSTOMERS
ELV 660
MAX ELEVATION: 670
FLOOR ELEVATION: 660
3" PVC
1" HDPE
TO 3 CUSTOMERS
ELV 650
1.5" HDPE
3" HDPE
TO ONE CUSTOMER
ELV 530
TO 5 MIDDLE ZONE CUSTOMERS
ELV 660
MIDDLE ZONE
140,000-GAL TANK
MAX ELEVATION: 488.4
FLOOR ELEVATION: 470.0
2" HDPE
6" HDPE
3" DIP
PRV VAULT ELV 270
6" HDPE
TO 40 CUSTOMERS
ELV 270
LOWER ZONE
ELV 465
ELV 300
ELV 236
WELL WTP
2" HDPE
FG ELEVATION: 240
WELL
CONTROL PANEL
STARTS WELL PUMP BASED ON LOW LEVEL SET POINT
STOPS PUMP BASED ON HIGH LEVEL SET POINT
SCREEN BOTTOM ELEVATION: 100

DATE FEBRUARY 2021 PROJECT NUMBER 20-063 FIGURE NUMBER 3	SYSTEM SCHEMATIC	Phillipsville Community Services District Water Quality, Supply and Distribution Improvements Preliminary Engineering Report	WATERWORKS ENGINEERS 760 CYPRESS AVE SUITE #201 - REDDING, CA - 96001

2.1 Upper and Middle Zones Supply and Storage

2.1.1 Spring Source

The spring is located uphill from the spring WTP at an elevation of approximately 900 feet above sea level. The spring collection system is a perforated 6" C900 PVC collection pipe buried in rock installed below a depressed portion of the hillside. The spring water is collected by the perforated pipe and transported to the WTP by above grade 2" HDPE piping that runs along the forest floor. Close to the downhill end of the 2" pipeline are two wye-strainer housings, but the strainers have been removed.

The construction drawings for the spring site from the 2009 Improvements Project in Appendix F show a geomembrane cover on the spring collection area. The existence of this liner was not confirmed during the site visit.

After the 2009 Improvements Project, a second 6" collection pipe was added above the original 6" collection pipe to improve the water collection from the spring. The two C900 PVC collection pipes join at an overflow tee and then transition down to 2" HDPE pipe. The spring effluent piping where the 6" combined piping transitions to the 2" HDPE piping is shown in Figure 4. The spring area is just beyond the ferns in the photograph.

Figure 4: Spring Discharge Piping

Typical access to the spring is by walking up a slippery and steep footpath just beyond the WTP. The area is very precarious to access by foot. The path is so steep, climbers must hold onto a rope for balance. The operators must climb up this path, stepping over fallen trees, to reach the raw water sample location.

A tank is located along the 2" HDPE pipeline between the spring and the spring WTP. The tank is shown in Figure 5. The tank was installed to settle out small rocks and gravels entrained into the spring source water by the spring collection area materials. The tank bypasses spring flows when the hydraulic grade line reaches the tank overflow elevation. According to Google Earth elevations, the tank is located at approximately the same elevation as the

spring, so it is unclear if the overflow elevation of the tank prevents over-pressurization of the filters at the spring WTP.

Figure 5: Spring Overflow Tank

2.1.2 Spring Water Treatment Plant

The influent piping enters the spring WTP through haphazard PVC piping on the rear side of the WTP building (Figure 6). There are no pipe supports, and the connections are held together with duct tape. This piping arrangement was installed after the 2009 improvements project to bypass the pressure reducing valve (PRV) located in the valve box in Figure 6. The 2009 construction drawings show the PRV was designed to reduce pressure into the filters and bypass excess flows to Tank C.

Figure 6: WTP Influent Plumbing and Bypassed PRV

The treatment train consists of two parallel trains of California approved alternative filtration technology Strainrite bag filters; each train has a pre-filter and a polishing filter (see Figure 7). The approval letter for the filters is included in Appendix G. Due to turbidity loads from the spring, the pre-filter cartridge requires replacement once every three weeks. The polishing filter requires less frequent replacement, about once every 6 weeks. Flow meters

located on the filter effluent pipeline are not reliable and are not used for flow measurement. Instead, flow is metered on each of the discharge lines leaving the storage site.

Two continuous chlorine analyzers and two continuous turbidimeters are located on the wall of the WTP. The equipment is offline because it is not functional. Chlorine concentrations, turbidity, pH, and temperature measurements are all taken manually.

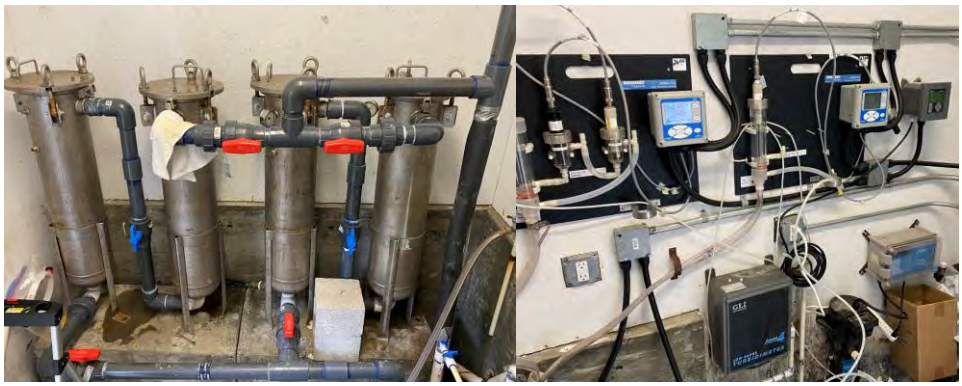


Figure 7: Cartridge Filters and Analytical Equipment

The chlorine source is sodium hypochlorite. The chlorine solution tank is stored in the spring WTP building. There is no secondary containment for the solution tank. The feed pump is a peristaltic pump, shown in Figure 8.

The control panel mounted on the wall in Figure 8 contains a flow totalizer and control modes for the bypassed PRV. This panel is not used.

Figure 8: Chlorine Feed Pump and Tesco Panel

2.1.3 Chlorine Contact and Storage Tanks

The upper zone storage is provided by three 5,000-gallon plastic storage tanks named Tanks A, B, and C. The middle zone is supplied by a 3,000-gallon plastic storage tank. The tanks are all plastic agricultural water storage tanks, and therefore the material may not be NSF 61 certified for potable water use. The tanks are not installed on concrete pads and are not anchored, and there are no seismic restraints on the tanks.

2.1.3.1 Tanks A, B, and C

Tanks A, B, and C are located adjacent to the WTP building. The tanks are supplied by the spring WTP finished water pipeline. Tanks A and B were designed to operate in series, with the overflow from Tank A supplying Tank B, to provide adequate contact time for disinfection. Tank C was designed to be supplied from the overflow from Tank B. The 3,000-gallon tank connection was designed to be supplied from Tank C overflow. A diagram of the intended tank operation is shown in Figure 9.

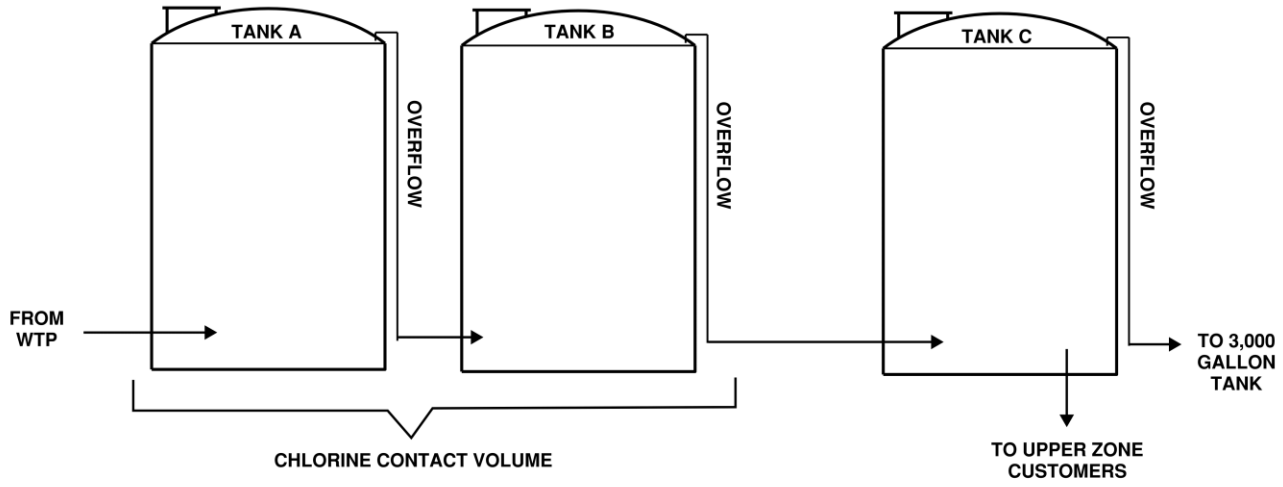


Figure 9: Upper Zone Tank Designed Operation for Chlorine Contact Volume

In response to system needs for storage serving the upper zone, the site plumbing has been modified to eliminate the overflow tank connections; instead, the tanks are operated in parallel to maximize storage. The current piping arrangement for the tank site is shown in Figure 10.

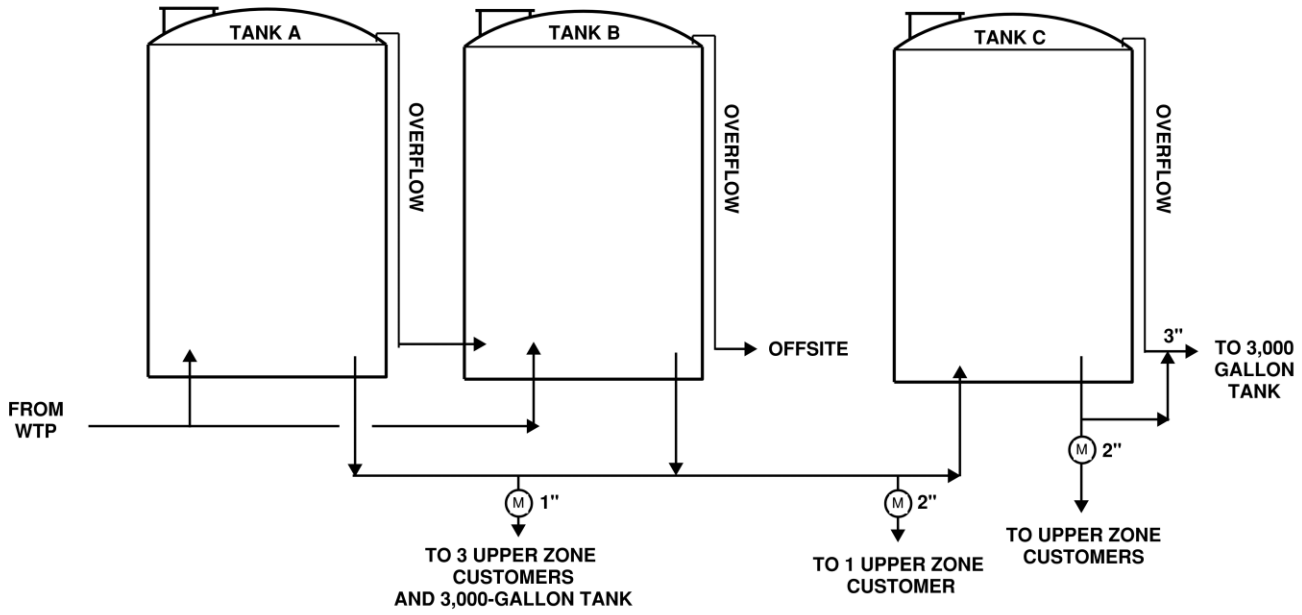


Figure 10: Current Upper Zone Tank Operation for Storage

Tanks A and B are operated in parallel, not in series. The tank draw lines exit from the bottom of the tanks and connect to a common header that supplies Tank C. Because the overflow connection arrangement between Tank A and B is bypassed, the disinfection volume required for GWUDI post-filtration disinfection is not maintained at the spring WTP. Two distribution lines are connected to Tank C's fill line. Tank C supplies the 2" distribution main and the 3" dedicated 3,000-gallon tank fill line. Flow is metered on the 1" , 2" and 3" HDPE lines existing the site. Overflow from Tank B is discharged just offsite down a hillside. There is no dechlorination of the overflow. Figure 11 shows the plumbing of Tank C. Each tank in the upper and middle zones have similar installation and plumbing arrangements.

Figure 11: Tank C Plumbing

2.1.3.2 3,000 Gallon Tank

The 3,000-gallon tank serves 5 customers in the middle zone. The customer connections in the middle zone have a tendency for leaks due to aging plumbing infrastructure. Because the 3,000-gallon tank connection is supplied from the bottom of Tank C, excessive water use in the middle zone drains the upper zone tanks. To prevent this, the ball valve on the 3,000-gallon tank fill line is partially closed. A float valve on the influent line to the 3,000-gallon tank closes when the tank is full.

2.2 Lower Zone Source and Supply

2.2.1 Well and Well Water Treatment Plant

The original well source for PCSD was a 50-foot deep agricultural well. A 140-foot deep well with a 29-foot sanitary seal was drilled in 2017 to replace the agricultural well. The well completion report is included as Appendix C. The well water treatment plant (WTP) and the chlorine storage shed are shown in Figure 12. The well WTP serves as a storage room and contains the well pump discharge flow meter, raw water sample point, and the chlorine injection point. There is a chlorine analyzer in the building, but it is broken and is offline. The district chlorinates the well source for precautionary reasons as recommended by the SWRCB DDW.

Figure 12: Wellhead, Well WTP and Chlorine Storage Shed

The discharge piping and instrumentation sit on the floor of the well house, see Figure 13. A high-water alarm will lock out the well pump if water is measured at the floor of the well water treatment plant. Raw water samples are taken from the hose connected to the discharge line. The flow meter on the far right in Figure 13 has a flow totalizer. Daily flow totals are recorded manually from the totalizer. The blue flow meter is non-operational. The white chlorine injection piping can be seen on the left section of piping.

Figure 13: Well Discharge Plumbing

The shed adjacent to the well house contains the sodium hypochlorite storage drums in 55-gallon capacities, the chlorine solution tank, and the injection pump for the well discharge chlorination. There is no secondary containment for the chlorine storage. The District prefers to use a Stenner brand peristaltic pump for chlorine

injection, as previous experience with diaphragm injection pumps was poor. The chlorine equipment is shown in Figure 14.

Figure 14: Chlorine Injection Equipment

2.2.2 140,000 Gallon Tank

The 140,000-gallon welded steel tank was constructed in 2009 as part of the improvements project. The tank is located on a public easement on private property. The tank is supplied by the well pump and serves the lower zone customers. High and low-level floats in the tank control the well pump. The tank is shown in Figure 15.

Figure 15: 140,000-Gallon Tank and PRV Vault

The lower zone PRV vault is shown in Figure 15, also. Two PRVs are located on the 6" distribution piping to the lower zone; a 2" valve is sized for low flow and a 6" valve is sized for high flow. The 6" valve is out of service and is valved off. This prevents adequate flow into the lower zone for fire suppression and high flow demands. The inlet and outlet pressure gauges show 80 psi and 60 psi, respectively. The 2" PRV is serving to reduce pressure into the lower zone by 20 psi.

2.3 Regulatory Requirements

Chapter 17 of the California Code of Regulations, Title 22 is the Surface Water Treatment Requirements (SWTR) which establishes general requirements for treatment techniques in lieu of maximum contaminant levels for turbidity and the following microbial contaminants: Giardia lamblia (cysts), viruses, heterotrophic plate count bacteria, and Legionella. Each supplier using an approved surface water source shall provide multibarrier treatment necessary to reliably protect users from the adverse health effects of microbiological contaminants and to comply with the requirements and performance standards prescribed. The SWTR requirements are as follows:

A total of 99.9 percent (3-log) reduction of Giardia lamblia cysts through filtration and disinfection

A total of 99.99 percent (4-log) reduction of viruses through filtration and disinfection

2.3.1 Spring Source Regulatory Requirements

The spring source has been classified as GWUDI. The SWTR applies to all public water systems which utilize a surface water source or GWUDI. To comply with the SWTR, the treatment facilities at the spring WTP must meet the SWTR through a combination of filtration and disinfection.

2.3.2 Well Regulatory Requirements

California Well Standards define the requirements for community wells. In particular, the minimum required sanitary seal for a community/public water system well is 50-feet. In the case of PCSD, the sanitary seal is 29-feet. DDW made a special acceptance for the depth of the sanitary seal of the existing well because of the unlikelihood of possible contaminating activities (PCAs) in the vicinity of the well.

The District maintains chlorination of the well source water for precautionary reasons only.

2.4 System Flows

The total annual demand for the system is the sum of the annual demand of the spring source and the well source. The monthly and peak day variance of average daily demand (ADD) rates is required to properly size the treatment system at the spring WTP. Since limited data is available from the spring source site, the well data was interpolated to estimate the monthly ADD of the spring source. This, combined with peaking data from the nearby community of Redway, was used to estimate monthly average demand and peak demand for the system.

2.4.1 Well Production

The well pump discharge is metered, and readings are recorded daily. Well meter records were provided for September 2018 to September 2020. The average annual production from the well for this time period, the number of connections the well source serves, and the average daily demand per connection are shown in Table 2. The well source ADD curve is shown in Figure 16.

Table 2: Well Production

Total Metered Flow	4,770,000	gal/yr
Customers Served	55	connections
Average Daily Demand	238	gpd/conn

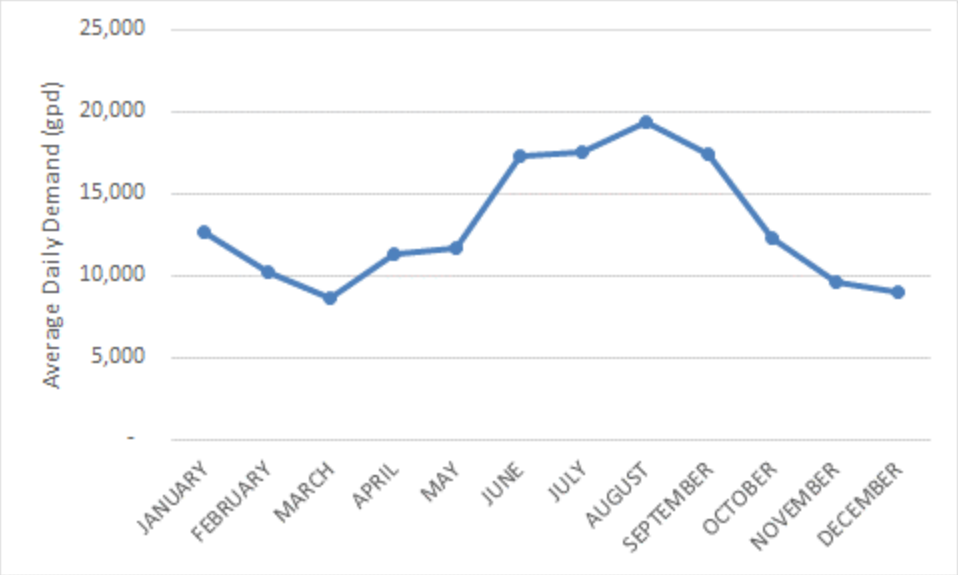


Figure 16: Well Source Average Daily Demand

2.4.2 Spring Production

Total spring production is not metered. The treated flow from the WTP is metered; however, the meter is unreliable and has not been calibrated so the readings from that meter were not used to determine spring production. The three effluent lines leaving the upper zone tank site are metered. These meter recordings were used to determine the upper and middle zone demand. The total recorded spring source demand from October 2019 to October 2020, the number of connections the spring source serves and the average daily demand per connection are shown in Table 3.

Table 3: Spring Production

Total Metered Flow	2,545,000	gal/yr
Customers Served	17	connections
Upper Zone	12	connections
Middle Zone	5	connections
Average Daily Demand	410	gpd/conn

The total combined production for the spring and well sources from October 2019 to October 2020 was 7.3 million gallons.

2.4.3 Monthly Average and Peak Day Demand

The monthly average and peak day demand rates per connection were calculated for the spring and well source connections separately. Daily demand data was not available for peak day use determination for the spring source, so flow data from Redway, a nearby community with a similar customer base and service area, was used to determine a peaking factor for ADD to peak day demand. The report referenced for this data is the *Redway Community Services District Water Use Evaluation for Residential and Commercial Customers,* by Water Works

Engineers, December 2015. The average and peak day and peaking factor information for Redway single family residential (SFR) use rates are shown in Table 4.

Table 4: Redway SFR Use Rates

Average Annual Demand	200	gpd
Peak Day Demand	700	gpd
Peaking Factor	3.5	

The peak day demand for the spring source was calculated using the 3.5 peaking factor from Redway, and the result is shown in Table 5.

Table 5: Spring Source Peak Demand

Average Daily Demand	410	gpd/conn
Redway Peaking Factor	3.5	
Peak Day Demand	1,436	gpd/conn
Connections Served	17	conn
Peak Day Consumption	24,404	gpd

The estimated curve for the spring source monthly ADD was created using the relative percentage of monthly ADD to annual ADD from the well curve. Then the monthly ADD for the spring and well sources were added to determine the monthly ADD for the system in Figure 17.

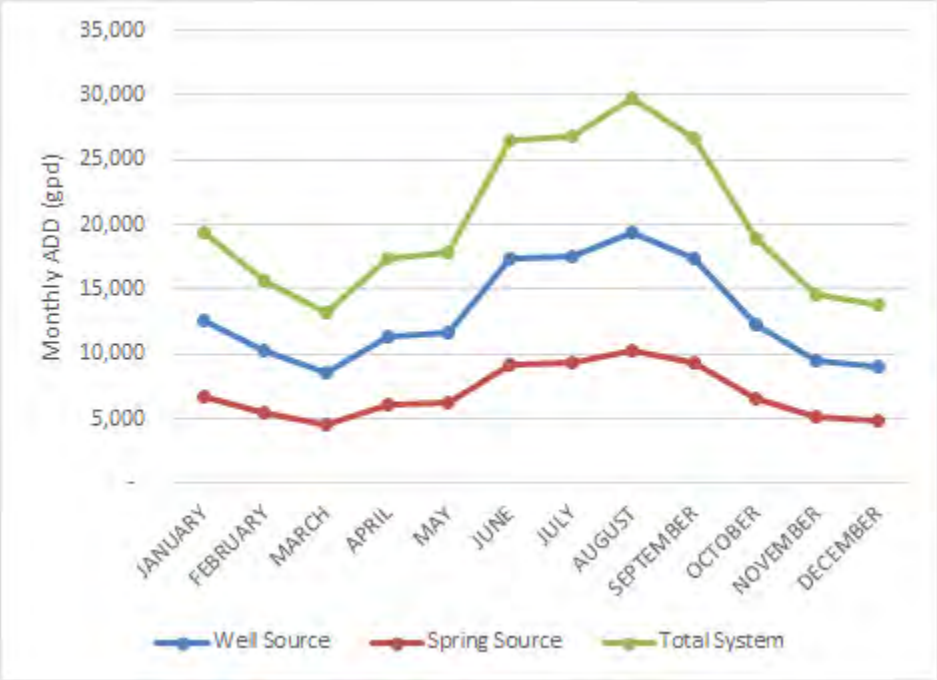


Figure 17: Monthly ADD

The annual ADD to peak day peaking factor of 3.5 from the Redway Report was applied to the peak month (August) to determine the monthly to peak day peaking factor of 2.4. The 2.4 peaking factor was applied to the combined monthly ADD curve to create a monthly peak demand curve for the system. This curve was compared to the well production capacity of 60 gpm and the estimated spring capacity in Figure 18. The spring source flow rates reportedly vary from 35 gpm in the wet weather months to 5 gpm in the dry weather months. However, a peak spring capacity of 45 gpm is shown in the graph because it is assumed the spring has a greater capacity that what is recorded at the spring WTP.

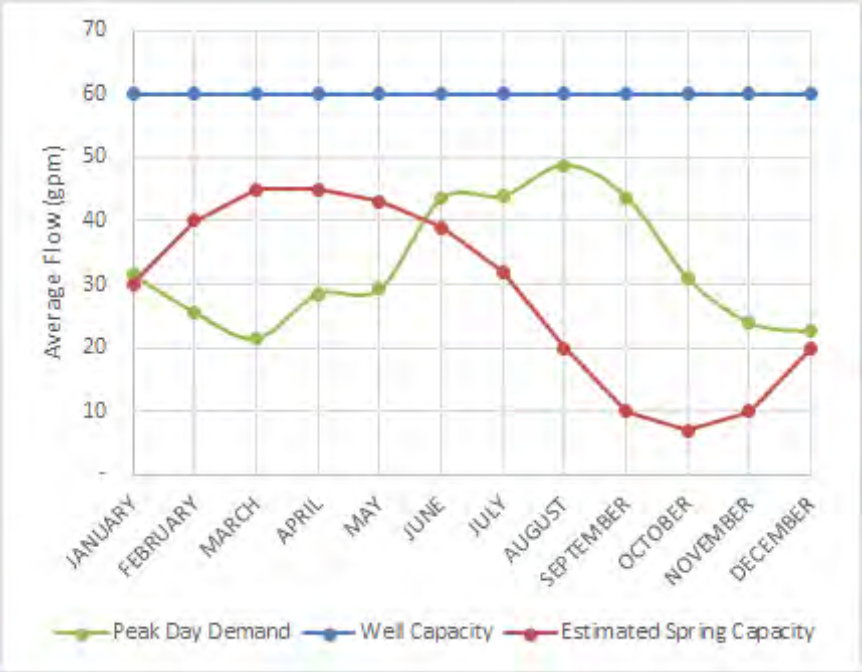


Figure 18: System Peak Day Demand and Source Capacities

From December to June, the spring has adequate flow to supply the entire system demand. From July to November the spring capacity is inadequate to serve the whole system. It is expected during the June to November time frame the well will be used to supplement the spring supply. The extent of the well use will be dependent on the specific demands and spring capacity during the low spring flow months. The spring capacity curve and the peak day demand curve intersect at 40 gpm, therefore the design flow rate of the spring WTP will be 40 gpm.

2.4.4 Water Quality

Spring and well treatment records are available for August 2018 to September 2020. Records were compiled and analyzed for trends in effluent turbidity for the spring source and coliform and E. Coli counts for both the spring and the well source.

2.4.4.1 Spring Source

The spring source water is monitored for finished water turbidity, total coliform, and E. coli. Finished water turbidity is measured daily from a grab sample taken downstream of the filters in the water treatment plant. Total coliform and E. Coli samples are taken from the spring raw water on a biweekly basis. Raw spring water samples

are collected upstream of the overflow tank. Absent or present tests for total coliform and E. Coli are performed monthly on finished water. Finished water samples are taken from a hydrant located on the end of the upper zone distribution main. The sample locations are identified in Figure 19.

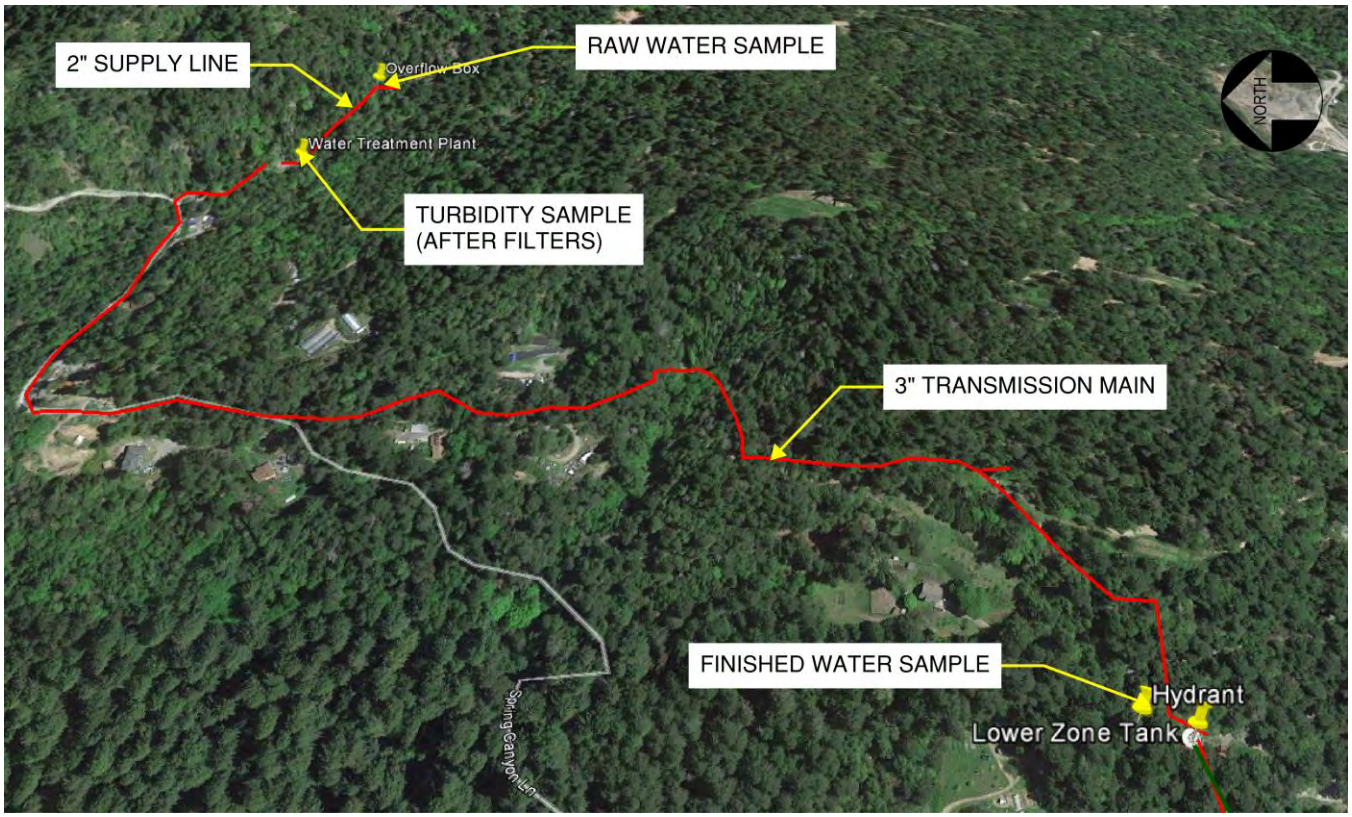


Figure 19: Spring Source Sample Locations

The turbidity data from 2018 to 2020 are graphed in Figure 20. Typically, effluent turbidity is less than 0.1 NTU. The regulatory limit for turbidity is 1 NTU. The samples have not exceeded the regulatory limit in the last 3 years.

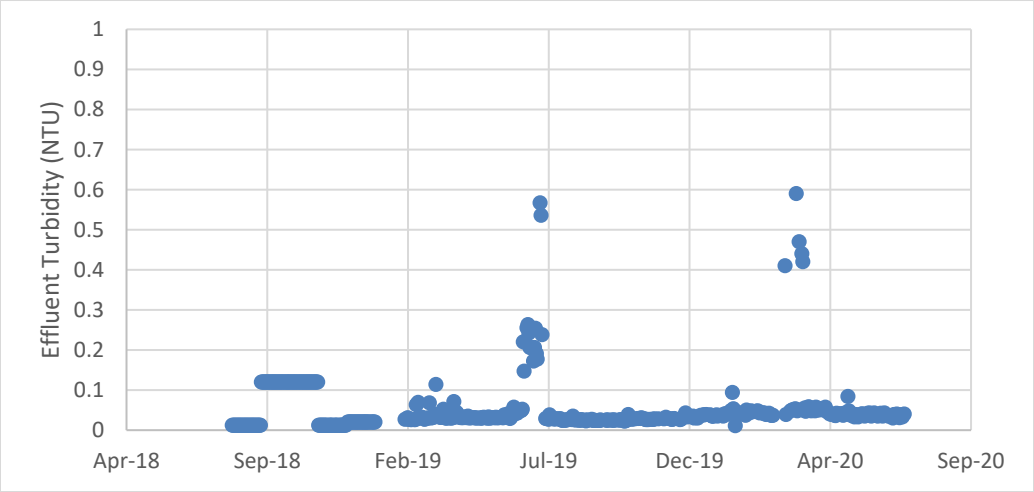


Figure 20: Spring Finished Water Turbidity

Figure 21 presents total coliform and E. Coli sample results from the spring source raw water. The E. Coli sample result for the sample taken on January 21, 2020 was determined to be influenced by improper sampling methods, and not a true indication of the raw water quality. The presence of total coliform in the spring raw water at various points over the period of inspection shows that the spring is GWUDI.

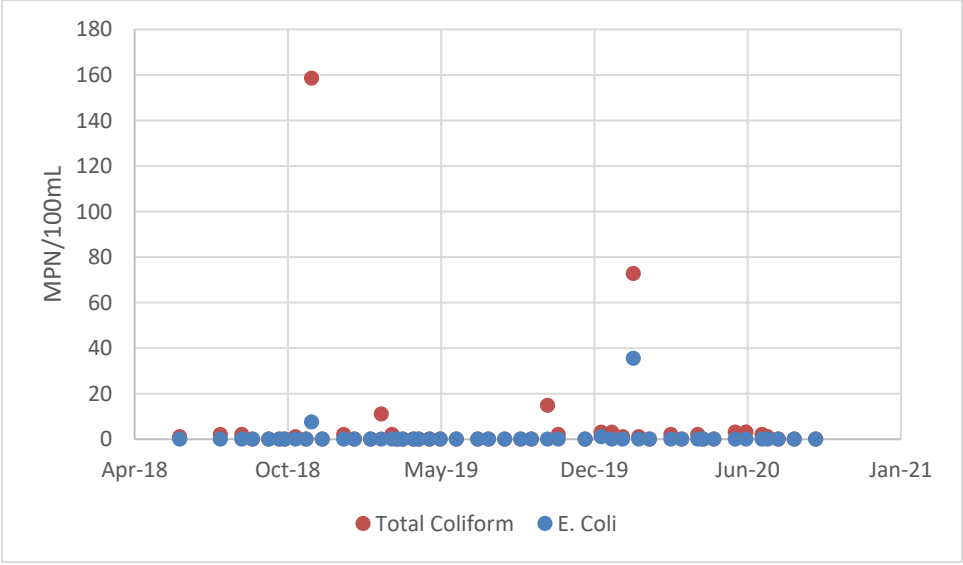


Figure 21: Spring Source Raw Water Total Coliform and E. Coli Results

Figure 22 presents the presence or absence test results for the spring source finished water. A present E. Coli or total coliform sample result means at least 1 E. Coli or total coliform colony was present in the test. The results do not provide a colony count in MPN/100mL.

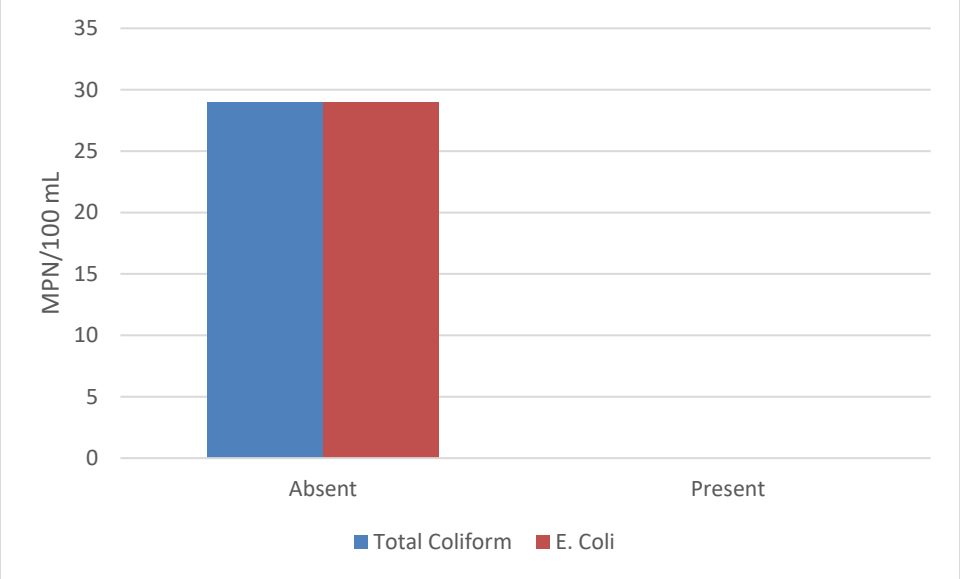


Figure 22: Spring Source Finished Water Presence/Absence Test Results

2.4.4.2 Well Source

The well source is monitored for total coliform and e. Coli. Total coliform and E. Coli samples are taken monthly from a sample line upstream of the chlorine injection point at the well house. Absent or present tests for total coliform and E. Coli are performed monthly on finished water. Finished water samples are taken from a hydrant located at the far end of the lower zone distribution main loop. The sample locations are shown in Figure 23.

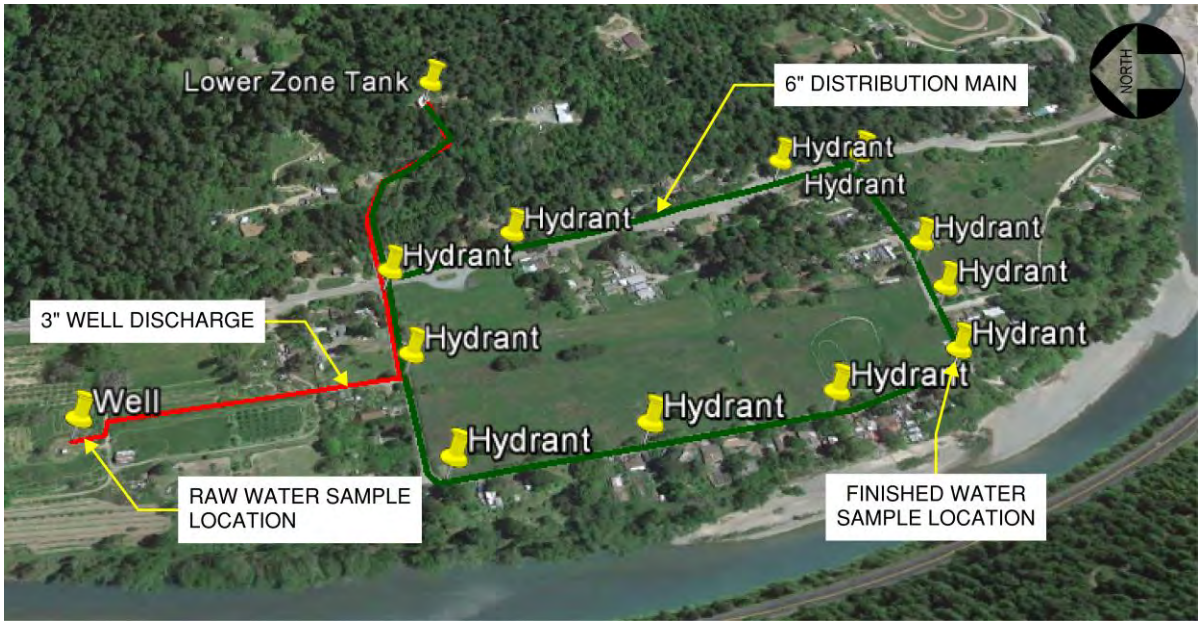


Figure 23: Well Source Sample Locations

Figure 24 presents the total coliform and E. Coli sample results from the well source raw water. Figure 25 presents the present or absence test results for well source finished water samples.

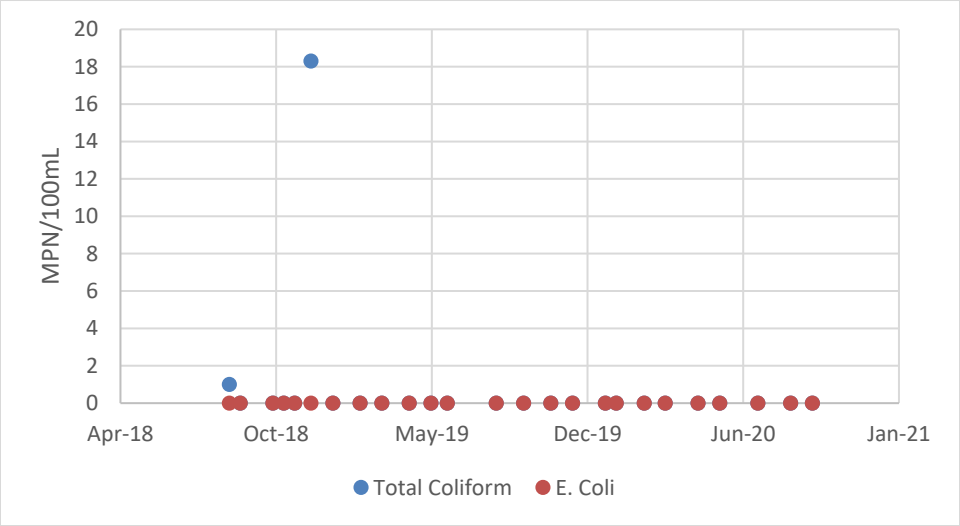


Figure 24: Well Source Finished Water Total Coliform and E. Coli Results

There were two positive total coliform results in the past 3 years from the well raw water source. These samples were determined to be influenced by improper sampling methods, and not a true indication of the raw water quality. The well water has no positive E. Coli results.

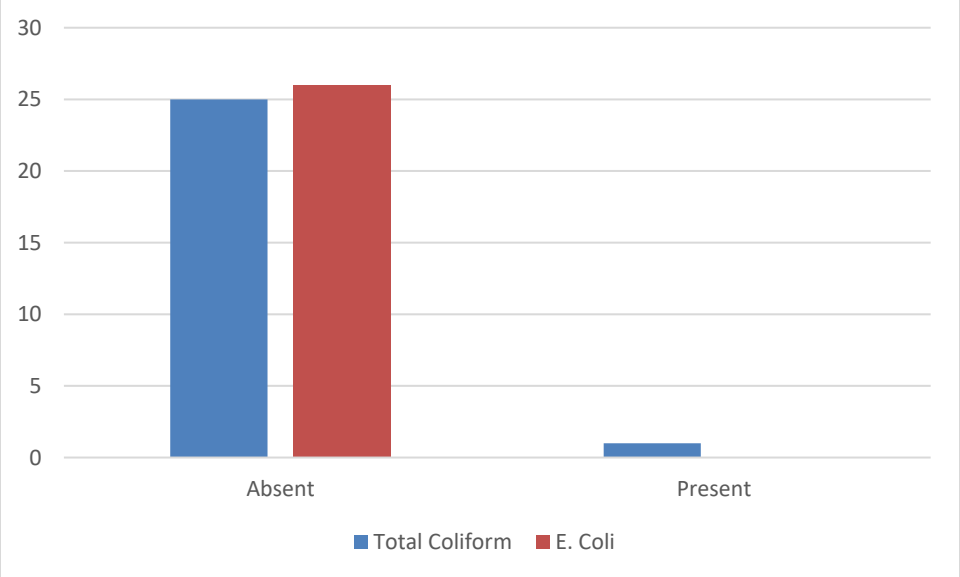


Figure 25: Well Source Finished Water Coliform Present/Absent Test Results

One present test result for total coliform in the finished water occurred in July 2018. This sample result was due to the inoperative chlorine injection pump at the time of sampling. All other results were absent.

2.4.5 Public Water Use

Public water use, either for fire suppression or main flushing, is not metered.

2.5 Future Needs

The 2009 improvements project technical report stated the population of the community was 300 people. However, the 2010 census reported a population of 140 people. Phillipsville's population density has not changed since the 2009 project. The project will not be designed for future growth of the District.

3 Alternatives Analysis

The project goals are to provide a primary and secondary source of potable water to the upper and middle zone customers and a secondary source of potable water to the lower zone customers. The alternatives that will be considered to remedy the potable water issues in the District are:

1. Consolidate with a nearby potable water system.
2. Retrofit the existing system.

The project must also solve issues within the distribution system which include:

- Inadequate storage capacity for the upper and middle zones.
- Fire flow protection for the upper and middle zones.
- Haphazard distribution piping infrastructure in the upper and middle zones.
- Pressure and flow issues in the lower zone
- Well capacity reduction
- Auxiliary power supply

3.1 No Project

The No Project alternative is not a viable option. The District must ensure a secondary water source to all customers, as required by California Code of Regulations (CCR). Potable water supply must be returned to the customers served by the spring source. Storage and distribution issues within the system do not provide adequate water supply as required by CCR. A failure of the spring source will leave 30% of the District without water supply. The declining capacity of the well reduces water supply to the remaining 70% of customers. The upper and middle zone infrastructure is exposed to asset damage and loss because of the lack of fire suppression infrastructure.

3.2 Consolidation

According to the Technical Report for the 2009 Improvements Project (Appendix B) the possibility of consolidating with a nearby community is not feasible. Consolidation with either Redway, CA, 8 miles to the south or Miranda, CA, 4 miles to the north on Highway 101, would require miles of pipeline through Humboldt Redwoods State Park. Miranda and Redway are not large communities and the addition of 72 services to their systems would be significant. Even under ideal circumstances, the cost of connecting Phillipsville customers to Miranda's system 4-miles away would be on the order of $5M, far more than the cost of the project conceived of here. Therefore, this alternative will not be considered further.

3.3 Retrofit Existing System

The spring source will be modified to meet regulatory standards for potability. The spring source will continue to be the primary source of water for the upper and middle zones. The distribution system will be modified to supply the upper and middle zones from the well as a secondary source. Returning the spring source to potability and reconnecting the tie in to the lower zone will provide a secondary source to the lower zone customers.

The spring site will be improved to reduce surface water influence on the groundwater. The filtration and disinfection treatment processes at the spring WTP will be improved to ensure compliance with the California Department of Drinking Water (DDW) potable water standards for turbidity and disinfection. A booster pump station will be installed to boost the well source water from the lower zone tank to the upper and middle zone customers.

To facilitate communication of the tank sites, the tank site locations for each zone will be referred to as the upper, middle, and lower zone tank sites; the tanks will be renamed the upper, middle, and lower zone tanks.

3.3.1 Improve Spring Source

The spring will be rebuilt according to the recommendations made in the Preliminary Geotechnical Report (Appendix D). The spring improvement elements are summarized below:

- The effluent end of the spring will be sealed with a bentonite cut-in wall placed around the collection pipeline.
- The spring liner as shown in the SHN construction drawings in Appendix F will be installed to protect the spring source from influence from surface water.
- The hillside around the spring will be re-graded to direct surface water runoff away from the spring.

The spring backfill source material will be the spoil pile remnants from the original spring construction. Multiple spoil piles left over from the previous construction project surround the spring site. This solution will protect the spring from surface water intrusion and will return the hillside to its original slope profile.

Excavation equipment access will be via the 1-mile off-road path from Rock Pit Lane from the east. The road is overgrown and will require clearing for construction access. The general route is shown in Figure 26.

Figure 26: Spring Access Road

The above grade pipeline between the spring and the WTP will not be improved. The tank below the spring site will be bypassed, and the wye-strainer housings on the influent line near the WTP will be removed and replumbed with 2" HDPE pipe. It is recommended the District demolish the tank following the completion of the project. The raw water sampling location will be moved just upstream of the flow meter into the spring WTP. The sampling site will be from a sample tap inside of the spring WTP.

3.3.2 Spring Water Treatment System Improvements

Although the planned spring improvements should improve the water quality to remove the groundwater influence, there will always be a long-term need to be able to provide GWUDI treatment if the spring conditions deteriorate. The surface water treatment requirements ensure the following pathogen removal/inactivation for surface water sources or GWUDI sources. The pathogen removal requirements for alternative filtration technologies and combined filtration and disinfection technologies are included in Table 6.

Table 6. Pathogen Removal/Inactivation Requirements of the Surface Water Treatment Requirement

Parameter	Removal/Inactivation Requirement
Cryptosporidium	2-log (99%)
Giardia Lamblia cysts	3-log (99.9%) (0.5-log required by Disinfection only)
Virus	4-log (99.99%)

These removal/inactivation requirements must be accomplished through a 2-barrier system. The use of filtration and disinfection at the spring WTP gives an appropriate amount of redundancy in protection of the customers from the potential for bacterial or virus contamination of the source.

3.3.2.1 Filtration

The approved operating conditions for the existing Strainrite bag filters are shown in Table 7. According to this information, the filters in their current installation may be over pressurized and exceeding the rated flow due to the following conditions:

- The spring production is not metered but is reported to vary from 5 gpm to 40 gpm. The actual maximum flowrate of the spring is unknown and is likely greater than 40 gpm. The combined filter flow rating only accommodates a maximum flow rate of 40 gpm with both filters online.
- Because of the 150-foot elevation difference between the spring and the spring WTP, the filter inlet pressure has the potential to reach a maximum pressure of 65 psi. There is minimal backpressure on the filters because the operating surface of the storage tanks is at the same elevation as the filters. This creates a maximum differential pressure condition of 65 psid, which exceeds the filter rating of 25 psid.

Table 7: Strainrite System Operating Parameters

Parameter	Value
Maximum Flowrate into system	20 gpm
Max Differential Pressure (as measured across the prefilter and final filter)	25 psid
Turbidity Performance Standards	0.1 NTU 95% of the time Not to exceed 0.5 NTU
Additional Design Criteria	1. Pressure relief to protect bag from an excessive pressure surge. 2. Filter to waste for 2 minutes after bag installation. 3. Means to measure the pressure drop across each filter.

As shown in the water quality analysis, the filters are meeting the turbidity limits. However, the current filter arrangement does not provide any redundancy. Additionally, the filter bags require frequent change outs which is wasteful and costly to the system.

To address the redundancy issue, a redundant Strainrite bag filter train will be provided. There will be a total of 3 parallel filter trains, but only 2 of the 3 filter trains should be operated at a time.

To address the frequent bag filter change out issue, an additional pre-filter will be installed upstream of the Strainrite filter trains. The recommended pre-filter type is a cartridge style filter that provides a larger surface area that provides a greater surface area per filter and therefore more time between filter cartridge change outs. The pre-filter does not provide any log-removal credits, but it will provide protection for and extend the life of the Strainrite filters. The pre-filter installation will reduce the bag filter change-out frequency. Additionally, the

selected filter can be manually washed which reduces the purchasing frequency of the pre-filter, overall reducing operating costs. The selected cartridge pre-filter is shown in Table 8.

Table 8: Pre-Filter Selection Criteria

Manufacturer	Harmsco
Model	HC/90-0.35
Number of Vessels	1
Flow Capacity per Vessel	65 gpm
Maximum Differential Pressure	15 psid
Media Surface Area	90 square feet
Cartridge Cost	$206
Vessel Cost	$2,702

Although the pre-filter cartridge is more expensive to replace than the current Strainrite pre-filter, the Strainrite pre-filter must be replaced so frequently it makes maintenance of the system costly. The addition of the cartridge pre-filter will reduce the replacement frequency of the Strainrite filters, reducing overall maintenance costs. The estimated annual maintenance cost for the system is included in Table 9. The table assumes 4 replacements of the cartridge filter per year, which is likely a conservative estimate. It was assumed that the addition of the cartridge filter would double the life of the Strainrite filters.

Table 9: Filtration Annual Maintenance Cost Estimate

Filter Type	Replacement Cost	Change Frequency (weeks)	Replacements per Year	Annual Replacement Cost
Existing				
Bag Prefilter	$ 104	3	17	$ 1,800
Bag Postfilter	$ 104	6	9	$ 900
Total				$ 2,700
Proposed				
Cartridge Prefilter	$ 270	12	4	$ 1,170
Bag Prefilter	$ 104	6	9	$ 900
Bag Postfilter	$ 104	12	4	$ 450
Total				$ 2,520

3.3.2.2 Disinfection

The filtration technology achieves the removal requirements for cryptosporidium and 2.5-log removal of giardia lamblia cysts. Disinfection must achieve the remaining 0.5-log removal credits for Giardia Lamblia cysts and 4.0-log removal for viruses. The summary of the log removal credits is shown in Table 10.

Table 10: Disinfection Log Removal Requirements

Parameter	Total Required	Provided by Filtration Technology	Required by Disinfection
Cryptosporidium	2-log (99%)	2.0-log	0-log
Giardia Lamblia cysts	3-log (99.9%) (0.5-log required by Disinfection only)	2.5-log	0.5-log
Virus	4-log (99.99%)	0-log	4.0-log

A chlorine contact pipeline will be installed between the spring WTP and the storage tanks to ensure adequate chlorine contact time. The pipeline will be sized for 40 gpm. PCSD must achieve a chlorine residual of 0.2 mg/L at the point of entry to the distribution system.

The current disinfection method is hypochlorite injection. No disinfection alternative will be considered for PCSD. The sodium hypochlorite disinfection method is the best disinfection alternative because of the low power demand and the relatively inexpensive operation and maintenance cost as compared to other chlorine alternatives, ozone disinfection, or UV disinfection. The WTP site often experiences power outages. With standby power and an uninterrupted power supply (UPS) battery, the chemical feed pump can continue to chlorinate the treated water during times of power loss.

3.3.2.2.1 Chemical Injection

The chlorine injection pump will be sized to provide the required dose for flow rates up to 40 gpm. The recommended injection pump is a peristaltic pump. The District currently uses this type of pump at both WTPs. The maintenance is simple for pump head replacement, and maintenance parts are relatively affordable. The chemical pump selection criteria are included in Table 11.

Table 11: Spring WTP Chemical Metering Pump

Pump Type	Peristaltic Metering Pump
Chemical	Sodium Hypochlorite 12.5%
Flow Rate	10 mL/min
Pressure	5 psi
Example Manufacturer, Model	Stenner Classic Series Single Head Adjustable
Maximum Flow Rate Output	40 gpd/100 psi

3.3.2.2.2 Chlorine Contact Pipeline

The contact time issue will be solved by installing a buried large diameter contact pipeline between the spring WTP and the upper zone storage tanks. The contact pipeline is designed to provide 4.0-log inactivation of viruses and 0.5-log inactivation of giardia. The design criteria for the contact pipeline are shown in Table 12.

Table 12: Chlorine Contact Time (CT) Design Criteria

Design Parameter	Value	CT
Log Removal of Virus	4.0-log	8 mg/L-min
Log Removal of Giardia	0.5-log	28 mg/L-min
pH	7.5	
Minimum Temperature	5 Deg C	
Chlorine Residual	0.4 mg/L	
Design CT		28 mg/L-min

The governing CT requirement for the contact pipeline is 28 mg/L-min. The contact pipeline will be installed with two passes extending between the spring WTP and Spring Canyon Road to achieve the required length. The contact pipeline design is shown in Table 13.

Table 13: Contact Pipeline Design

CT Requirements	Unit	Value
Chlorine Contact Time	mg/L - min	28
Target Residual	mg/L	0.32
Required Time	min	88
Maximum Treated Flow	gpm	40
Required Treatment V	gal	3500
Contact Pipeline Design		
Nominal Pipe Size	in	16
Pipeline ID (DR 32.5)	in	16.27
Cross Sectional Area	sqft	1.44
Install Length	ft	180
Number of Passes		2
Total Length	ft	360
Pipeline Volume	cft	519.8
Length to Width Ratio		266
T10/T		0.90
Effective Volume	cft	467.8
Effective Volume	gal	3500

3.3.2.3 Valving and Instrumentation

The plumbing at the WTP will be completely rebuilt. The existing instrumentation in the building will be demolished. Pipe supports will be installed for above grade piping. New flow meters will be installed upstream of the bypass line and on the filter effluent line.

A flow control valves will be installed on each filter inlet line to limit the influent flows to 20 gpm. Excess flows from the spring will be directed downhill through the natural flow path of the spring at the location of the spring collection connection.

A combination pressure regulating valve (PRV) and altitude valve will be installed upstream of the filters to limit the inlet pressure to 30 psi. This will allow no more than 25 psi differential across the filters in combination with the backpressure valve. The PRV will have a sensing line connected to the upper zone tanks fill line to close when the upper zone storage tanks have reached capacity. This will divert excess spring flow to overflow at the spring head. The combination PRV valve selection criteria are included in Table 14.

Table 14: Altitude Valve Specifications

Valve Type	Combination PRV and Altitude Valve
Size	2”
Max Continuous Flow	210 gpm
Manufacturer	Cla-Val
Model	210-09
Valve Material	Ductile Iron

A backpressure valve will be installed downstream of the filter trains to maintain 5 psi of backpressure on the filters as recommended by the manufacturer. The backpressure will prevent filter shocking upon startup of a clean filter.

Turbidimeters will be installed for the combined inlet and outlet compliance monitoring requirements. The turbidimeters will be installed with a local controller that will log the continuous turbidity measurement data. The operator will periodically download the measurement data from the controller using the USB port and a laptop. The turbidimeter and controller selection are included in Table 15.

Table 15: Turbidimeter and Controller Selection

Turbidimeter	Hach TU5400sc
Description	Low Range Laser Turbidimeter
Digital Controller	Hach SC4200c
Description	Microprocessor-controlled and menu-driven controller that operates the sensor

A reagentless chlorine analyzer will be installed to monitor the POE (point of entry) chlorine residual. The sample line to the analyzer will be tapped at the end of the contact pipeline. The analyzer will be mounted in the WTP. A benefit of the reagentless analyzer is the buffer solution is internally contained in the sample probe, so the District does not need to consider special reagent disposal options as they would with a reagent style analyzer. The chlorine analyzer selection is included in Table 16.

Table 16: Chlorine Analyzer Selection

Turbidimeter	Hach CLT10sc
Description	Reagentless Chlorine Analyzer

The raw water sample line, filtered effluent sample line, and point of entry (POE) chlorine residual sample line will all be run to a single sampling station in the WTP. The two turbidimeters and the chlorine analyzer will be mounted in this location for the continuous sampling. The influent sample line will be tapped upstream of the flow meter. The effluent sample will be tapped downstream of the combined filter effluent. The POE sample line will be tapped at the outlet of the contact pipeline. A schematic of the WTP improvements is shown in Figure 27.

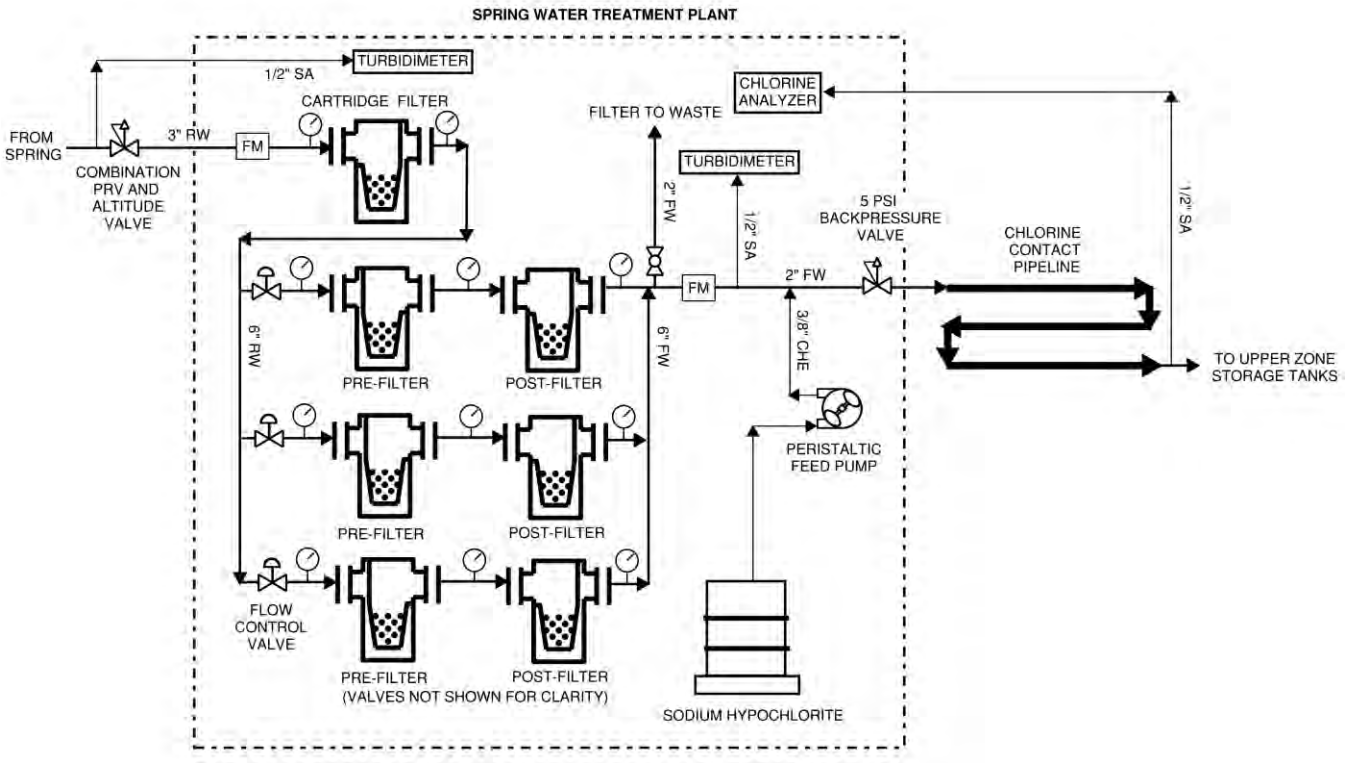


Figure 27: Spring WTP Schematic

3.3.2.4 Standby Power

A trailer mounted generator will be installed at the spring WTP. The generator will be trailer mounted so it can be relocated to another site if the spring source is no longer viable and the spring WTP is no longer in use. The trailer will be installed on a concrete pad with a locking mechanism so the trailer cannot be relocated without permission. The site will be secured with fencing to prevent intruders. The generator will have a manual transfer switch (MTS) to allow the operator to switch over to generator power when grid power is lost. The chlorine pump will have an uninterrupted power source (UPS) to provide power between electrical service and generator power switch over.

3.3.3 Upper/Middle Zone Storage

Total system production will be used to determine maximum day demand (MDD) of the entire District for storage calculations. Spring production data will be used to determine the upper and middle zone MDD requirements. Storage volume will be provided to accommodate MDD for the upper and middle zones. Infrastructure will be installed to provide fire flows to the upper and middle zones.

3.3.3.1 Storage Volume Determination

3.3.3.1.1 Minimum Regulatory Requirements for Water Source Capacity

Title 22 of the California Code of Regulations includes the requirements for source capacity. The regulation is partially quoted below (emphasis added):

> *22 CCR § 64554*
>
> *New and Existing Source Capacity.*
>
> *(a) At all times, a public water system's water source(s) shall have the capacity to meet the system's maximum day demand (MDD). MDD shall be determined pursuant to subsection (b).*
>
> *(1) For systems with 1,000 or more service connections, the system shall be able to meet four hours of peak hourly demand (PHD) with source capacity, storage capacity, and/or emergency source connections.*
>
> *(2) For systems with **less than 1,000** service connections, the system shall have **storage capacity equal to or greater than MDD**, unless the system can demonstrate that it has an additional source of supply or has an emergency source connection that can meet the MDD requirement.*
>
> *(3) Both the MDD and PHD requirements shall be met in the **system as a whole and in each individual pressure zone.***
>
> *(b) A system shall estimate MDD and PHD for the water system as a whole (total source capacity and number of service connections) and for each pressure zone within the system (total water supply available from the water sources and interzonal transfers directly supplying the zone and number of service connections within the zone), as follows:*
>
> *If only annual water usage data are available:*

Identify the year with the highest water usage during at least the most recent ten years of operation or, if the system has been operating for less than ten years, during its years of operation.

To calculate the average daily use, divide the total annual water usage for the year with the highest use by 365 days; and

To calculate the MDD, multiply the average daily usage by a peaking factor of 2.25.

To calculate the PHD, determine the average hourly flow during MDD and multiply by a peaking factor that is a minimum of 1.5.

*(c) Community water system using only groundwater shall have a minimum of **two approved sources** before being granted an initial permit. The system shall be capable of meeting MDD with the highest-capacity source off-line.*

(k) the course capacity of a surface water supply or a spring shall be the lowest anticipated daily yield based on adequately supported and documented data.

Using the 2019 annual production data and connections from the spring source (Table 3) and the well production records and lower zone connections (Table 2), the maximum day demand (MDD) was calculated for the entire system and each individual pressure zone, as shown in Table 17. The peaking factor of 2.25 was applied per the requirements in the regulations quoted above to calculate MDD since daily flow records are not available.

MDD Calculation		
DDW Peaking Factor	2.25	
Upper Zone MDD	11,100	gpd
Middle Zone MDD	4,600	gpd
Lower Zone MDD	29,404	gpd
Total System MDD	45,104	gpd
Residential Fire Flow Volume	60,000	gal
Total	105,104	gal

Table 17: Storage Requirement Determination

Per CCR 22, the minimum storage requirement for each zone shall provide. MDD. Table 18 compares the existing storage volume capacities to the required minimum storage volume per zone and for the system as a whole.

Table 18: MDD Storage Comparison

Storage Description	Total System	Upper Zone	Middle Zone	Lower Zone
MDD	45,400	11,100	4,600	29,700
Existing Storage	158,000	15,000	3,000	140,000
Excess (Deficit)	112,600	3,900	(1,600)	110,300

The middle zone storage capacity is undersized to accommodate the calculated MDD. All other zones have adequate storage volume for MDD. Because the upper and middle zone supply is hydraulically connected, the project will provide a total of 15,700 gallons of storage volume for the upper and middle zones. This is the sum of the upper and middle zone MDD.

3.3.3.1.2 Fire-Flow Storage Volume

Phillipsville is in a wildland interface zone. It is a heavily wooded area with access difficulty issues. The recent fire events in Northern California in places like and Paradise and Santa Rosa show a trend toward large and devastating wildfires in locations near wildland interfaces. These fires are commonly a result of energy discharge from power infrastructure. Phillipsville's power is provided by Pacific Gas and Electric (PG&E), and many homeowners also operate their own personal diesel generators. Due to the lack of oversight of private generator maintenance in the area and the town's wildland interface location, wildfires in this location are of great concern.

The fire flow storage volume will be determined by a combination of the following factors:

- Practicality for construction and maintenance
- Existing distribution infrastructure

The NFPA 2021 California fire code (CFC) determines fire storage and supply design criteria for new distribution system construction for new developments. The CFC requires 1,000 gpm of flow for 1 hour for new residential developments, which is a total of 60,000 gallons. Since the project is a retrofit of an existing system and community, the design is not governed by the CFC. However, the target fire flow storage volume of 60,000 gallons will only be used as a target volume, and not as a design volume. The storage solution that provides the largest storage capacity in addition to meeting all other site requirements will be selected for the project.

The minimum fire suppression flowrate for municipal fire hydrants is 500 gpm. This will be the design flowrate for the upper and middle zone fire suppression system.

3.3.3.1.3 Total Storage Volume

Total storage requirement should consider the sum of MDD, fire flow, and emergency storage. PCSD has no standard for required emergency volume. The target fire flow storage volume is 60,000 gallons. Table 19 lists the target storage volumes for the total system and each zone, or combination of zones, for MDD and fire flow.

Table 19: MDD and Fire Flow Storage Volumes

Storage Description	Total System	Upper and Middle Zone	Lower Zone
MDD + Fire	105,400	75,700	89,700
Existing Storage	158,000	18,000	140,000
Excess (Deficient)	52,600	(57,700)	50,300

The system as a whole has adequate storage volume for total MDD and fire flow volume. The upper and middle zones are deficient in fire flow storage. The 50,300-gallons of excess storage above fire flow and MDD in the lower zone tank would be beneficial to the upper and middle zones for fire flow. The District has no ability to provide fire flows from the lower zone tank to the upper and middle zones. The project will provide a pump station and transmission pipeline to serve the upper and middle zone customers fire flow from the lower zone tank.

3.3.3.2 Storage and Fire Flow Supply Alternatives

According to the geotechnical report, the upper zone storage site is located on a landslide. Evidence of slope movement is visible onsite. Because of the site conditions, a permanent tank solution will not be considered for the site. Instead, a temporary solution will be considered. Crosslinked polyethylene plastic tanks are a superior temporary tank material solution compared to the existing linear plastic tank material. The crosslinked polyethylene material has superior impact resistance, tensile strength, and resistance to fracture compared to linear polyethylene. The proposed tank material and all wetted components are NSF 61 certified. Since plastic tanks are shipped by flat-bed trailer, the diameter is limited by California Department of Transportation regulations. The maximum dimensions and volume for a crosslinked polyethylene plastic tank, considering a 2-foot freeboard, are shown in Table 20. Two tanks will provide sufficient MDD storage volume for the upper and middle zones with an additional 46% of MDD as emergency storage volume. The two-tank arrangement is beneficial for operation because one tank can be taken offline for maintenance, and the other will continue to provide storage.

Table 20: Crosslinked Polyethylene Tank Specs

Nominal Volume	12,150	gal
Diameter	12	feet
Top of Tank	16	feet
Freeboard	2	feet
Max Operating Level	14	feet
Maximum Volume	11,500	gallons
Number of Tanks	2	
Total Volume	23,000	gallons
Upper and Middle MDD	15,700	gpd
Percent of MDD	146%	
Emergency Volume	7,300	gallons

3.3.3.2.1 Upper Zone Tank Site

The existing tanks at the upper zone tank site will be demolished. The ground surface around Tank C is showing evidence that the tank is slowly sliding downhill. The ground surface near Tanks A and B do not show the same movement signs. The new tanks will be installed on the northern edge of the site near the uphill slope where Tanks A and B are currently installed.

The existing site plumbing will be demolished to prepare for the contact pipeline installation and new yard piping for the new tanks. Buried piping larger than 6" will be PVC C900. Buried and exposed piping smaller than 6" will be Schedule 80 PVC. The tanks will be filed by a common header. Separate fill and draw lines will be installed to the tanks. The tank draw lines will combine before being tied into the existing 3" HDPE distribution main. Tank drains will be plumbed from the tank draw lines to an onsite drainage swale. The customer connection located onsite will be tied into the common tank discharge line.

Gravel road surfacing and gravel pathways will be installed at the tank site for access to the spring WTP and walking access around the tanks. Fencing will be installed around the site to prevent unpermitted access. Security alarms will be provided for the site access gate. Exterior building lighting will be installed at the spring WTP. The proposed tank site improvements are shown in Figure 28. The red shaded areas in the figure do not represent any site features.

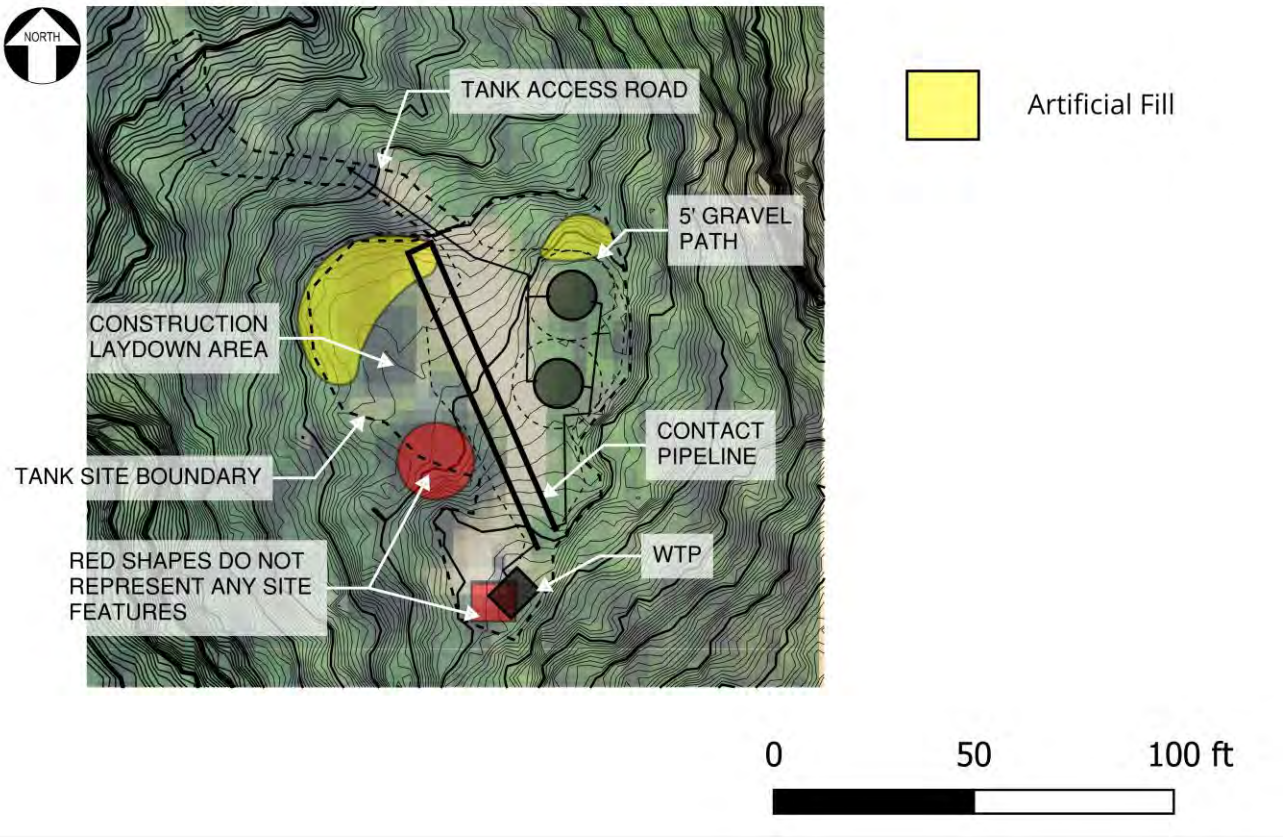


Figure 28: Upper Tank Site Arrangement

3.3.3.2.2 Middle Zone Tank Site

The middle zone tank is located on private property. Improvements at the middle zone tank will not be included in the project because the District does not have property rights. The tank is required under current operating methods to reduce the service pressures to acceptable amounts in the middle zone. The maximum service pressures in the middle zone are shown in Table 21.

Table 21: Middle Zone Service Pressures

Middle Zone Tank		
Finished Grade	600	feet
Maximum Water Level	8	feet
Maximum Water Elv	608	feet
Middle Zone		
Highest Service	500	feet
Operating Pressure	47	psi
Lowest Service	300	feet
Operating Pressure	133	psi

A PRV bypass line will be installed to connect the upper zone distribution main to the middle zone distribution main. The PRV will reduce the maximum allowable service pressure in the middle zone. The estimated installation elevation for the PRV and the PRV setpoints are shown in Table 22.

PCSD can continue to operate the middle zone tank once the improvements project is complete. If the middle zone tank fails, or if the owner claims rights to the property, the bypass line can be opened, and the middle zone tank site will be isolated from the system. The middle zone customers would then be supplied from the upper zone tanks or the booster pump station, with appropriate service pressure.

Table 22: Middle Zone Tank Bypass PRV

Upper Zone Tank		
Finished Grade	740	feet
Maximum Water Level	14	feet
Maximum Water Elv	754	feet
Middle Zone (No PRV)		
Highest Service	500	feet
Operating Pressure	110	psi
Lowest Service	300	feet
Operating Pressure	197	psi
PRV		
Install Elevation	550	feet
Max Inlet Pressure	88	psi
Max Outlet Pressure	20	psi
Middle Zone (With PRV)		
Highest Service	500	feet
Operating Pressure	42	psi
Lowest Service	300	feet
Operating Pressure	128	psi

3.3.4 Booster Pump Station

CCR 22 requires public water systems to have a secondary water source. PCSD has two water sources, the spring and the well, but all pressure zones cannot be served by either source. The well source will be connected to the upper and middle zones by a booster pump station located at the lower zone tank site.

3.3.4.1 Supply Pump Hydraulics and Selection

The booster pump will be supplied by the lower zone tank. The pump station discharge will be tied into the existing 3" main that connects the upper zone tank site to the middle zone and the lower zone tanks. The main runs beneath Spring Canyon Road which is a gravel road that provides access to the 12 customers in the upper zone. The 3" main will be tied into the 1" and 2" distribution mains and the middle zone tank fill line. The 1" HDPE line will be demolished between the upper zone tank site and the 3" main connection. The 3" main alignment is shown in Figure 29.

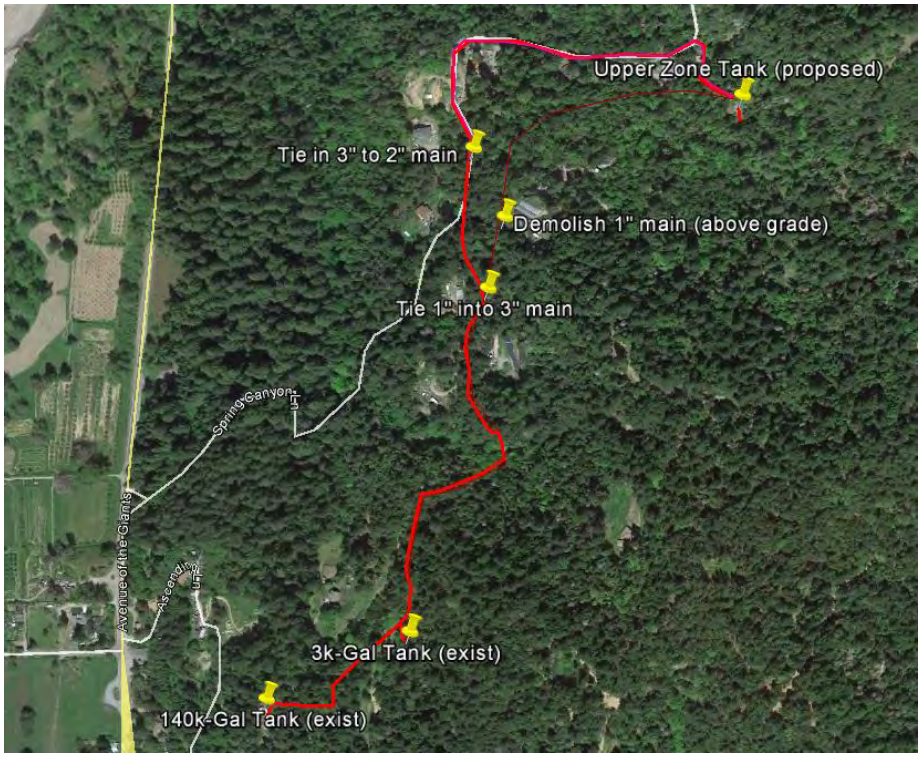


Figure 29: Existing 3" Distribution Main

The system pressures for the upper and middle zones are set by the respective tank operating water levels. The booster pump station operation will increase the service pressures at the customer connections. The new system pressures at each main connection during pump operation are shown in Table 23. The 1" service connection will require a PRV to limit the delivery pressure to a maximum of 80 psi.

Table 23: Customer Pressure on Discharge Pipeline

Connection	Elevation	Static Head	Service Pressure
	feet	feet	psi
Pump Station	470	355	154
Middle Zone Tank	600	225	97
1" Service Connection	600	225	97
2" Service Connection	640	185	80
Upper Zone Tanks	740	85	37

The discharge pipeline will also serve as the gravity flow supply line from the upper zone tanks to the lower zone tank. A PRV will be installed on a bypass line that connects the pump discharge to the pump suction line. When open, the bypass line will allow spring flow into the lower zone tank. The line will be closed during pump station operation.

The booster pump station capacity will be 50 gpm to balance the fill time for the upper zone tanks (8 hours) while not drawing down the volume in the lower zone tank faster than the well pump can refill the tank (60-gpm). The system and pump curve are shown in Figure 30. The selected pump details are shown in Table 24.

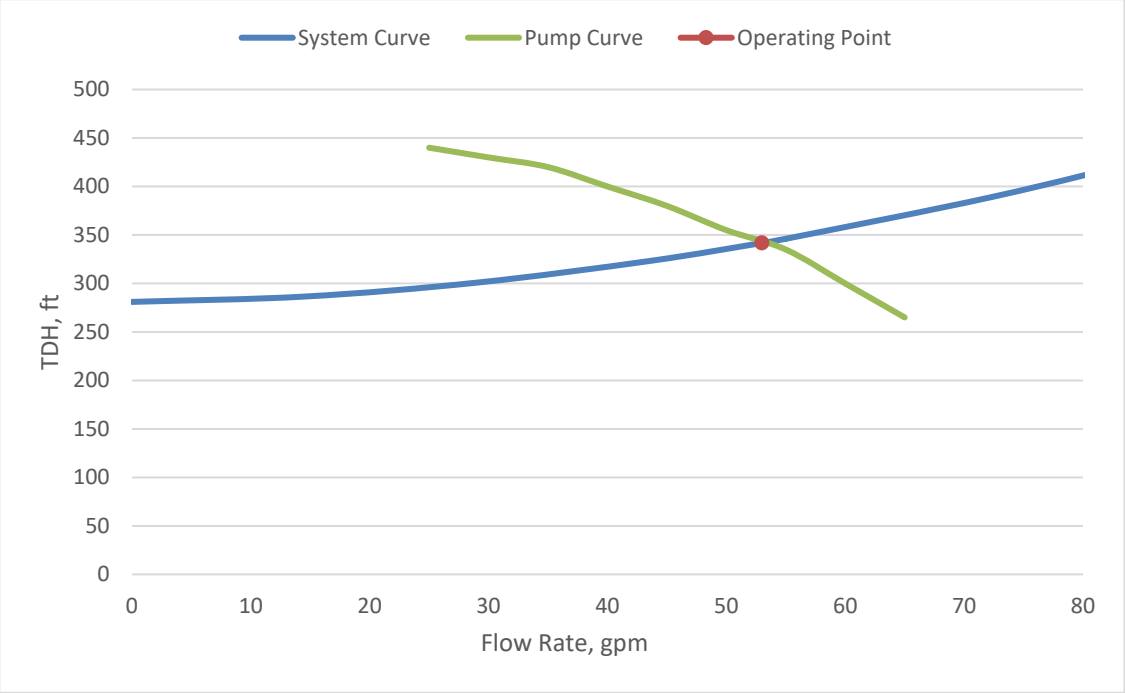


Figure 30: System and Supply Pump Curve

Table 24: Supply Pump Selection

Pump Name	Supply Pump
System Arrangement	1 + 1
Design Flow	50 gpm
TDH	322 feet
Efficiency	62.7%
NPSHr	9.76 feet
Rated Power	7.5 HP
Rated Voltage	208-230YY/460 YV
Frequency	60 Hz
Example Manufacturer	Precision Systems
Model Number	CR 10-9

3.3.4.2 Fire Flow Hydraulics and Pump Selection

The maximum pressure rating of the 3" main is 250 psi which will accommodate a maximum flow of 145 gpm from the booster pump station. This flow rate is not adequate for fire suppression. The fire suppression system will be designed for 500 gpm, which is the minimum flow rate for municipal fire hydrants. A new 8" HDPE fire suppression service pipeline will be installed approximately 1-mile from the booster pump station to the upper zone tank site

along the 3" main alignment. Trenching for this alignment will also allow for a fiber optic cable to be installed from the upper zone tank site to the booster pump station to transmit level signals from upper zone tanks for the booster pump station control. The gravel road will be restored to pre-construction conditions following the pipeline installation and other system improvements. Ten fire hydrants will be located at approximately 500-foot intervals along the 8" HDPE fire suppression service pipeline, targeting driveway locations and including one at the upper and middle tank locations. The section of pipeline between the middle zone tank and the lower zone tank is not along a road or near service connections, so no fire hydrants are required in that section. The main alignment and fire hydrant locations are shown in Figure 31.

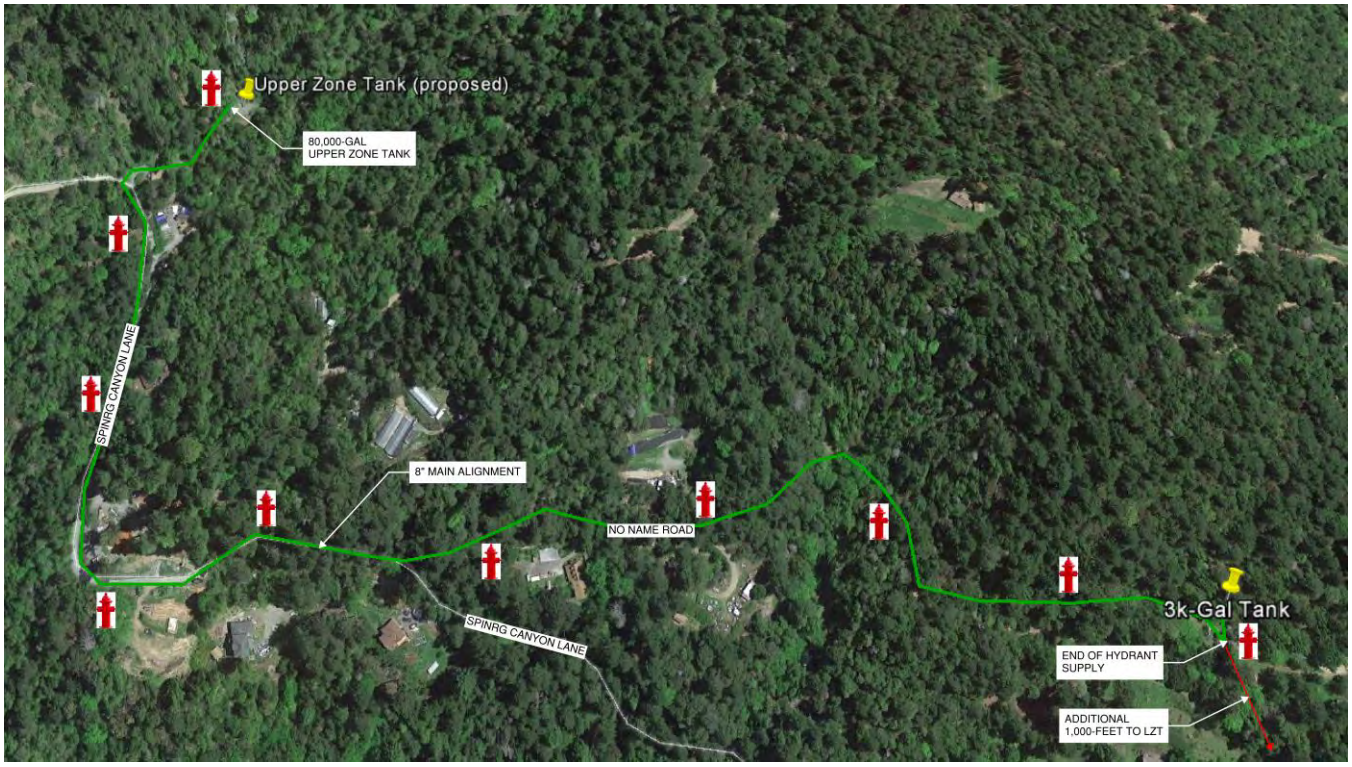


Figure 31: Upper Zone Fire Suppression Map

An additional high flow pump will be provided at the booster pump station to supply the hydrant pipeline. The system and high flow pump curves are shown in Figure 32. The high flow pump selection information is included in Table 25. The pump will provide a minimum of 20 psi to the uppermost hydrant at the upper zone tank site.

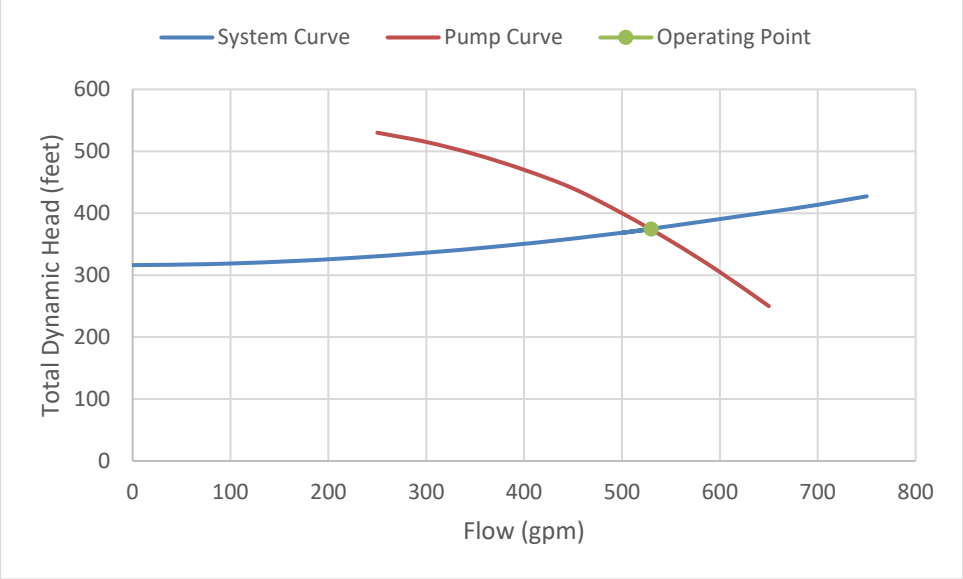


Figure 32: System Curve and High Flow Pump Curve

Table 25: High Flow Pump Selection

Pump Name	High Flow Pump
System Arrangement	1, no redundancy
Design Flow	500 gpm
TDH	415 feet
NPSHr	14.34 feet
Rated Power	60 HP
Rated Voltage	230/460 V
Frequency	60 Hz
Example Manufacturer	Precision Systems
Model Number	CR 95-4-1

3.3.4.3 Pump Station Design

The pump station will be installed inside a CMU block building. The pump station control panel and motor control center will be pad mounted adjacent to the building. The building will have lighting and electric cooling and heating systems to satisfy the needs of the electrical and mechanical equipment in the building. These systems will be designed in compliance with Title 24.

The centrifugal pump arrangement will include two 50 gpm supply pumps, one duty and one standby, and a single 500 gpm high flow pump. The supply pumps will be designed to operate in either a manual or automatic configuration. Before the supply pumps are enabled, certain manual valve position changes will be needed to ensure proper pump station operation and to not over-pressurize service pressures. The high flow pump will be enabled in normal operation and will start and stop based on system pressure.

3.3.4.3.1 Pump Station Piping Arrangement

The 3" gravity main is connected to the 3" well pump discharge line and tank fill line at the lower zone tank site. The gravity line tie-in to the 3" well pump discharge line will be removed, and the well discharge line will be reconnected to the tank fill line with a straight run of pipe.

One 8" suction line will be installed in the tank sidewall of the lower zone tank. The discharge header for the supply pumps will connect to the 3" distribution main. The high flow pump discharge will tie into the 8" HDPE fire suppression service main. A flexible expansion joint will be installed above grade between the exposed and buried suction lines to the pump station to allow for ground movement due to slope instability since the lower zone tank is also located on a landslide formation, although the formation is not as active at the upper zone tank site.

A bypass line will be installed between the supply pump suction and the pump discharge lines. The bypass line will have a gate valve and an altitude valve. The gate valve will be closed when the pump station is in manual or automatic operation. When the gate valve is open, flows from the spring site can be transmitted to the lower zone tank. The altitude valve will close when the lower zone tank is at the maximum operating level. The pump station piping arrangement is shown in Figure 33.

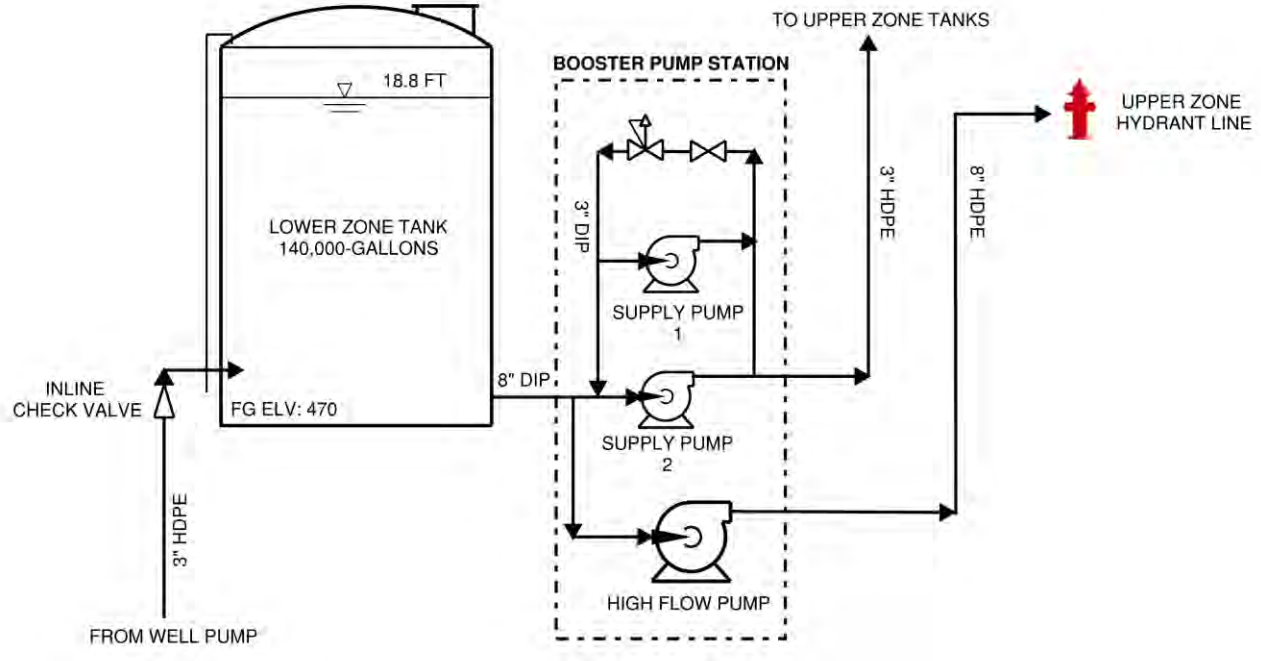


Figure 33: Booster Pump Station Piping

The pump station and tank site will be enclosed with site fencing, and parking and exterior building lights will be installed.

3.3.4.3.2 Control

The supply pumps will have hand-off-auto switches which will allow the operator to place the supply pumps in hand (manual) or automatic control. When the supply pumps are in manual control, the operator will start the pump station with a pushbutton. The lead and lag pumps will automatically alternate based on run time. The supply pumps will stop when the upper zone tanks have reached the maximum operating level. In automatic control, the supply pumps will turn on when the upper zone tanks reach a low level setpoint and shut down when the tanks reach a high level setpoint. Whenever the pump station is in automatic control, the bypass gate valve must be closed.

Level transducers will be installed on the upper zone tanks. The control signals from the transducers to the pump station will be transferred by fiber optic cable. The fiber optic cable will be installed parallel to the 8" diameter main.

The high flow pump will also be supplied from the same 8" suction line. The high flow pump will be controlled by system pressure of the 8" fire suppression service main and will be in automatic control under normal operation. All pumps will lockout when the lower zone tank reaches a low level. The level setpoints for the pump station operation are shown in Table 26.

Table 26: Booster Pump Station Control Setpoints

Control	Measurement Location	Setpoint
Supply Pump Start	Upper Zone Tank	2 feet
Supply Pump Stop	Upper Zone Tank	11 feet
Supply Pump Alternate	Run Timer	100 hours
High Flow Pump Start	Pump Discharge	180 psi
High Flow Pump Stop	Pump Discharge	200 psi
Pump Lockout	Lower Zone Tank	5 feet

3.3.4.3.3 Power

The proposed pump station site does not have electrical service. There is a nearby PG&E power pole with 12-kV service that can provide 3-phase power to the site. The PG&E delineation map for this service is included in Appendix H. To apply for a new service, PCSD must submit an online application that includes the pump station electrical design. A service representative from PG&E will review and approve the project documents. The new electrical installation will be scheduled for at least 6 months from plans approval date, so proceeding with the PG&E service application immediately upon receipt of construction project funding is recommended.

Electric power is often shut down to the area. The pump station will have standby generator power for times when the power service is not available. The generator will have an automatic transfer switch.

3.3.4.4 Middle Zone Hydraulics

The middle zone tank sets the hydraulic grade line for the middle zone customers. The tank is installed on private property, so no improvements to the tank will be included as part of this project. A PRV station will be installed near the booster pump station to provide a secondary supply connection to the middle zone that is pressurized by the booster pump station. This will allow for the middle zone to be served by the pump station when the spring source is no longer viable. The PRV station will be a bypass line. It can be valved off while the middle zone tank is online. When the District chooses to take the middle zone tank offline, the PRV station will be valved online, and there will be no disruption to service. The PRV station configuration is shown in Figure 34.

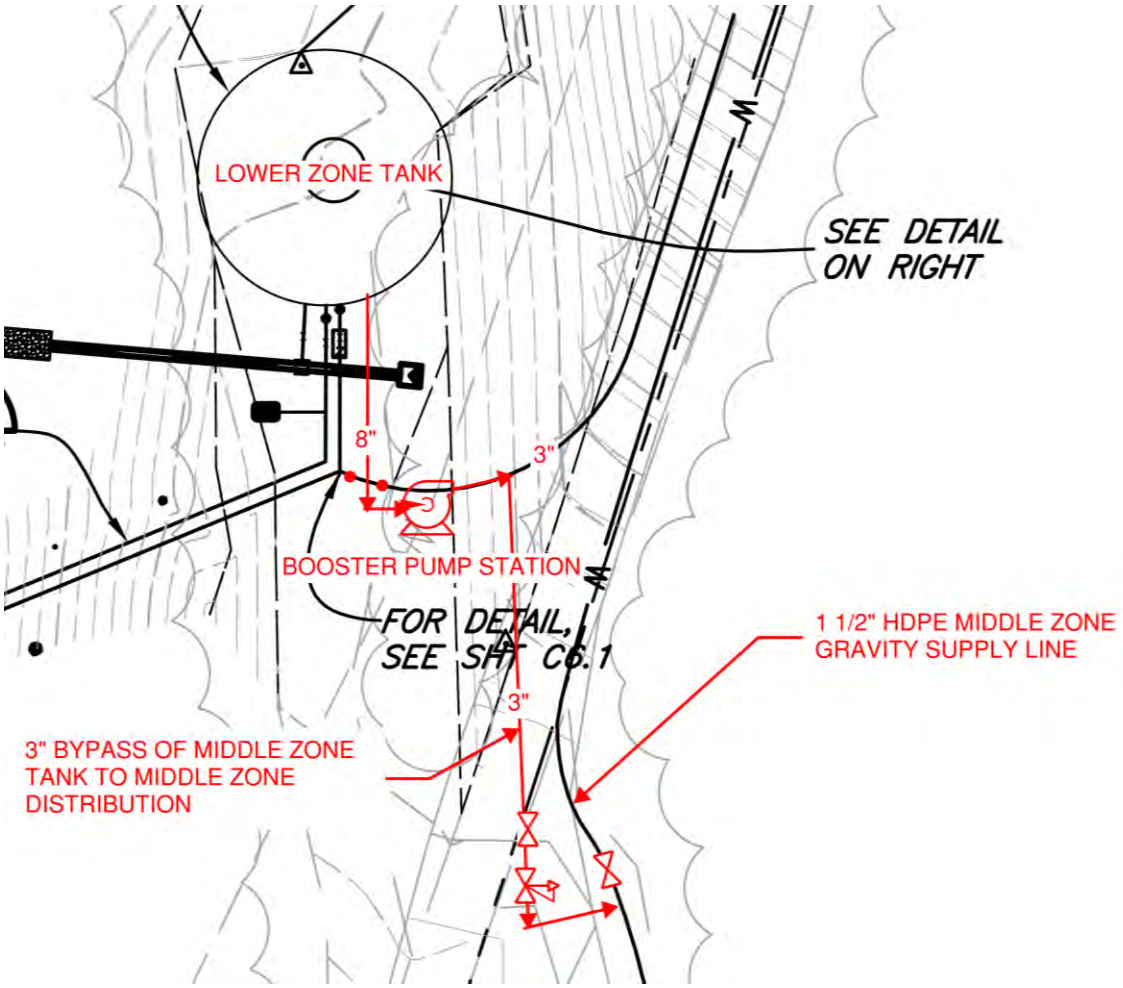


Figure 34: Middle Zone PRV

The middle zone customers have no fire suppression, and they cannot be served by the new 8" HDPE main. A hydrant will be installed on Rock Pit Road at the south end of town which is in the vicinity of the middle zone customer properties. The hydrant line will be connected to the 6" lower zone distribution main along Highway 254. The hydrant location will be within 500-feet of the surrounding customers and will be located at an elevation to provide a minimum service pressure of 20 psi. The hydrant and 6" main alignment is shown in Figure 35.

Figure 35: Middle Zone Hydrant Location

The middle zone service connections are prone to leaks on the customer side of the meter which drain the middle zone tank and eventually the upper zone tanks. The current method of preventing uncontrolled upper zone tank draining is by keeping the middle zone tank fill ball valve partially closed. This valve restricts the fill rate into the middle zone tank. When there is a leak, the operator closes the fill valve disconnecting the upper zone transfer to the middle zone. The stored volume in the middle zone tank continues to drop until the leak is isolated starving the other residents in the zone.

The middle zone customer connections will be outfitted with a leak detection valve. The valve uses flow sensing technology to identify all water leaks and automatically shuts off the water upon detection. The specifications for the leak detection valve are shown in Table 27.

Table 27: Leak Detection Valve Specifications

Valve Type	Leak Detection
Size	1”
Example Manufacturer	Flo N Stop LF22958

3.3.5 Lower Zone Improvements

The lower zone tank, distribution main and hydrants do not require any improvements. Improvements to the PRV station, well and well water treatment plant will be included in this project.

3.3.5.1 Lower Zone Tank Fill Connection

The District has experienced leaking issues with the well pump discharge line. When this occurs, the leak drains the lower zone tank. To prevent this from occurring in the future, a check valve will be installed on the upper end

of the well discharge line closest to the tank. The check valve will prevent water from exiting the tank site through the 3" well discharge line.

3.3.5.2 Lower Zone PRV Station

The lower zone pressures are limited by a PRV station that is installed along Highway 254. The PRV station contains a 6" PRV and a 2" PRV and is at elevation 268, according to Google Earth. The 2009 Improvements Project drawings show the 2" PRV is sized for low flow (minimum 1 gpm and maximum 210 gpm), and the 6" PRV is sized for high flow (minimum 10 gpm and maximum 1800 gpm). The maximum HGL of the lower zone tank is elevation is 488.4, and the minimum service elevation in the lower zone is 236. Therefore, the maximum service pressure in the lower zone without the PRV is 109 psi. The PRV outlet pressure is set to 60 psi, so the actual maximum service pressure in the zone is 78 psi.

Lower zone customers experience issues with adequate flows and pressure. The 6" PRV is out of service and is valved off which does not allow the PRV vault to operate as designed. The project will inspect the PRVs for functionality. A replacement valve type will be considered that is less maintenance intensive than the existing valves. The non-operational valves will be replaced.

3.3.5.3 Well Improvements

The well pump is not maintaining the 60-gpm flow rate that it provided at installation in 2017. The capacity has slowly decreased to 35 gpm over time. The well completion report states the screened portions of the well are installed in sandy gravel and fractured sandstone deposits. The alluvial deposits in the formation are small diameter deposits. Since further information has not been provided on the well construction or the formation sieve analysis, the assumption for the reduced well pump capacity is that the alluvial deposits are clogging the gravel pack and therefore water is not able to enter the well as freely as when the well was first installed. The reduced capacity of the well pump may also be attributed to iron deposits in the gravel pack due to air entrainment in the aquifer. The best solution to revive the well capacity is to re-develop the well. The formation and/or iron deposits may return overtime because of the well construction methods, so redevelopment may not be a permanent solution to solve the reduced capacity at the well.

If, in fact, the redevelopment of the well does not prove to be a permanent solution to the well capacity issue, it is recommended that the District include periodic redevelopment of the wells, as required, in their Capitol Improvement Plan (CIP).

A second well will be drilled in addition to redeveloping the existing well to ensure a secondary source of water for the District, and to provide redundancy to the first well. The new well will be installed approximately 60-feet from the existing well. The well will have similar specifications (140-feet deep with 29-foot sanitary seal, well pump capacity 60 gpm) with a factory slotted 50-slot screen and an 8x12 gradation gravel pack. The well will be properly developed after drilling. The two wells will operate in a one plus one operation with one well as a standby well. The operator will manually alternate the well pump in operation on a monthly or bimonthly basis to exercise the pumps. The well pumps will be connected to disconnect switches located in the well house. The operator will flip the disconnect switch to transfer power to the pump in operation.

3.3.5.4 Well Water Treatment Plant Improvements

The well water treatment plant interior plumbing will be demolished. New well discharge piping, chlorine injection equipment, and a finished water sample station will be provided in the well house. A new roof will be installed on the existing block building. The well site will be enclosed with fencing and exterior building lights will be installed.

3.3.5.4.1 Chlorine Injection

The 55-gallon sodium hypochlorite storage containers and mixing tank will be relocated into a secondary containment shed located on a concrete pad adjacent to the well water treatment plant. The existing chemical shed will be demolished. Two new chlorine injection pumps will be provided, one duty and one standby. These will be wall-mounted in the water treatment plant. The district is using a peristaltic pump and is satisfied with the pump operation. The district previously used a diaphragm pump and did not like the performance. The high injection pressure may wear out the silicone tubing of the peristaltic pump more quickly than what is experienced at the spring WTP where the injection pressure is much less. However, the district prefers the peristaltic pump type, so this is the type that will be provided. The chemical pump selection criteria are included in Table 28.

Table 28: Well Chemical Metering Pump

Pump Type	Peristaltic Metering Pump
Chemical	Sodium Hypochlorite 12.5%
Flow Rate	5 mL/min
Pressure	107 psi
Example Manufacturer, Model	Stenner Classic Series Single Head Adjustable
Maximum Flow Rate Output	40 gpd/100 psi

3.3.5.4.2 Electrical Requirements

The chemical injection pump will be powered by a circuit that is energized when the well pump is running, so the injection pump will only operate when the well pump is operating. The well water treatment plant currently has a generator with a manual transfer switch. When power to the site fails, the well pump and chemical injection pump will shut down. When the operator manually transfers power, both pumps will be brought back online on generator power. The Lower Zone Tank has adequate storage for this lapse in operation during a power failure.

3.3.5.4.3 Piping Arrangement

The well water treatment plant plumbing will be demolished and replumbed to be supported off the ground. The well water treatment plant piping arrangement will be replaced with new PVC piping. A flow meter with automatic flow totalizer will be installed. A schematic of the piping arrangement is shown in Figure 36.

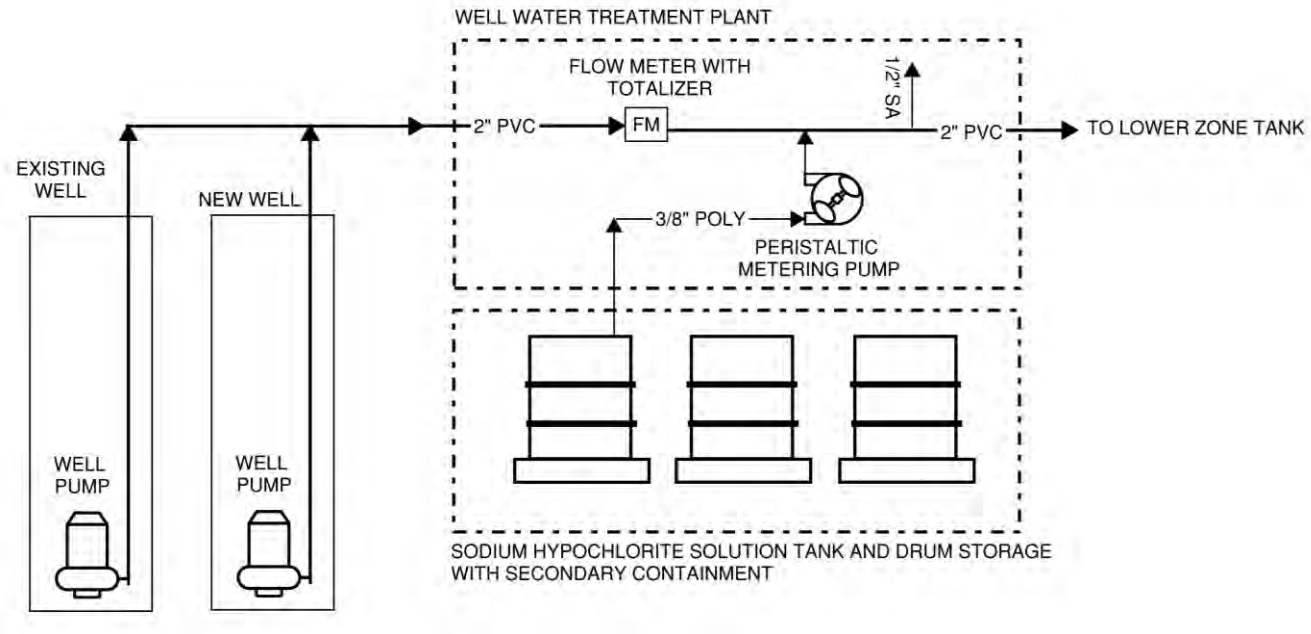


Figure 36: Well House Schematic

3.3.5.4.4 Roof Addition

The existing roof is plywood with chicken-wire covered ventilation gaps. Evidence of rodent intrusion is apparent in the well WTP. A permanent roof solution will be installed at the well WTP. The roof design will allow for natural light entry into the building, will have proper ventilation, and will prevent rodent intrusion.

3.4 Proposed Project Summary

The recommended project elements identified in the previous sections are summarized in Table 29. The system schematic of the proposed improvements is included as Figure 37.

Table 29: Proposed Project Improvements

Site	Proposed Improvements
Spring Site	Install bentonite spring plug Install HDPE spring liner at spring site Regrade spring hillside to direct surface water away from spring Repair or replace spring collection piping as necessary
Spring Water Treatment Plant	Install redundant Strainrite filter train Install Harmsco pre-filter and piping, valves, instruments as necessary Install Turbidimeters and chlorine analyzer Provide duty and standby chlorine injection pumps Install secondary containment for solution tank Install trailer mounted 10 kw generator and MTS Install building entrance lighting
Upper Zone Tank Site	Demolish tanks and piping Install two 12-foot diameter, 16-foot tall plastic tanks Install contact pipeline Install concrete tank foundation and yard piping Install site fencing
Upper Zone Distribution Pipeline	Connect existing distribution mains to 3” main Install pressure reducing valves where required Install 5,300-foot 8” main with hydrants for fire suppression
Middle Zone Distribution	Install leak protection valves Install 1,000-foot 6” pipeline for middle zone hydrant
Lower Zone Tank and Booster Pump Station Site	New electrical service Install 85 kw trailer mounted generator and ATS Install 1+1 booster pump station with high flow pump Connect Upper Zone gravity flow to Lower Zone Tank Install PRV bypass of middle zone tank to middle zone services Install site fencing and parking and building lighting
Lower Zone Distribution	Inspect PRV station for functionality and replace damaged valves
Well and Well Water Treatment Plant	Redevelop existing well and drill new 140-foot well Replumb well water treatment plant, install chlorine analyzer Install secondary containment shed for chemicals Provide replacement chemical pumps Replace well house roof Install site fencing and building lighting

FEET

900
850
775
750
725
700
685
660
550
525
500
475
250
225
200
100

KEY

- ELEVATION SCALE BREAK
- PRESSURE ZONE BREAK
- TANK NAME
- TRANSMISSION MAIN
- HIGH FLOW TRANSMISSION MAIN
- FLOAT VALVE
- ALTITUDE VALVE
- INLINE CHECK VALVE

SPRING BOX

RECONSTRUCT SPRING
ELEVATION: 905

SPRING OVERFLOW

BYPASS OVERFLOW TANK

2" HDPE

DEMOLISH WYE-STRAINERS AND INSTALL CONTINUOUS PIPE

OVERFLOW DIVERSION

SENSING LINE

SPRING WTP

ADD CARTRIDGE FILTER
ADD REDUNDANT STRAINRITE TRAIN
REPLUMB WTP
ELEVATION: 755

POWER:
MTS
GENERATOR

CHEMICAL FEED SYSTEM:
SECONDARY CONTAINMENT
CHEMICAL FEED PUMP

2" HDPE

16" PVC C900 DR 32.5

CT PIPELINE

UPPER ZONE TANKS

TANK A 11,500-GAL

TANK B 11,500-GAL

MAX ELEVATION: 754

FLOOR ELEVATION: 740

3" HDPE

6" HDPE

TO DRAIN

UPPER ZONE

1" HDPE

TO 1 CUSTOMER
ELV 680

3" HDPE

1" HDPE

2" HDPE

1" HDPE

1" HDPE

INSTALL FIRE HYDRANTS AT 500-FOOT INTERVALS ALONG SPRING CANYON ROAD

MIDDLE ZONE TANK
3,000 GAL

3" PVC

MAX ELEVATION: 670

FLOOR ELEVATION: 660

MIDDLE ZONE TANK BYPASS

3" HDPE

8" HDPE

TO 7 UPPER ZONE CUSTOMERS
ELV 660

1" HDPE

TO 3 CUSTOMERS
ELV 650

1.5" HDPE

3" PVC SCH 80

TO ONE CUSTOMER
ELV 530

TO 5 MIDDLE ZONE CUSTOMERS
ELV 500

MIDDLE ZONE

BOOSTER PUMP STATION:
SUPPLY PUMP - 50 GPM
HIGH FLOW PUMP - 500 GPM

SUPPLY PUMP CONTROL
ON: LOW LEVEL AT UPPER ZONE TANK

OFF: HIGH LEVEL AT UPPER ZONE TANK

LOCK OUT: LOW LEVEL AT LOWER ZONE TANK

8" HDPE

3" DIP

LOWER ZONE TANK

MAX ELEVATION: 488.4

FLOOR ELEVATION: 470

OVERFLOW

6" HDPE

3" DIP

PRV VAULT
ELV 270

POWER:
ELECTRICAL SERVICE
ATS
GENERATOR

WELL WTP

POWER:
MTS
GENERATOR

CHEMICAL FEED SYSTEM:
SECONDARY CONTAINMENT
CHEMICAL FEED PUMP
CALIBRATION SKID

WELL WTP

LEAK DETECTION VALVE

ELV 465

ELV 300

2" HDPE

TO 40 CUSTOMERS
ELV 270

LOWER ZONE

INSTALL FIRE HYDRANT ON ROCK PIT LANE

ELV 236

FG ELEVATION: 240

NEW WELL

EXISTING WELL

MANUAL DISCONNECT TO ENABLE/DISABLE PUMP

CONTROL PANEL
STARTS WELL PUMP BASED ON LOW LEVEL SET POINT
STOPS PUMP BASED ON HIGH LEVEL SET POINT

SCREEN BOTTOM ELEVATION: 100

DATE FEBRUARY 2021 PROJECT NUMBER 20-063 FIGURE NUMBER 37	PROPOSED SYSTEM SCHEMATIC	Phillipsville Community Services District Water Quality, Supply and Distribution Improvements Preliminary Engineering Report	WATERWORKS ENGINEERS 760 CYPRESS AVE SUITE #201 - REDDING, CA - 96001

3.4.1 Estimated Construction Cost

The construction cost estimate is included in Appendix I and summarized in Table 30. The cost estimate includes a 30% contingency added to the project subtotal. This contingency amount accounts for the level of accuracy of preliminary design estimating. As the design is finalized and the cost estimate line items are refined, the contingency amount will be reduced to a final amount of 10%.

Table 30: Estimated Project Costs

Project Location	Value	Cost Estimate
Spring Site		$ 76,100
Spring Water Treatment Plant		$ 112,100
Upper Zone Tank Site		$ 272,400
Distribution		$ 690,900
Lower Zone Tank and Booster Pump Station Site		$ 539,600
Well Site and Water Treatment Plant		$ 150,600
Subtotal		*$ 1,841,700*
Design Contingency	30%	$ 552,600
General Conditions, Bonds, Taxes, and Insurance	9%	$ 165,800
Contractor Profit	7%	$ 129,000
Probable Construction Bid		**$ 2,689,100**
Construction Contingency	10%	$ 268,900
Total Probable Construction Cost		**$ 2,958,000**
Planning, Design and Project Management Costs		
Preliminary Engineering and 90% Design		$ 321,721
Design Completion and Bid Documents		$ 90,000
Humbolt County Building Permitting		$ 45,000
PG&E New Service Permit		$ 30,000
Project Management		$ 60,000
Engineering Services During Construction	10%	$ 295,800
Operations and Maintennace Manual		$ 30,000
Total Planning, Design and PM Costs		**$ 842,521**
Total Estimated Project Cost (Planning, Design and Construction)		**$ 3,801,000**
Cost per Connection		***$ 58,000***

3.4.2 Project Schedule

The Proposition 1 funding agreement requires the technical assistance and outreach work be completed by February 28, 2022. The preliminary project schedule is included as Appendix K. It projects the preliminary engineering work will be completed June 25, 2021. The project schedule is dependent on the completion of the CEQA process and receiving timely project review responses from the involved agencies. The CEQA process is

currently underway and will be ready for agency review in early 2021. The preliminary engineering process will continue with 90% design following the approval of the Preliminary Engineering Report by the involved parties.

A summary of the overall project schedule is included as Table 31.

Table 31: Project Schedule Summary

Task	Start	Finish
Preliminary Engineering	September 2020	February 2021
CEQA Permitting	October 2020	July 2021
60% Design	February 2021	April 2021
90% Design	March 2021	June 2021
Financing	April 2021	January 2022
Pre-Construction Activities	January 2022	July 2022
Construction	May 2022	April 2023

3.5 Operation and Maintenance

The District employs two part time employees: one supervisor and one operator. The two employees share most operations and maintenance (O&M) tasks. The current list of recurring O&M tasks includes:

State Reporting Requirements:

- Daily flow readings of the spring and well flow meters
- Daily turbidity, pH, and temperature measurement at the spring WTP
- Daily chlorine residual measurement of finished water at the spring WTP and the well WTP
- Daily readings of the lower zone tank water level
- Twice monthly total coliform and E. Coli sampling of the spring source
- Monthly total coliform and E. Coli sampling of well source
- Monthly absence/presence testing of the distribution system for total coliform and E. Coli for the spring source and well source finished water

Other operational requirements:

- Monthly customer meter readings
- Bag filter replacement
- Tank maintenance
- Chlorine injection pump maintenance and operational control adjustments at the WTP and the well house

Operator costs were assumed based on a 14-hour workweek at a cost of $15 per hour, and a 20-hour work week for the supervisor at a cost of $20 per hour. For estimating purposes, the employee time and pay were kept consistent between the pre- and post-project operating periods. Annual employee cost is estimated to be $31,700.

3.5.1 Current O&M Costs

Current costs, besides operator costs, for the District include:

- Spring WTP bag filter replacement and sodium hypochlorite dosing
- Well pump operation and sodium hypochlorite dosing
- Lower Zone tank maintenance

Current operating costs for the WTP were estimated based on an average bag filter replacement frequency of 4.5 weeks and a 6 mg/L hypochlorite dose. The lower zone tank requires periodic maintenance for tank cleaning and inspection. Industry standards show welded steel potable water storage tanks typically require recoating to repair corrosion damage on a 20-year basis. This repair cost was also included in the annual estimate. The well pump operating cost was calculated based on the 2019 well operating records flow total at a well pump capacity of 35 gpm with an assumed hypochlorite dose of 3 mg/L. The current estimated O&M costs are shown in Table 32.

Table 32: Current O&M Costs

Facility	O&M Items	Annual Cost
Spring WTP	Hypochlorite Dosing, Filter Replacement	$ 4,700
Lower Zone Tank	Tank Cleaning and Inspection, Recoating	$ 3,200
Well Pump and WTP	Pump Operation, Hypochlorite Dosing	$ 4,600
Employees	Operator and Supervisor	$ 31,700
Annual O&M Cost		**$ 44,200**

3.5.2 O&M Estimates After Project Completion

The immediate most noticeable operational change following project completion will be the cartridge filter operation and maintenance, and the online turbidimeters and chlorine analyzers. The cartridge filter will lead to less frequent filter insert replacement than the current filter arrangement, and the online turbidimeter and analyzers will reduce the operator involvement to collect water samples. The water samples and measurements will be collected by the equipment continuously, and the operator will download the measurement information from the controller for reporting purposes.

The project includes two additional generator installations, and the District must maintain the generators in compliance with Air Quality Control Board (AQCB) requirements.

Following project completion, the most drastic change to the system will be the booster pump station operation. However, this facility will not be operated until the District chooses to do so when the spring is either offline, or not producing enough water. When the booster pump station is placed online, it will run automatically.

The following sections make a reasonable assumption of the future annual O&M costs. The estimates provided in the following sections are to be used for planning purposes to ensure the District has funds to complete the maintenance activities when they arise. The complete O&M estimates are included in Appendix J. The costs have been summarized in the following sections.

3.5.2.1 Future O&M Costs, Spring and Well Operation

The future operating costs of the spring WTP were estimated based on average day demand estimates presented in Figure 17, and the resulting supply requirement from either the spring or well source. The ADD estimates for each source are shown in Figure 38. The well pump will likely only operate in the summer months when the spring source is inadequate to supply the total system demand. The spring operating costs includes hypochlorite dosing. The well operating costs include hypochlorite dosing and pump operation.

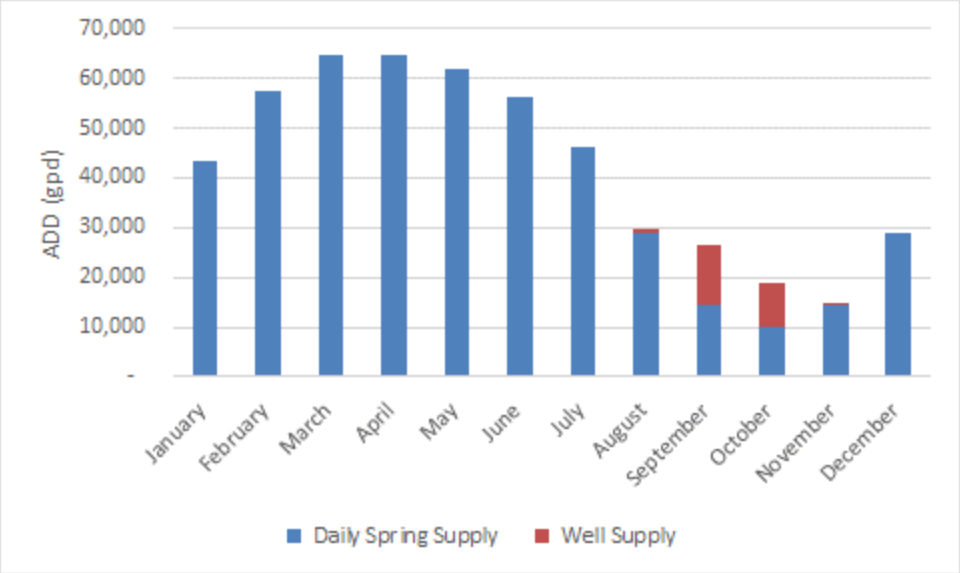


Figure 38: Average Daily Supply by Each Source

The filtration system maintenance costs were estimated for four Harmsco cartridge filter replacements per year, and 13 Strainrite filter replacements. The O-ring for the cartridge filter was assumed to require one replacement per year.

The booster pump station operation was not included in this estimate because it is assumed the spring source can provide adequate flows for the upper and middle zones throughout the year. The high flow pump was not included in this cost estimate because that pump station will only be run during fire-fighting events.

The future O&M costs of the spring and well system is included in Table 33.

Table 33: Future O&M Estimate, Well and Spring

Facility	O&M Items	Annual Cost	Assumptions
Spring WTP	Hypochlorite Dosing, Filter Replacement	$ 6,300	Filter inserts and annual pump replacement
Lower Zone Tank	Tank Cleaning and Inspection, Recoating	$ 3,200	No change
Well Pump and WTP	Pump Operation, Hypochlorite Dosing	$ 2,200	Recovered capacity, Reduced operation
Employees	Operator and Supervisor	$ 31,700	No change
Annual O&M Cost		**$ 43,400**	

3.5.2.2 Future O&M Costs, Well Operation Only

A future operating cost was calculated based on the well pump providing 100% of ADD at 60 gpm. The O&M cost of the booster pump station was calculated based on supplying the upper and middle zone ADD volume. The high flow pump was not included in this cost estimate because that pump station will only be run during fire-fighting events. The estimated O&M costs for the well and booster pump station are included in Table 34.

Table 34: Future O&M Costs, Well Only

Facility	O&M Items	Annual Cost	Assumptions
Lower Zone Tank	Tank Cleaning and Inspection, Recoating	$ 3,200	No change
Booster Pump Station	Pump Operation, Radio Renewal Fee	$ 900	Pumping Upper and Middle Zone MDD
Well Pump and WTP	Pump Operation, Hypochlorite Dosing	$ 6,800	Recovered capacity, Increased operation
Employees	Operator and Supervisor	$ 31,700	No change
Annual O&M Cost		**$ 42,600**	

The well pump and booster pump station operation is less costly than the spring and well operation because there are no filter maintenance costs and the pumping costs to the upper and middle zones is not a significant cost adder. However, the District prefers to operate the system by gravity flows whenever possible because of the high probably of power loss in the rural community and to reduce the dependency on grid power.

3.5.2.3 O&M Cost Summary

A summary of the O&M cost for the three operating scenarios is included as Table 35.

Table 35: Summary of Annual O&M Costs

Method of Operation	Current Operation	Spring/Well Operation	Well/Booster Pump Operation
Spring WTP	$ 4,700	$ 6,300	$ -
Lower Zone Tank	$ 3,200	$ 3,200	$ 3,200
Booster Pump Station	$ -	$ -	$ 900
Well Pump and WTP	$ 4,600	$ 2,200	$ 6,800
Employee Cost	$ 31,700	$ 31,700	$ 31,700
Total Annual O&M Cost (Harmsco Filters)	$ 44,200	$ 43,400	$ 42,600

The future O&M cost estimates of the spring/well operation and the booster pump/well operation are very similar. It may be slightly more expensive to operate the spring and well pump station compared to the spring WTP and well pump, but regardless, the new system arrangement is estimated to cost nearly the same or less to operate as compared to the existing system. PCSD will not need to increase customer rates because of the project. The operating cost savings can be utilized as seen fit by the system operator, possibly to fund a capital replacement reserve for the new equipment, to fund preventative maintenance, or for emergency repair costs.

3.6 Additional Management Considerations

3.6.1 Private Tank Fill Schedule

The upper zone customers with private water tanks are required to have a manual shut-off valve on the tank fill lines. The customers must control inflow into the tanks by manually turning on and off the fill valve to their tank,

or by leaving the fill valve throttled to reduce the fill rate. This operation prevents the private tank customers from draining the upper zone tanks.

A fill schedule shall be implemented for the private tank owners to prevent starving the upper zone tanks by filling too many tanks at one time. The schedule will restrict private customers to filling their tanks on certain days of the week. An assessment of the private storage volume at each service will help determine which customers may fill their tanks on certain days of the week.

To complete the schedule, the District will require the private tank volumes and the number of times the tanks are filled each week for each customer. The schedule will divide the customers into two or more groups of equal private storage volume. Each group will be assigned certain days of the week that they can fill their tanks.

3.6.2 Backflow Protection

Department of Drinking Water (DDW) regulations require backflow protection to prevent backflow into the public water supply. The best backflow protection method is Air Gap Separation (AG). PCSD should inspect all private customer tank connections for air gaps between the service connection and the private tank's operating water surface to ensure the customer connections meet this requirement.

3.7 Comprehensive Response to Climate Change

The project addresses climate change in California with two major changes. First, fire suppression will be provided to the upper zone customers. This is an improvement to the existing system which did not provide fire protection to those 12 customers. Next, a secondary water source will be ensured for all customers. The spring rehabilitation will extend the life of the spring source and the well rehabilitation and construction will ensure a secondary water source for the District. Because the spring collection system is being improved, the project allows for more extensive use of the spring source, taking advantage of gravity feed and using less power than the well source, therefore requiring less energy and having less of an impact on the climate.

Appendix A – USGS Quadrangle Map

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

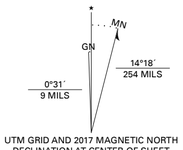
The National Map US Topo

MIRANDA QUADRANGLE
CALIFORNIA - HUMBOLDT COUNTY
7.5-MINUTE SERIES

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 10T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery	NAIP,	May 2016 - October 2016
Roads	U.S. Census Bureau,	2016
Names	GNIS,	1981 - 2018
Hydrography	National Hydrography Dataset,	2004
Contours	National Elevation Dataset,	1999
Boundaries	Multiple sources; see metadata file	2016 - 2017
Public Land Survey System	BLM,	2018
Wetlands	FWS National Wetlands Inventory	2002



UTM GRID AND 2017 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
DK
Grid Zone Designation
10T

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1 MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET

CONTOUR INTERVAL 40 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES

1 Weott
2 Myers Flat
3 Blocksburg
4 Ettersburg
5 Fort Seward
6 Briceland
7 Garberville
8 Harris

ROAD CLASSIFICATION

Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

MIRANDA, CA
2018

NSN: 7643016357062
NGA REF NO. USGSX24K70921

Appendix B – Technical Report for Phillipsville CSD 2009 Water Infrastructure Upgrade

Project Technical Report

Phillipsville Community Water Infrastructure Upgrade

Prepared for:

Phillipsville Community Services District

In the matter of:

California Department of Health Services
Proposition 50 Funding Program 4a.1

SHN Consulting Engineers & Geologists, Inc.

812 W. Wabash
Eureka, CA 95501-2138
707/441-8855

December 2006
006167

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707-441-8855 • Fax 707-441-8877 • info@shn-eureka.com

Reference: 006167

December 22, 2006

Mr. Tom Lasbury
Phillipsville Community Services District
PO Box 231
Phillipsville, CA 96559

Subject: Project Technical Report, Phillipsville Community Water Infrastructure Upgrade

Dear Mr. Lasbury:

This ~~draft~~ project technical report is based on field analysis of the Phillipsville Community Water System. The report contains a project description, and a description of alternatives considered. Included as appendices to the report are the results and recommendations from geologic and biological investigations completed by SHN Consulting Engineers & Geologists, Inc. in December 2006. The project has been found to be feasible from a geologic standpoint; however, the reports should be carefully reviewed as they discuss potential permitting requirements, and additional investigations required for final project design.

We trust the information provide will help the Phillipsville Community Water District obtain funding for much needed upgrades to the water system. Please call me at 441-8855 if you have any questions or comments regarding the report, or if you wish to discuss possible future actions related to your water system upgrades.

Sincerely,

SHN Consulting Engineers & Geologists, Inc.

Brian Freeman, P.E.
Project Manager

BAF/ARK:lms
Enclosures: Project Technical Report
Biological Evaluation
Preliminary Geologic Investigation

Reference: 006167

Project Technical Report

Phillipsville Community Water Infrastructure Upgrade

Prepared for:

Phillipsville Community Services District

In the matter of:

California Department of Health Services
Proposition 50 Funding Program 4a.1

Consulting Engineers & Geologists, Inc.
812 W. Wabash Ave.
Eureka, CA 95501-2138
707-441-8855

December 2006

QA:QC: BAF___

Table of Contents

List of Illustrations

Abbreviations

cu. yds.	cubic yards
gpcd	gallons per capita per day
gpd	gallons per day
lf	linear foot
ppm	parts per million
AWWA	American Water Works Association
DE	Diatomaceous Earth
DHS	California Department of Health Services
DWSRF	Drinking Water State Revolving Fund
EPA	Environmental Protection Agency
HPC	Heterotrophic Plate Count
NTU	Nephelometric Turbidity Unit
O&M	Operation And Maintenance
PCSD	Phillipsville Community Services District
PEP	Polyethylene Pipe
PVC	Polyvinyl Chloride
RA	Rural Residential Agricultural (zoning designation)

1.0 Project Location

The proposed project is located in Phillipsville, California in the southern portion of Humboldt County approximately 8 miles north of Garberville. The project lies within a portion of Sections 12 and 13, Township 3 South, Range 4 East, Humboldt Base and Meridian (Figure 1). The site is accessed by State Highways 101 and 254 and adjacent to the South Fork of the Eel River. Phillipsville is bound to the north and south by Humboldt Redwoods State Park. The Phillipsville Community Services District (PCSD) service area incorporates over 180 acres of river flood plain and transition to steep hillside terrain.

2.0 Description of Water System

The PCSD presently services a small rural area with a population of less than 250 (based on an average of 2.8 persons/customer). Phillipsville is considered a disadvantaged community in that the annual household income is less than 80% of statewide annual median household income of $51,647.

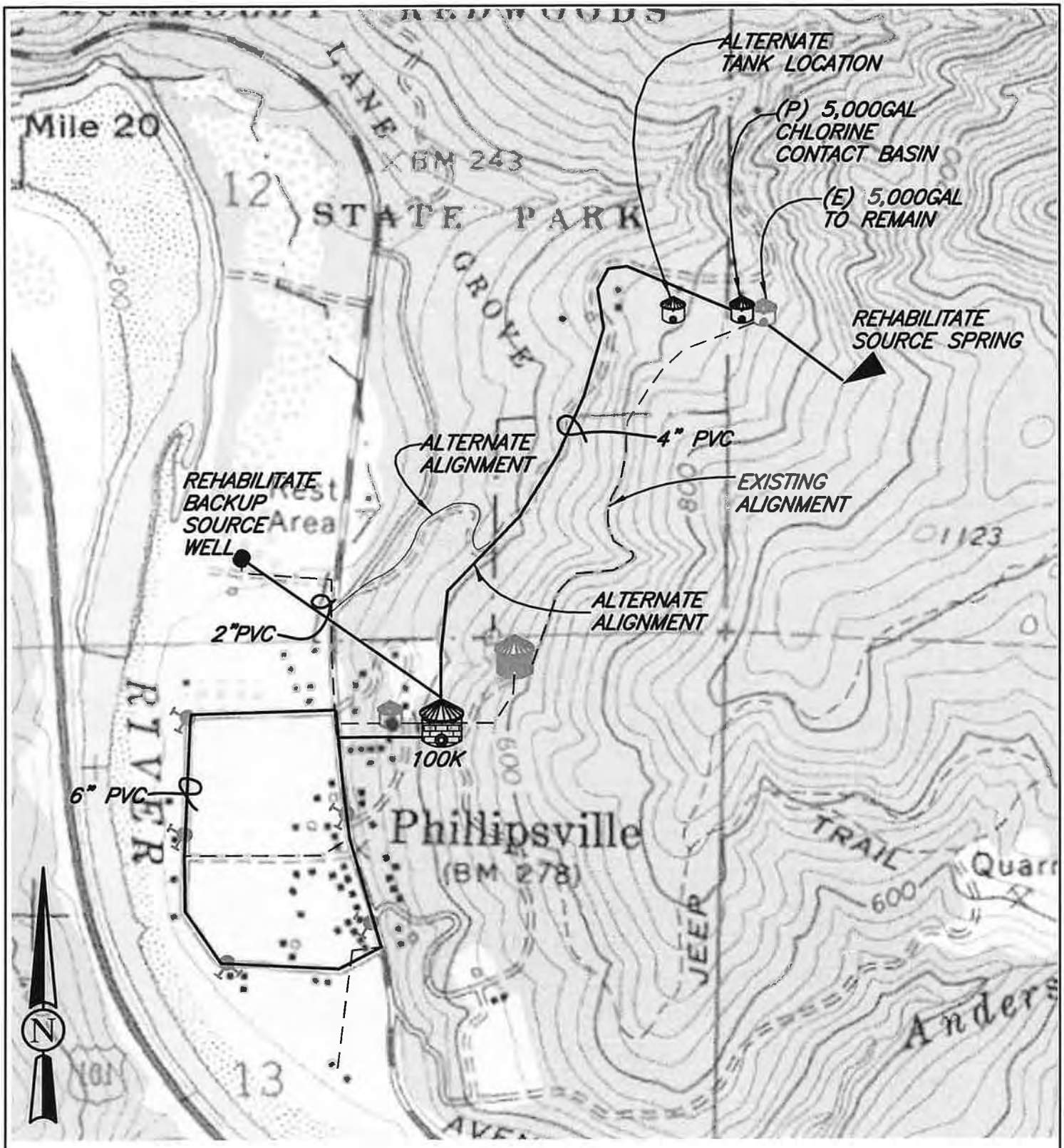
The customers are provided metered domestic water. The central town area, contains mostly permanent resident and "summer home" type customers, and consists of 65 residential and 7 commercial service connections. A mobile home park, with travel trailer spaces, uses three service connections service 22 permanent and 11 seasonal customers. A Laundromat® accounts for two services. The maximum daily demand is 28,125 gallons per day (gpd), based on an average of 75 gallons per capita per day (gpcd) with a multiplier of 1.5 (Lindburg, 2001).

The existing system source is groundwater under the influence of surface water from a developed spring head northeast of the town area in the forested hills under the ownership of the PCSD. The backup water source, is an old irrigation well, and is located on the river valley floor. The recently redeveloped spring head is historically a reliable source of water. Reports show the spring area has consistently provided a sufficient quantity of water to sustain the resident population water demand during drought summer conditions. The minimum estimated yield during drought is 18,000 gpd.

The existing treatment, storage, and distribution facilities consist of approximately 8,300 feet of plastic pipe (2-inch to 6-inch Polyvinyl Chloride [PVC] and Polyethylene Pipe [PEP]), a mechanical pellet chlorinator, and a combination of concrete, fiberglass and redwood storage tanks. A complete description and photos of the existing facilities are presented below and in Figures 1 and 2.

Photo 1. PCSD Spring Head Source

The spring head development (Photos 1) consists of two, 20-foot lengths of 18-inch diameter PVC pipe, with 1-inch perforations, set end to end in a trench. The collectors are set in 24-inch wide ditches and backfilled with 2-inch drain rock to cover over the top of the pipe approximately 2 feet. Natural fill was used to cover the drain rock an additional 3 feet.



LEGEND:

	EXISTING	PROPOSED	ALTERNATE
WATER PIPE	- - - - - -	———	———
STORAGE TANK		REDWOOD / POLY / CONCRETE	

SHN Consulting Engineers & Geologists, Inc.	Phillipsville Community Services District Infrastructure Upgrade Phillipsville, CA		Water Service Facilities Topo Map SHN 006167
	December 2006	quad.dwg	Figure 1

A line tee allows collected water to flow through a 6-inch flexible corrugated plastic drain pipe and a 2-inch polyethylene pine to join above ground immediately downstream of the spring area. An assemblage of reductions and fittings terminate with one, 2-inch polyethylene pipe transmitting collected spring water to a 5,000-gallon poly storage tank. The PCSD plant operator manually adds chlorine tabs to this storage tank for treatment. The poly tank discharges downstream toward town (Photo 2), then the pipe routes cross country to a deteriorating 60,000-gallon tank (Photos 3) To this point, the entire pipeline route follows the climbing and falling topography of the area and is subject to many sections of air entrapment and potential line breakage.

Downstream from the fiberglass tank, the PEP passes another small (500-gallon) wooden tank that services a couple of homes. The 2-inch pipeline then goes into the existing deteriorated 10,000-gallon redwood storage tank above the town.

Photo 2. Service Lines Discharge

Photo 3. Deteriorating 60,000-Gallon Redwood Tank

A 3-inch PVC line continues across the Avenue of the Giants, through town, and then routes north and south to service town extremities and the valley flat to the west.

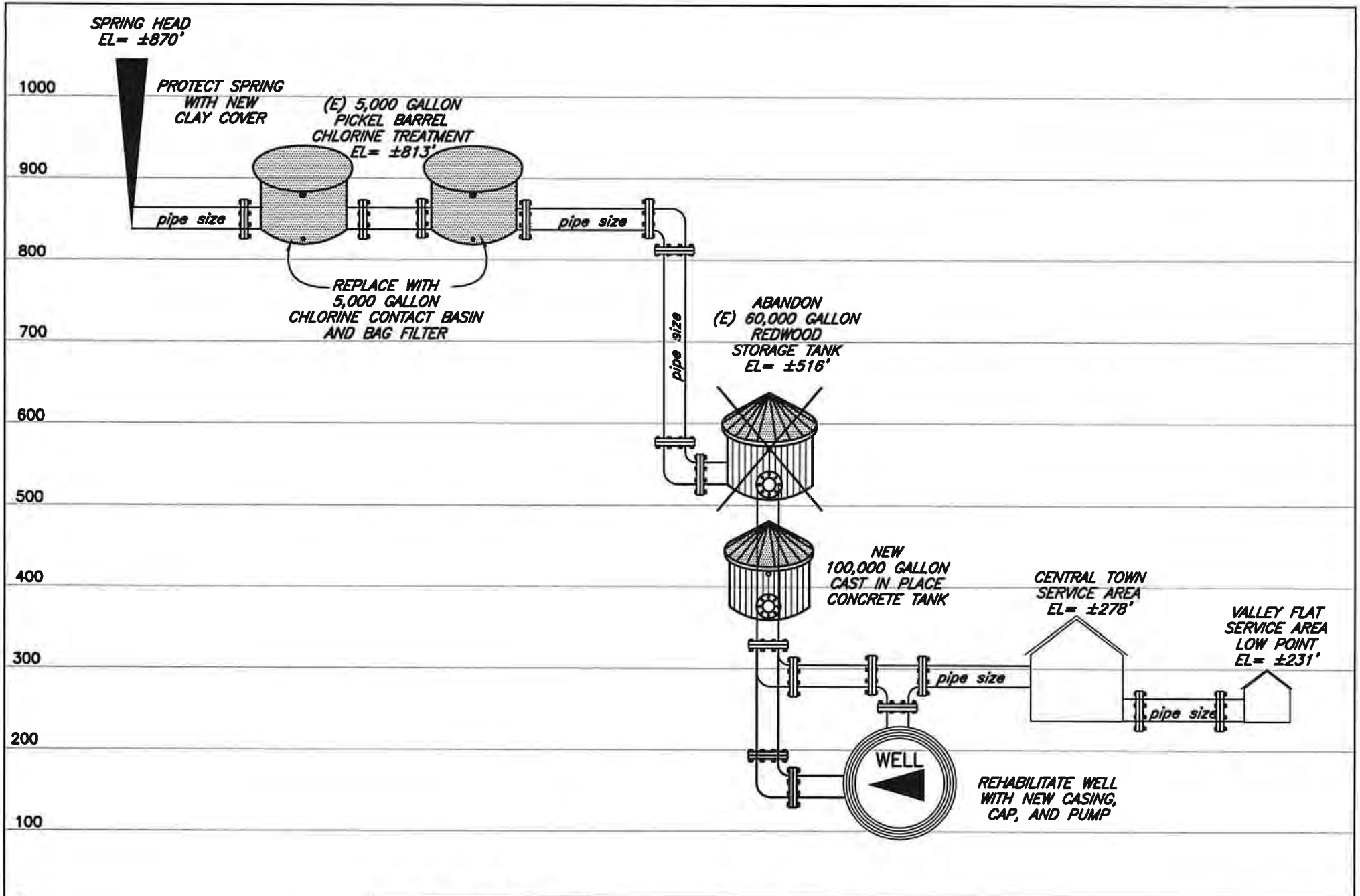
The existing backup source is a well northwest of town on the river valley flat and is an auxiliary supply to the 60,000-gallon redwood tank during the summer. The discharge line of the well submersible pump is equipped with a small injector chlorinator for water treatment, and the pump reportedly can produce "fairly good" yields with only light turbidity problems on startup. No well yield tests have been performed on the system.

See Figures 1 and 2 for a delineation of the service area and the water service facilities.

3.0 Problem Description

The Phillipsville community water system is ranked number 2 on the "Draft Funding Priority List" for disadvantaged communities eligible for Proposition 50-Chapter 4a.1 grants. They are ranked under Drinking Water State Revolving Fund (DWSRF)-C for unfiltered surface water or wells that have fecal or E. coli contamination.

Generally speaking, the water system collection, treatment, and distribution systems consist of a patchwork of sizes and materials and are in a state of imminent ill repair. Very little of the pipeline is buried, and some sections are aerial hung and of substandard size for distribution and fire



SHN Consulting Engineers & Geologists, Inc.	Phillipsville Community Services District Infrastructure Upgrades Phillipsville, CA		Water Service Facilities Schematic SHN 006167
	December 2006	skemat-1.dwg	Figure 2

protection. Portions of the transmission system do not comply with DHS and American Water Works Association (AWWA) standards for piping material as they are constructed with plastic and metal electrical conduit. This pipe is not safe for drinking water.

The existing development at the spring collection system is open to contamination. The above ground pipeline has created the need for constant maintenance due to line breakage. Air entrapment of the system is unavoidable and is presently only released at the storage tanks. Contamination of the water supply, at any point in the system, is difficult to prevent with above ground piping. The existing primary storage facilities are also generally deteriorated and of insufficient storage volume for peak seasonal demands and emergency water requirements.

4.0 Proposed Project Description

In order to comply with safe drinking water standards, provide emergency storage capacity, and meet the expected increase in demand, upgrades to the existing transmission, treatment, and storage facilities are needed. The PCSD has examined alternatives and determined the best project to be a combination of rehabilitation and replacement. Table 1 presents the design criteria used to develop the project design.

Table 1
Design Criteria
Phillipsville, CA

Criteria	Value
Average Annual Daily Flow[1]	75 gpcd[2]
Maximum Daily Multiplier[3]	1.5
Annual Growth Rate[4]	1%
System Life Expectancy	20 years[5]
Design Maximum Daily Flow[6]	30,940 gpd[7]
Minimum Storage Capacity	68,625 gallons
Fire Flows[8]	560 gpm[9]
Fire Hydrant Spacing[10]	500 feet

1. Lindeburg 2001 for residential
2. gpcd: gallons per capita day
3. Lindeburg 2001
4. Projections for Humboldt County by the California Department of Finance = 0.5%
5. 30 new service connections are expected
6. $(250 \times (1+0.01)^{20}) \times 1.5 \times 75 > 30{,}940$ gpd. Use 10%MDF for Prop 50
7. Based on 3x the projected maximum daily use
8. Based on: Q=1020xsqrt(population)x(1-0.01sqrt(population)) (Lindeburg, 2001)
9. gpm: gallons per minute
10. Spacing for rural-residential areas

The following project elements are being proposed:

1. the rehabilitation of the existing well as a backup water supply. This includes a new pump, protective cap, discharge piping, telemetry and controls;
2. rehabilitation of the primary water source spring head to prevent contamination, including an impervious cover such as a bentonite clay;
3. the construction of additional water storage for serving peak service demands with an emergency storage capacity (specifically, the construction of a new 100,000-gallon cast-in-place concrete storage tank);
4. installation of a new 5,000 gallon chlorine contact basin and bag filter treatment system, to disinfect and filter source water to control *Giardia lamblia* by 99.99%; turbidity to less than 1 Nephelometric Turbidity Unit (NTU); and an Heterotrophic Plate Count (HPC) of no more than 500 bacterial colonies per milliliter, as required by the Environmental Protection Agency (EPA) for groundwater under the direct influence of surface water (the new chlorinating system will be operated to provide a free residual chlorine level of 0.2 parts per million {ppm]); and
5. a new buried pipeline from the spring head to the new storage tank and transmission lines. The new pipeline will be 1,500 lf of 2-inch PVC, 2,000 lf of 4-inch PVC and 4800 lf of 6-inch PVC buried with 3 feet of cover over the pipe (the proposed pipeline material, size, and cover complies with AWWA standards and will allow for fire hydrant use).

The above improvements will bring the PCSD water system into compliance with AWWA, and DHS. Other benefits include the protection of Phillipsville's source of drinking water by upgrading the spring area, the new chlorination system will improve customers water quality, and increasing the emergency storage capacity and service lines through town will allow for fire protection. Figure 2 shows a schematic of the existing and proposed improvements.

5.0 Alternatives

This technical report considers 4 alternatives in order to determine the best method to upgrade the PCSD water system. These alternatives are summarized below:

5.1 Alternative #1: Filtration Systems

Three options for small water systems with a high quality water source are slow sand filtration, diatomaceous earth filtration, and bag filtration. Table 2 presents a comparison of these three filtration processes.

Table 2 Filtration Process Alternatives Phillipsville, CA		
Process	**Advantages**	**Disadvantages**
Slow Sand Filtration	• Lower level of operator skill required • Lower O&M[1] Cost	• Requires larger land area • Requires low turbidity water source
DE[2] Filtration	• Smaller area required • Lower capital cost	• Higher degree of material handling • Requires low turbidity water source
Bag Filtration	• Smaller area required • Simple operations • Lower capital cost	• Disposal of bags and cost replacement can be significant depending upon replacement frequency and number of units. • Poor Cryptosporidium removal • Uncertain source of future replacement elements
1. O& M : Operation and Maintenance 2. DE: Diatomaceous Earth (Source: "Slow Sand Filtration and Diatomaceous Earth Filtration for Small Water Systems," Washington State Department of Health, April 2003.)		

The bag filtration is chosen as the best alternative for the PCSD because it is the most cost effective technique and will require the least amount of operations.

5.2 Alternative #2: Storage Tank Construction Material

Alternative tank construction materials include fiberglass, wood, precast concrete, cast-in-place concrete, plastic polycast, and metal. The chosen alternative for tank construction is a polycast plastic for the 5,000 gallon chlorine contact chamber. The PCSD currently owns this tank, along with others of the same material. Therefore the capital cost is very low and the maintenance personnel are familiar with this material. The proposed 100,000-gallon tank is chosen to be cast-in-place concrete because it is the only feasible option for a tank of this size.

5.3 Alternative #3: Alignment Alternatives

The alignment of the new pipeline is based on minimizing conflicts with property owners, access for construction, utilization of existing facilities and maintaining 3-feet of cover over the pipe. Many alternatives were researched, but the proposed alignment met all of the requirements and is therefore the best alternative considered.

5.4 Alternative #4: Consolidation

The possibility of physically consolidating with a nearby community water system is not feasible because there are no other systems within reasonable proximity. The closest districts to Phillipsville are Redway (8 miles to the south) and Miranda (4 miles to the north). Consolidation with either of these two services systems would require miles of piping through the Humboldt Redwoods State Park, therefore this alternative is not feasible.

6.0 Proposed Design and Construction Schedule

Table 3 presents a preliminary cost estimate for the proposed design. Included, for each applicable element is an estimate of the useful life of that element.

Table 3
Preliminary Cost Estimate
Phillipsville, CA

Bid Schedule Item	Amount	Unit	Price	Cost	Subtotal
Earthwork and Paving					$30,000
Clearing & Grubbing	1	ls	$10,000	$10,000	
A/C Paving	1	ls	$5,000	$5,000	
Erosion Control	1	ls	$15,000	$15,000	
Pipes					$313,500
2-inch Plastic Pipe	1,500	lf	$25	$37,500	
4-inch PVC (inc bedding and backfill)	2,000	lf	$30	$60,000	
6-inch PVC (inc bedding and backfill)	4,800	lf	$45	$216,000	
Miscellaneous					$347,500
Fire Hydrants	5	ea	$2,500	$12,500	
Water Tanks - 100,000 gallon	1	ea	$270,000	$270,000	
Water Tanks - 5,000 gallon	2	ea	$10,000	$20,000	
Treatment - Chlorinator and Building	1	ea	$15,000	$15,000	
Treatment - Bag Filter	1	ea	$5,000	$5,000	
Reconstruct Spring	1	ls	$20,000	$20,000	
Well Upgrades	1	ls	$5,000	$5,000	
Insurance & Mobilization					$103,650
Insurance & Mobilization		%	15%	$103,650	
Construction Subtotal					$794,650
Location Factor		%	10%	$79,465	
Construction Contingency		%	30%	$238,395	
Design Engineering, Survey, Geotechnical		%	15%	$119,198	
Construction Management and Permits Acquisition		%	15%	$119,198	
Subtotal					$556,255
PROJECT TOTAL					$1,350,905

The preliminary construction schedule for project completion is as follows:

Preparation and Submission of Plans	4 months
Preparation and Submission of Permitting Documents	3 months
Preparation and Submission of Specifications	2 months
Preparation and Receiving of Construction Bids	2 months
Purchasing of Required Land/Easements	6 months
Earthwork	1 months
Project Construction	4 months

Figure 3 presents a flow diagram for completing the project:

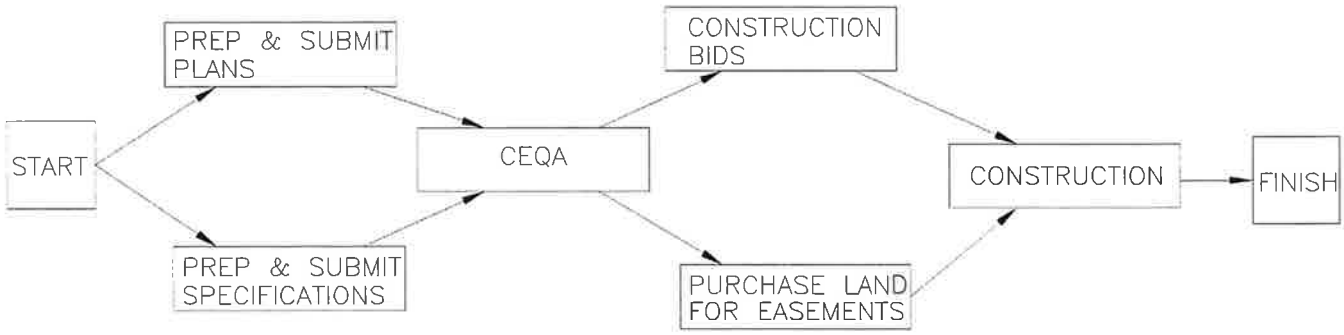


Figure 3. Project Work Flow Schematic

7.0 Planning

The area in and around the town of Phillipsville is zoned rural residential agricultural (RA). The area east of town through which the pipeline will be located is zoned agricultural (AG) and timber production (TPZ). Although, this project does not conflict with the zoning regulations of this area, portions of the proposed project will be conducted within a streamside management area, defined by the Humboldt Streamside Management Ordinance. The Biological Evaluation completed by SHN in December of 2006 is provided as Attachment A, and addresses agency coordination and potential planning and permitting requirements for the proposed project.

A geologic investigation was completed by SHN in December of 2006. Although, the results of the investigation state the feasibility of the project from a geotechnical standpoint, recommendations are included for future design-level analysis. The Preliminary Geologic Evaluation can be found in Attachment B of this report.

8.0 Eligibility

The PCSD is a publicly owned community water system eligible for financial assistance from both the State Revolving Fund program and the Proposition 50-Chapter 4a.1 program. Phillipsville is a small community (less than 1,000 service connections), and is considered a disadvantaged community (annual household income less than 80% of the statewide annual median household income).

All proposed project elements are eligible, as they relate directly to the problem of filtration and disinfection. These eligible components include rehabilitation of spring head to prevent contamination; upgrading the water pipes to 4-inch PVC C900 to comply with AWWA; increasing storage to provide emergency storage and connections for future growth; and a new treatment system (chlorine contact basin and bag filter) to disinfect and filter supply in order to meet DHS standards for fecal coliform, E. coli, and turbidity.

Also being proposed as an integral part of the infrastructure upgrades are the permitting, engineering, and site work associated with project construction. These aspects are also eligible for funding as they are a vital element of project completion.

9.0 References Cited

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Washington State Department of Health. (April 2003). *Slow Sand Filtration and Diatomaceous Earth Filtration for Small Water Systems. NR:WSDH.*

Appendix A

Biological Evaluation

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707/441-8855 • FAX: 707/441-8877 •shninfo@shn-engr.com

Technical Memorandum#

Reference:	006167
Date:	December 26, 2006
To:	Mr. Tom Lasbury Phillipsville Community Service District PO Box 231 Phillipsville, CA 96559
From:	**SHN Consulting Engineers & Geologists, Inc.**
Subject:	Biological Evaluation of the Phillipsville Community Service District Water Supply Improvements

On December 12, 2006, the SHN Consulting Engineers & Geologists, Inc. (SHN) wildlife biologist and botanist conducted a site visit at the Phillipsville Community Service District (PCSD) water supply system to evaluate potential impacts to sensitive biological resources as a result of improving and upgrading the water supply system. Mr. Tom Lasbury of the PCSD accompanied SHN's wildlife biologist and botanist andPCSD explained the layout of the existing system as well as the proposed improvements.

The proposed project is located in Phillipsville, California, in the southern portion of Humboldt County, approximately 8 miles north of Garberville. The project lies within a portion of Sections 12 and 13, Township 3 South, Range 4 East, Humboldt Base and Meridian (Figure 1). The site is accessed by state highways 101 and 254 and adjacent to the South Fork of the Eel River. Phillipsville is bound to the north and south by Humboldt Redwoods State Park. The PCSD service area incorporates more than 180 acres of river flood plain and transition to steep hillside terrain. Elevations range from approximately 200 to 600 feet above Mean Sea Level (MSL).

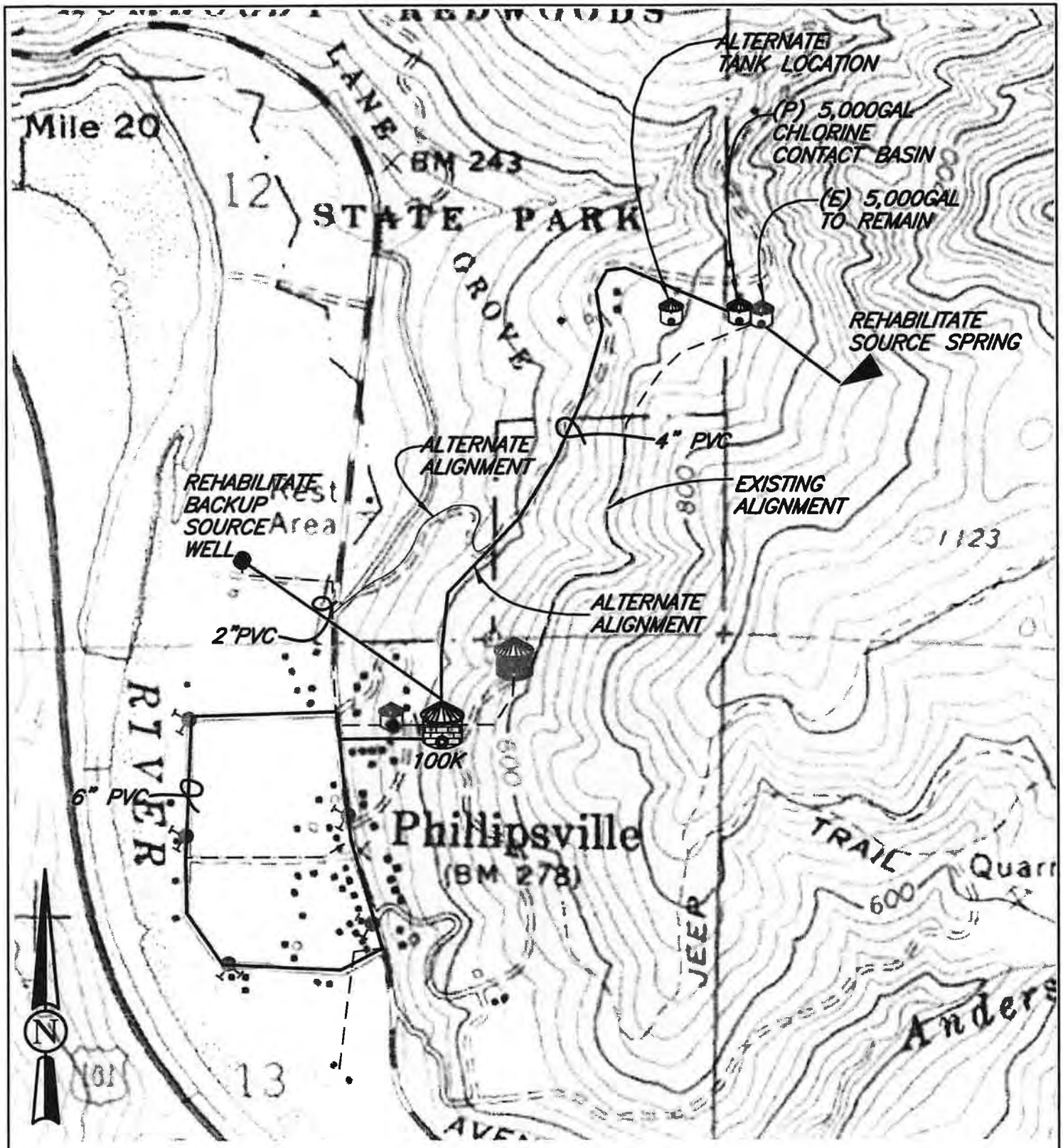
Project Description

The following project elements are proposed:

1. Rehabilitate the existing well as a backup water supply.
2. Reconstruct the primary water source springhead to prevent contamination including an impervious cover such as bentonite.
3. Install a 5,000-gallon chlorine contact basin and bag filter treatment system.
4. Install a new buried pipeline from the springhead to the new storage and treatment components and transmission lines through town.
5. Construct a new 100,000-gallon storage tank for additional water storage and peak service demands.

Habitat Description

Attachment 1 presents a list of all plant species encountered at the site. Botanical nomenclature follows the Jepson Manual (Hickman, 1993).



LEGEND:

	EXISTING	PROPOSED	ALTERNATE
WATER PIPE	- - - - - -	———	———
STORAGE TANK		REDWOOD POLY CONCRETE	

SHN Consulting Engineers & Geologists, Inc.	Phillipsville Community Services District Infrastructure Upgrade Phillipsville, CA		Water Service Facilities Topo Map SHN 006167
	December 2006	quad.dwg	Figure 1

Broadleaved upland forest habitat comprises the majority of vegetation in the project area. The overstory consists of a moderately open canopy of second and third growth Douglas fir (*Pseudotsuga menziesii*), tan oak, canyon live oak (*Quercus chrysolepis*), and California bay (*Umbellularia californica*) with scattered madrone (*Arbutus menziesii*). The understory ranges from sparse with dense leaf litter and small woody debris, to moderately shrub-dominated with evergreen huckleberry (*Vaccinium ovatum),* red huckleberry (*V. parvifolium*), hairy honeysuckle *(Lonicera involucrata),* salal *(Gaultheria shallon),* sword fern (*Polystichum munitum),* and Pacific bramble (*Rubus ursinus*). Dominant herbaceous species include modesty (*Whipplea modesta*), Pacific snakeroot (*Sanicula crassicaulis*), self-heal (P*runella vulgaris*), bracken fern (*Pteridium aquilinum*), and a variety of native and non-native grass species.

Habitat along the dirt roads and at the proposed tank locations are moderately disturbed and are dominated by a mix of native and non-native species. Vegetation cover varies from sparse to moderate. Dominant shrubs include coyote bush (*Baccharis pilularis*), French broom (*Genista monspessulana*), pampass grass (*Cortaderia jubata*), scotch broom (*Cytisus scoparius*), and Himalaya berry (*Rubus discolor*). Herbaceous species consist of whipplea, hedge-nettle (*Stachys* sp.), self-heal, ox-eye daisy (*Leucanthemum vulgare*), hairy cat's-ear (*Hypochaeris radicata*), pearly everlasting (*Anaphalis margaritacea*), sweet vernal grass (*Anthoxanthum odoratum*), hedgehog dogtail grass (*Cynosurus echinatus*), common velvet grass (*Holcus lanatus*), and orchard grass (*Dactylis glomerata*).

Riparian habitat is located in the project area, generally along the spring (primary water source). The spring provides substantial hydrology and supports a predominance of hydrophytes. The moderately open overstory is dominated by red alder (*Alnus rubra)* with scattered willows (*Salix lucida* and *S.* sp.). Shrub species include Pacific bramble, Himalaya berry, hazelnut (*Corylus cornuta*), and American dogwood. The dense herbaceous layer consists of coltsfoot (*Petasites frigidis*), lemon balm (*Melissa officinalis*), small-flowered bulrush (*Scirpus microcarpus*), giant chain fern (*Woodwardia fimbriata*), sedges (*Carex* spp.), common horsetail (*Equisetum arvense*), lady fern (*Athyrium filix-femina*), and elk clover (*Aralia californica*).

Riparian habitat is also located in the western section of the project area, on Phillipsville Flat above the South Fork of the Eel River. The open overstory is dominated by black cottonwood (*Populus balsmifera*) and ornamental fruit trees. The understory is densely vegetated with slough sedge (*Carex obnupta*) and a variety of native and non-native grass species.

Special Status Species

Prior to the field visit, a California Natural Diversity Database (CNDDB) Rare Find and Biogeographical Information and Observation System (BIOS) search was completed for the 7.5-minute U.S. Geological Survey (USGS) Miranda quadrangle (Table 1). The CNDDB was queried for historical and existing occurrences of state and federally listed Threatened, Endangered, and Candidate species, and species proposed for listing; state species of concern; and species listed by the California Native Plant Society (CNPS; Tibor, 2001). Collectively, these species are referred to as "Special Status Species."

Table 1
Sensitive Plant and Vertebrate Species Reported for the Miranda 7.5-minute USGS

Species Latin Name	Common Name	Listing Status[1]	Preferred Habitat
Plants			
Astragalus agnicidus	Humboldt milk-vetch	SE/1B	Distributed openings in broadleaved upland forest and disturbed areas in North Coast coniferous forest; open soil in woodlands; elevation 640-2,460 feet; flowers June-September.
Erythronium revolutum	Coast fawn lily	2	Bogs and fens, broadleaved upland forest, North Coast coniferous forest, margins of swamps and bogs and along wooded streams; elevation 0-3,493 feet; flowers March-June.
Monardella villosa ssp. *globosa*	Robust monardella	1B	Openings in chaparral, cismontane woodland, and oak woodlands; elevation 600-1,970 feet; flowers June-July.
Montia howellii	Howell's montia	2	Wet disturbed sites around meadows and openings in North Coast coniferous forests, usually located on compacted surfaces with minimal vegetation coverage; elevation 0-2,500 feet; flowers March-May.
Vertebrates			
Ascaphus truei	Coastal tailed frog	SC	Sea level to near timberline in cold fast flowing perennial streams in forested areas.
Accipiter cooperii	Cooper's Hawk	SC	Nests in dense cover, primarily forests.
Aquila chrysaetos	Golden Eagle	Sensitive to disturbance while nesting	Rolling foothills and mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of the range as well as large trees in open areas.
Brachyramphus marmoratus	Marbled Murrelet	T/SE/SC	Near-shore waters along coast to 40+ miles inland; nests in mature trees with old growth characteristics.
Empidonax traillii	Willow Flycatcher	SE	Inhabits extensive thickets of low, dense willows on edge of wet meadows, ponds or backwaters.
Falco peregrinus anatum	American Peregrine Falcon	SE	Nests near open water habitat of ten on cliffs or human-made structures.

Table 1
Sensitive Plant and Vertebrate Species Reported for the Miranda 7.5-minute USGS

Species Latin Name	Common Name	Listing Status[1]	Preferred Habitat
Martes pennanti pacifica	Pacific Fisher	C/SC	Intermediate to large-tree succession stages of coniferous forests and deciduous-riparian habitat with closed canopies.
Pandion haliaetus	Osprey	Sensitive to disturbance while nesting	Nests on tree tops or human-made structures near good fish-producing bodies of water such as ocean, bays, fresh-water lakes.
Rhyacotriton variegatus	Southern torrent salamander	SC	Cold, perennial streams with rocky substrate in mesic coastal habitats.
Strix occidentalis caurina	Northern Spotted Owl	FT	Coastal to mountainous mature and old growth coniferous forests; nests in cavities or on natural platforms.

1. CNPS list 1B includes plants that are rare, threatened, or endangered in California and elsewhere.
CNPS list 2 includes plants that are rare, threatened, or endangered in California but more common elsewhere.
Species of Concern (SC) include species that may become candidates for listing.
State Threatened (ST) or Federally Threatened (FT) designation refers to species that are not presently threatened with extinction but are likely to become endangered throughout all or a significant portion of their range in the foreseeable future if special protection and management efforts are not undertaken.
Species listed as State Endangered (SE) or Federally Threatened (FT) are in danger of extinction throughout all or a significant portion of their range.
Candidate (C) designation includes taxa that requires additional information to propose for listing.

Species Accounts and Habitat Suitability

Plants

The state listed Endangered Humboldt milk-vetch (*Astragalus agnicidus)* was presumed extinct until rediscovered in 1987 at its only known historical location near Bear Buttes, Humboldt County, approximately 5 miles northwest of the project site. Since 1999, several occurrences have been documented on Pacific Lumber Company (PALCO) property in southern Humboldt County (CNDDB, 2006). Humboldt milk-vetch is an early successional species that is thought to require both scarification and stratification for seed germination, as well as, openings in the canopy for optimal growth. This species is known to survive for long periods in the soil seed bank when stand canopy densities are unsuitable for its growth. Preferred habitat for the Humboldt milk-vetch includes Douglas fir/tan oak forest, and in recently disturbed areas where canopy cover is low and

competition from other vegetation is minimal. Suitable habitat at the project site for this state endangered species includes roadsides and the two landings were the new water tanks will be located.

Coast fawn lily *(Erythronium revolutum)* is included on CNPS list 2. This perennial herbaceous species occurs in mesic broadleaved upland forest, mesic North Coast coniferous forest, and margins of bogs and fens. Occurrences within broadleaved upland forest and North Coast coniferous forest are typically located near a shaded watercourse. Associate species include tan oak, Douglas fir, white oak (*Quercus garryana*), slink-pod *(Scoliopus bigelovii)*, and sword fern. Suitable habitat within the project area includes the riparian vegetation and a few other scattered locations in the broadleaved upland forest.

Robust monardella (*Monardella villosa* ssp. *globosa)* is included on CNPS list 1B. This perennial species occurs on dry, open sites in woodland, broadleaved upland forest, cismontane woodland, or chaparral, and valley and foothill grassland. The closest occurrence of robust monardella to the project site is located several miles north of Garberville, adjacent to Highway 101. This occurrence is located on a rocky road bank (CNDDB, 2006). Suitable habitat at the project site for robust monardella is located on a road bank in the southern portion of the project area and at the landing where the new 5,000-gallon water tank will be located.

Howell's montia (*Montia howelli*) was rediscovered in 1999 on several low flats above the Van Duzen River east of Carlotta, Humboldt County. Since 1999, numerous occurrences of Howell's montia have been reported including several occurrences on PALCO property (CNDDB, 2006). A historical record from 1921 reports an occurrence of Howell's montia from Phillipsville Flat, potentially within the western section of the project area (CNDDB, 2006). This special status species occurs in wet disturbed sites around meadows and openings in North Coast coniferous forest, usually located on compacted surfaces with minimal vegetation coverage. Most populations occur on roadsides or old roadbeds that remain seasonally moist through May. Howell's montia is an annual ephemeral species that completes its lifecycle by mid-May. Focused surveys for Howell's montia must be made between late February and mid-May when the species is identifiable. Suitable habitat in the project area includes all the landings and dirt roadbeds and roadsides.

Vertebrates

Amphibians

Southern torrent salamanders are occasionally found in adjacent moist riparian vegetation, but are usually in contact with cold (43 - 59 ° F) water in springs, seeps, and headwater streams with shallow, slow flows, over unsorted rock or rock rubble substrate, in mesic mature to old growth forests of the Pacific Northwest (Welsh and Karraker, 2005). Southern torrent salamander populations are thought to be declining due to timber harvesting and related land-management practices (Welsh and Karraker, 2005). Southern torrent salamanders are dependent on riparian conditions that provide cool, wet microenvironment because they are desiccation-intolerant (Welsh

and Karraker, 2005). Habitat suitability for this species within the spring appears to be high especially in the upper steep section where flow is perennial. The substrate composition in the spring appears to be conducive to southern torrent salamander presence.

Tailed frogs occur in small, cool streams. Adults may use thermal micro-habitats to avoid warm water and can be found in moist woods or riparian habitat adjacent to streams (Adams and Pearl, 2005). Tailed frogs have been characterized as both environmentally sensitive and resilient to large-scale disturbance (Adams and Pearl, 2005). Habitat suitability for this species in the spring appears moderate to high.

Avian

Marbled Murrelet is listed as Threatened under the federal Endangered Species Act (ESA) and Endangered under the California Endangered Species Act (CESA); Humboldt Redwood State Park is designated Critical Habitat. Marbled Murrelet are associated with mature forest or mature forest components. Marbled Murrelet nesting habitat within the project area is unlikely, but flyover and nesting in nearby mature redwood stands on State Park Land are likely.

Northern Spotted Owl is listed as Threatened under the ESA and Humboldt Redwood State Park is designated Critical Habitat. Most habitat studies indicate a strong association with older, more structurally diverse stands (Hunter et al. 2005). Northern Spotted Owl occurrences are in close proximity to the project area. Habitat suitability, especially foraging habitat for this species near the upper portion of the spring appears moderate to high.

Cooper Hawk is a State Species of Special Concern; is associated with several habitat types; and can be found in dense forests, to ecotones, to urban environments. The entire project area is suitable habitat for the Cooper's Hawk.

Golden Eagles are sensitive to disturbance while nesting. In southern Humboldt County, Golden Eagles would most likely be associated with open grasslands found on ridge tops. The project area does not contain suitable golden Eagle habitat.

Willow Flycatchers are primarily associated with dense willow stands along rivers and lakes and to a lesser extent have been observed using even aged young forests. Suitable habitat for the Willow Flycatcher does not occur in the project area.

American Peregrine Falcons are usually associated with large water bodies where substantial avian prey is available. Cliffs and human made structures are important for nesting. Suitable habitat for the American Peregrine Falcon does not occur in the project area.

Osprey are usually associated with large water bodies with good fish production. Suitable habitat for the Osprey does not occur in the project area.

Mammals

Pacific fishers are usually associated with intermediate to late succession coniferous and deciduous forests and riparian habitat. The project area contains suitable components of Pacific fisher habitat and records do exist from the Humboldt Redwoods State Park. Furthermore, Pacific fishers have large home–ranges and may frequent the project area. However, several residences extend up slope from the town of Phillipsville and the project area in several locations passes adjacent to residences or directly through their yards. It is likely that these residences (and their pets) and the overall level of urban development may provide enough of a deterrent to exclude Pacific fishers from the project area.

Recommendations

The following recommendations may require additional coordination with resource agencies and are not intended to provide a complete permitting pathway for the project as proposed.

1) The spring may provide habitat for special status amphibian species. Proposed changes to the spring may alter the hydrology or have other unknown impacts. Understanding the presence of amphibians within the spring is important to assess potential impacts to these species as a result of the project. We recommend conducting focused surveys to assess amphibian presence within the spring. The results of the survey will be conveyed to the California Department of Fish & Game (CDFG) to incorporate into the planning and permitting process.
2) Consultation with the CDFG and the U.S. Fish and Wildlife Service are necessary well in advance of the proposed project to determine whether Marbled Murrelet or Northern Spotted Owl surveys are warranted. Surveys could be required and seasonal noise restrictions may need to be incorporated into the planning and permitting process.
3) Portions of the proposed project will be conducted within a Streamside Management Area (SMA) as defined by the Humboldt Streamside Management Ordinance. Coordination should be conducted with the Humboldt County Community Development Department to determine if a County Special Permit is required.
4) Coordination should be conducted with the Regional Water Quality Control Board, North Coast Region (RWQCB) to determine if the project is subject to a Section 401 Water Quality Certification due to the vicinity of the project to a watercourse. Additionally, the RWQCB may require a general construction stormwater permit if the project includes over 1 acre of disturbance and/or due to the vicinity of construction operations to a watercourse.
5) The placement of a bentonite liner into the primary water source spring may be considered fill of "waters of the U.S." and subject to a Section 404 permit with the U.S. Army Corp of Engineers (ACOE). If the ACOE requires a permit, the project will likely be subject to a Section 401 Certification with RWQCB.
6) To the extent feasible, all new construction operations should be conducted in previously disturbed areas such as roadbeds. For example, roads should be used for trenching rather than crossing forested sections of the hillside.

7) Focused botanical surveys should be conducted for Humboldt milk-vetch, fawn lily, robust monardella, and Howell's montia in suitable habitat, as described above. Surveys should be conducted in April for Howell's montia and fawn lily; surveys for Humboldt milk-vetch and robust monardella should be conducted in June or July.

8) Erosion and sediment control best management practices will be important for this project due to the steep slope and juxtaposition within the SMA. Furthermore, extra care should be taken by the project proponent/contractor to ensure that construction debris does not mobilize and enter the spring during project activities, or subsequent to completion.

9) Coordination should be conducted with Humboldt Redwoods State Parks to ensure that access agreements or permits are not required for the proposed project.

10) The project should comply with the California Environmental Quality Act (CEQA).

References Cited

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Attachment 1

Plant Species List

Plant Species List		
Scientific Name	**Common Name**	**Presence (1=tree, 2=shrub, 3=herb)**
Alnus rubra	red alder	1
Lithocarpus densiflorus var. *densiflorus*	tanbark oak	1
Populus balsmifera spp. *trichocarpa*	black cottonwood	1
Pseudotsuga menziesii var. *menziesii*	Douglas-fir	1
Rhamnus purshiana	cascara	1
Salix lucida ssp. *lasiandra*	Pacific willow	1
Salix sp.	willow	1
Sequoia sempervirens	coast redwood	1
Thuja plicata	western red cedar	1
Umbellularia californica	California-bay	1
Baccharis pilularis	coyote brush	2
Ceanothus integerrimus	deer brush	2
Cornus sericea	American dogwood	2
Corylus cornuta var. *californica*	California hazelnut	2
Cytisus scoparius	Scotch broom	2
Gaultheria shallon	salal	2
Genista monspessulana	French broom	2
Heteromeles arbutifolia	toyon	2
Ribes sp.	gooseberry	2
Rosa sp.	rose	2
Rubus discolor	Himalayan blackberry	2
Rubus leucodermis	white-stemmed raspberry	2
Rubus parviflorus	thimbleberry	2
Rubus spectabilis	salmonberry	2
Toxicodendron diversilobum	poison-oak	2
Vaccinium ovatum	evergreen huckleberry	2
Vaccinium parvifolium	red huckleberry	2
Lonicera hispidula var. *vacillans*	hairy honeysuckle	2
Achillea millefolium	common yarrow	3
Agrostis sp.	bent grass	3
Anagallis arvensis	scarlet pimpernel	3
Anaphalis margaritacea	pearly everlasting	3
Anthoxanthum odoratum	sweet vernal grass	3
Aralia californica	elk clover	3
Athyrium filix-femina	lady fern	3
Bellis perennis	English daisy	3
Blechnum spicant	deer fern	3
Bromus sp.	brome grass	3
Cardamine oligosperma	western bittercress	3
Carex obnupta	slough sedge	3

Plant Species List		
Scientific Name	**Common Name**	**Presence (1=tree, 2=shrub, 3=herb)**
Carex sp.	sedge	3
Cirsium sp.	thistle	3
Cynosurus echinatus	hedgehog dogtail grass	3
Cyperus eragrostis	nut-grass or tall flat-sedge	3
Dactylis glomerata	orchard grass	3
Daucus carota	wild carrot or Queen Anne's lace	3
Elymus glaucus	blue wildrye	3
Equisetum arvense	common horsetail	3
Erechtites minima	toothed coast fireweed	3
Festuca arundinacea	tall fescue	3
Foeniculum vulgare	fennel	3
Fragaria vesca	wood strawberry	3
Galium sp.	bedstraw	3
Geranium dissectum	cut-leaved geranium	3
Geranium molle	dovefoot geranium	3
Gnaphalium sp.	cudweed	3
Holcus lanatus	common velvet grass	3
Hypochaeris radicata	hairy cat's-ear	3
Iris purdyi	Purdy's iris	3
Juncus patens	spreading rush	3
Leucanthemum vulgare	ox-eye daisy	3
Lolium perenne	perennial ryegrass	3
Lotus corniculatus	birdfoot trefoil	3
Lupinus sp.	lupine	3
Melissa officinalis	lemon balm	3
Mentha pulegium	pennyroyal	3
Oxalis oregana	redwood sorrel	3
Petasites frigidis	western coltsfoot	3
Plantago lanceolata	English plantain	3
Polypodium californicum	California polypody	3
Polypodium glycyrrhiza	licorice fern	3
Polystichum munitum	sword fern	3
Prunella vulgaris	self-heal	3
Pteridium aquilinum	western bracken fern	3
Ranunculus repens	creeping buttercup	3
Rubus ursinus	Pacific bramble or California blackberry	3
Rumex acetosella	sheep sorrel	3
Sanicula crassicaulis	Pacific snakeroot	3
Satureja douglasii	yerba buena	3
Scirpus microcarpus	small-flowered bulrush	3

Plant Species List		
Scientific Name	**Common Name**	**Presence (1=tree, 2=shrub, 3=herb)**
Sonchus asper	prickly sow thistle	3
Stachys sp.	hedge-nettle	3
Stellaria sp.	chickweed	3
Tolmiea menziesii	youth-on-age	3
Trientalis latifolia	Pacific star flower	3
Trifolium repens	white clover	3
Typha latifolia	broadleaf cattail	3
Urtica dioica ssp. *holosericea*	stinging nettle	3
Vancouveria planipetala	redwood inside-out flower	3
Veronica americana	American brooklime	3
Vicia sp.	vetch	3
Viola sp.	violet	3
Whipplea modesta	yerba de selva	3
Woodwardia fimbriata	giant chain fern	3

Appendix B

Preliminary Geologic Evaluation

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707/441-8855 • FAX: 707/441-8877 •shninfo@shn-engr.com

Technical Memorandum

Reference:	006167
Date:	December 20, 2006
To:	Brian Freeman
From:	Gary Simpson
Subject:	**Preliminary Geologic Evaluation of the Proposed Phillipsville Community Water Infrastructure Upgrade**

This technical memorandum describes the results of SHN Consulting Engineers & Geologists, Inc.'s preliminary geologic review of the proposed upgrade to the Phillipsville community water system. We visited the site on August 15, 2006, and conducted a general reconnaissance of the area encompassed by the principal elements of the existing and proposed water system. Specifically, we visited the spring source area, several existing and proposed tank sites, and existing and potential transmission pipeline alignments.

The principal geologic hazard that may affect the water system is landsliding. The project area is located in a complex geologic environment characterized by highly sheared, weak bedrock materials that are subject to high levels of annual precipitation. Topography of the site is characterized by low to moderate gradient slopes descending from the spring source area, the highest point in the system, to the lower elevation areas (near the Eel River) where most existing and future development has occurred. The area is subject to frequent moderate to strong seismic shaking. During our field reconnaissance, we observed several areas of apparent slope instability. The most significant mass wasting is occurring in a large area near the spring source, which is subject to active earthflow type landslide deformation. Areas of recent bank slumping were observed along several proposed pipeline alignments where they coincide with existing roads (that is, slumping in the cut bank along the inboard edge of the road).

Despite the presence of recent mass wasting in the project area, the extent of unstable ground is relatively localized. Therefore, it appears that the project is imminently feasible from a geologic and geotechnical standpoint, as long as the geologic limitations are considered in project design. We note that the existing intake and distribution system has been successfully constructed and maintained in the past without significant impact from localized slope instability. The areas of existing and potential landsliding are readily apparent, or can be located through detailed geologic analysis; these areas can in all likelihood be avoided.

Other aspects of the project appear relatively straightforward from a geotechnical standpoint. Soils at the project site appear rocky and should provide ample bearing capacity for placement and support of tanks. Existing tanks we observed during our reconnaissance had not been impacted by weak or soft soil issues. The project area does not appear subject to secondary seismic effects (soil liquefaction, etc.).

Future design-level geologic and geotechnical analysis will be required as this upgrade project evolves. Specific geotechnical (soils) data will need to be generated at proposed tank sites. Detailed geologic mapping of existing and potential unstable areas will aid in project layout.

Appendix C – Well Completion Report

Well-2017

Humboldt County Department of Health & Human Services

Division of Environmental Health
100 H Street - Suite 100 - Eureka, CA 95501
Phone: 707-445-6215 - Toll Free: 800-963-9241
Fax: 707-441-5699
envhealth@co.humboldt.ca.us

RECEIVED
JUN 5 2017
HUMBOLDT CO. DIVISION OF ENVIRONMENTAL HEALTH

16/17-1251

WATER WELL APPLICATION

CONSTRUCTION – REPAIR – DESTRUCTION

The Well Permit will be returned to the property owner when approved by Humboldt County Division of Environmental Health (DEH)

Instructions:

1. Complete both sides and submit the Water Well Application with required fee. Include Well Driller's signature and property owner's signature.
2. Work on a well shall not be started prior to approval of the Water Well Application by DEH.
3. Any changes made to the location of a new well shall be approved by DEH prior to commencement of drilling.
4. Well Driller shall notify DEH a minimum of 24 hours prior to sealing the annular space.

Site Address	3104 Ave of Giants	APN	014-131-016
City/State/Zip	Phillipsville, CA	CA	95559
Directions to Site			
Applicant	Watson Well	Contact	Erica Rivera
Mailing Address	500 Summer St	Work Phone	707-442-2249
City/State/Zip	Eureka, CA 95501	Cell Phone	
Property Owner	PCSD	Home Phone	Bonnie Wallace
Mailing Address	PO Box 231	Work Phone	707-930-0800
City/State/Zip	Phillipsville, CA 95559	Cell Phone	707-382-8917

I hereby grant 'right-of-entry' for inspection purposes _____

Drilling Contractor Watson Well Drilling Inc. **C-57 License #** 1014048

I hereby agree to comply with all laws and regulations of the County of Humboldt and the State of California Department of Water Resources Bulletin 74 pertaining to water well construction. I will contact Humboldt County Division of Environmental Health (DEH) when I commence work. Within 30 days after completion of work, I will furnish DEH a report of the work performed.

Well Driller Signature: _____

Would driller like a copy of approved application? ☑ Yes ☐ No

☐ U.S. Mail address: _____

☑ Email address: erica@watsonwelldrillinginc.com

Type of Application:	Construction:		Intended Use:
☑ Construction	Estimated Depth (ft.)	100-200	☐ Domestic - private
☐ Destruction	Diameter (in.)	13-15"	☑ Community Supply
☐ Repair/Modification	Depth of Seal (ft.)	50	☐ Irrigation
	Sealing Material	Bentonite	☐ Other _____

Revised 7-26-16

PE 2722

Estimated Work Dates:	Casing:	Type of Sewage System:
Start _____	Diameter (in.) _____	☐ Community Sewer ☐ OWTS (Septic)
Completion _____	Material _____	Distance from well site to OWTS _____

Special Requirements/Comments:

_____

_____

_____

_____

PLOT PLAN

FOR OFFICE USE ONLY

Fee:	$373.00 ✓1544	Site Approved by:	
Date:	6-5-17	Site Approved Date:	6/5/17
Receipt:	214775	Sealed to Depth of:	28.5'
Project #:	16/17-1251	Seal observed:	☒ Yes ☐ No
Paid by:	Watson Well Drilling	Final Approved Date:	6/6/17

Well-2017

Humboldt County Department of Health & Human Services

Division of Environmental Health
100 H Street - Suite 100 - Eureka, CA 95501
Phone: 707-445-6215 - Toll Free: 800-963-9241
Fax: 707-441-5699
envhealth@co.humboldt.ca.us

RECEIVED
JUN 5 2017
HUMBOLDT CO. DIVISION OF ENVIRONMENTAL HEALTH

16/17-1251

WATER WELL APPLICATION
CONSTRUCTION – REPAIR – DESTRUCTION

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3. Any changes made to the location of a new well shall be approved by DEH prior to commencement of drilling.
4. Well Driller shall notify DEH a minimum of 24 hours prior to sealing the annular space.

Site Address	31604 Ave of Giants	APN	014-131-016
City/State/Zip	Phillipsville, CA	CA	95559
Directions to Site			
Applicant	Watson Well	Contact	Erica Rivera
Mailing Address	500 Summer St	Work Phone	707-442-2249
City/State/Zip	Eureka, CA 95501	Cell Phone	
Property Owner	PCSD	Home Phone	Bonnie Mullaney
Mailing Address	PO Box 231	Work Phone	707-932-5502
City/State/Zip	Phillipsville, CA 95559	Cell Phone	707-382-8917

I hereby grant 'right-of-entry' for inspection purposes _____

Drilling Contractor: Watson Well Drilling Inc. C-57 License #: 1014048

I hereby agree to comply with all laws and regulations of the County of Humboldt and the State of California Department of Water Resources Bulletin 74 pertaining to water well construction. I will contact Humboldt County Division of Environmental Health (DEH) when I commence work. Within 30 days after completion of work, I will furnish DEH a report of the work performed.

Well Driller Signature: _____

Would driller like a copy of approved application? ☑ Yes ☐ No

☐ U.S. Mail address: _____

☑ Email address: erica@watsonwelldrillinginc.com

Type of Application:	Construction:		Intended Use:
☑ Construction	Estimated Depth (ft.)	100-200	☐ Domestic - private
☐ Destruction	Diameter (in.)	13-15	☑ Community Supply
☐ Repair/Modification	Depth of Seal (ft.)	50	☐ Irrigation
	Sealing Material	Bentonite	☐ Other _____

Work Dates:

Completion:

Casing:

Diameter (in.)

Material

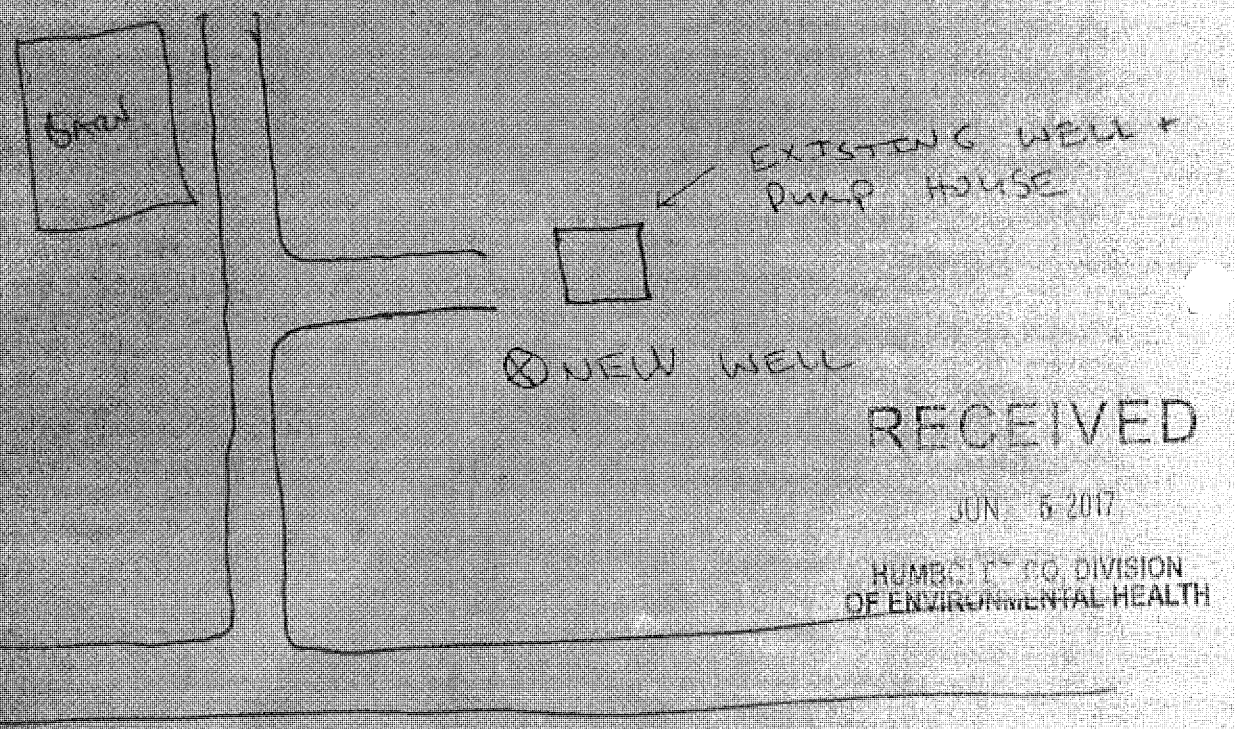
Type of Sewage System:

☐ Community Sewer
☐ OWTS (Septic)
Distance from well site to OWTS

Special Requirements/Comments:

PLOT PLAN

N →



RECEIVED
JUN 5 2017
HUMBOLDT CO. DIVISION OF ENVIRONMENTAL HEALTH

FOR OFFICE USE ONLY

Fee:	$373.00 ✓#1544	Site Approved by:	
Date:	6-5-17	Site Approved Date:	6/5/17
Receipt:	214775	Sealed to Depth of:	
Project #:	16/17-125	Seal observed:	☐ Yes ☐ No
Paid by:	Watson Well Drilling	Final Approved Date:	

State of California

Well Completion Report

WCR Form - DWR 188 Submitted 06/26/2017

WCR2017-001873

Owner's Well Number: 1 | Date Work Began: 06/07/2017 | Date Work Ended: 06/11/2017

Local Permit Agency: Humboldt County Department of Health & Human Services - Land Use Program

Secondary Permit Agency: | Permit Number: 16/17-1251 | Permit Date: 06/06/2017

Well Owner (must remain confidential pursuant to Water Code 13752)

Name: PCSD

Mailing Address: PO Box 231

City: Phillipsville | State: CA | Zip: 95559

Planned Use and Activity

Activity: New Well

Planned Use: Water Supply Public

Well Location

Address: 3164 Avenue of Giants

City: Phillipsville | Zip: 95559 | County: Humboldt

Latitude: Deg. Min. Sec. N | Longitude: Deg. Min. Sec. W

Dec. Lat. | Dec. Long.

Vertical Datum | Horizontal Datum: WGS84

Location Accuracy | Location Determination Method

APN: 214-131-016

Township | Range | Section | Baseline Meridian | Ground Surface Elevation | Elevation Accuracy | Elevation Determination Method

Borehole Information

Orientation: Vertical | Specify

Drilling Method: Direct Rotary | Drilling Fluid: Air

Total Depth of Boring: 140 Feet

Total Depth of Completed Well: 140 Feet

Water Level and Yield of Completed Well

Depth to first water: 30 (Feet below surface)

Depth to Static Water Level: 26 (Feet) | Date Measured: 06/11/2017

Estimated Yield*: 90 (GPM) | Test Type: Air Lift

Test Length: 4 (Hours) | Total Drawdown: (Feet)

*May not be representative of a well's long term yield.

Geologic Log - Free Form

Depth from Surface Feet to	Feet	Description
0	18	Brown Sand
18	30	Brown Sand & Gravel
30	45	Gravel with Brown Sand
45	50	Fractured Blue Sandstone
50	115	Blue Sandstone
115	117	Blue Sandstone with Gravel
117	140	Blue Sandstone

Casings

Casing #	Depth from Surface Feet to	Feet	Casing Type	Material	Casings Specifications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	40	Blank	Low Carbon Steel	N/A	0.188	8.625			
1	40	100	Screen	Low Carbon Steel	N/A	0.188	8.625	Saw Cut	0.25	
1	100	120	Blank	Low Carbon Steel	N/A	0.188	8.625			
1	120	140	Screen	Low Carbon Steel	N/A	0.188	8.625	Saw Cut	0.25	

Annular Material

Depth from Surface Feet to	Feet	Fill	Fill Type Details	Filter Pack Size	Description
0	29	Bentonite	Non Hydrated Bentonite		
29	140	Other Fill	See description.		Pea Gravel

Other Observations:

Borehole Specifications

Depth from Surface Feet to	Feet	Borehole Diameter (inches)
0	140	15

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name: WATSON WELL DRILLING, INC.
Person, Firm or Corporation

500 Summer Street (Address) | Eureka (City) | CA (State) | 95501 (Zip)

Signed: *electronic signature received* (C-57 Licensed Water Well Contractor) | 06/26/2017 (Date Signed) | 1014048 (C-57 License Number)

DWR Use Only

Site Number / State Well Number

Latitude Deg/Min/Sec: N

Longitude Deg/Min/Sec: W

TRS:

APN:

Appendix D – Preliminary Geotechnical Report

PRELIMINARY (DESKTOP) GEOTECHNICAL REPORT

Phillipsville Community Services District
Water System Improvement Project
Humboldt County, California

Submitted To:

Mr. Sami Kader, P.E. &
Ms. Sheila Magladry, P.E
WATER WORKS ENGINEERS
760 Cypress Avenue, Suite 201
City of Redding, CA 96001

WATERWORKS ENGINEERS

Prepared by:
Bajada Geosciences, Inc.

December 11, 2020
Project No. 2001.0137

BAJADA
Geosciences, Inc.

BAJADA
Geosciences, Inc.
28301 Inwood Rd.
Shingletown, CA 96088
(530) 638-5263

December 11, 2020
2001.0137

Mr. Sami Kader, P.E., & Ms. Sheila Magladry, P.E.
WATER WORKS ENGINEERS, INC.
760 Cypress Avenue, Suite 201
Redding, CA 96001

Subject: **Preliminary (Desktop) Geotechnical Report**
Phillipsville Community Services District
Water System Improvement Project
Humboldt County, California

Dear Mr. Kader & Ms. Magladry:

Bajada Geosciences, Inc., is pleased to submit this preliminary (desktop) geotechnical report to Water Works Engineers, LLC (WWE), for the Water System Improvement Project for the Phillipsville Community Services District. The project is in the unincorporated Phillipsville area of Humboldt County, California. This desktop report is being submitted in accordance with our proposal dated October 1, 2020. This desktop report discusses data collection and reviewed, field observations, and preliminary geotechnical analyses performed for this study.

We appreciate the opportunity to perform this preliminary study. If you have any questions pertaining to this report, or if we may be of further service, please contact us at (530) 638-5263 at your earliest convenience.

Sincerely,

BAJADA GEOSCIENCES, INC.

James A. Bianchin, P.G., C.E.G.
Principal Engineering Geologist

Jon Everett, P.E., G.E.
Principal Geotechnical Engineer

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PHILLIPSVILLE COMMUNITY SERVICES DISTRICT IMPROVEMENTS
PHILLIPSVILLE AREA, HUMBOLDT COUNTY, CALIFORNIA

PLATES

APPENDICES

1 GENERAL

This report presents a preliminary (desktop) geotechnical study for proposed improvements to the Phillipsville Community Services District (CSD) Water distribution system. The project is located in the Phillipsville area of unincorporated Humboldt County, California, as shown on Plate 1 – Site Location Map. Our services have been performed under contract with Water Works Engineers, LLC (WWE), who is the civil engineering consultant to the CSD for this project.

The following sections present our understanding of the project, the purpose of our study, and preliminary geotechnical findings, conclusions, and recommendations for the project.

1.1 PROJECT UNDERSTANDING & LOCATIONS

1.1.1 Existing Facilities

We understand that the CSD currently operates a water system that captures, treats, pumps, stores, and distributes water to subscribers within their service area. That system is shown on Plate 2 – Existing Water System Elements. We understand that the CSD collects water from a spring, treats that water, then distributes it through 1.5-, 2-, 3-, and 6-inch diameter pipelines. In addition, water is pumped from a well located on the terrace near the Eel River, as shown on Plate 2.

Locally, water is stored in tanks located along the distribution system. Three 5,000-gallon polyethylene tanks are located near the treatment building, just below the spring. A 5,000-gallon polyethylene tank and 140,000-gallon steel tank are located on the slopes above Phillipsville, as shown on Plate 2.

1.1.2 Proposed Improvements

Three primary improvements are being considered for this project:

- Improvement of the existing spring site;
- Construction of a new tank; and
- Construction of a new pump station.

We understand that the existing collection gallery at the spring site is capturing and transmitting water but the seal around the solid (nonperforated) transmission pipeline leading from the spring to the tank immediately downslope from the gallery needs to be improved/replaced to reduce leakage. In addition, measures to improve surface water drainage away from the spring and reduce the potential for surface pooling of water are proposed for the spring site.

We understand that a new tank is being considered near the treatment building, just below the spring. We understand that the proposed tank will likely be 30 feet in diameter or smaller and will likely be bolted or welded steel. It is anticipated that a ring foundation will be utilized for the project.

In addition, we understand that a new pump station is being considered adjacent to the existing 140,000-gallon tank. We understand that a retaining wall may be constructed to provide adequate room for improvements at that site.

1.1.3 Project Location

The proposed improvements noted above are situated on two parcels. The following table presents the Assessor Parcel Numbers (APN) of those parcels and the approximate latitude and longitude for the proposed tank and pump station.

PROJECT IMPROVEMENT LOCATIONS					
Proposed Improvements	APN	Latitude		Longitude	
		Decimals	Degrees	Decimals	Degrees
Tank & Spring	214-201-040	40.217956°	40° 13' 4.6"	-123.777384°	-123° 46' 38.6"
Pump Station	214-280-008	40.210957°	40° 12' 39.5"	-123.784316°	-123° 47' 3.5"

1.2 STUDY PURPOSE

The purpose of our preliminary geotechnical study was to gather selected, available geotechnical, geological, and hydrogeologic information pertinent to the project to prepare a preliminary characterization of geological conditions in the study area and to provide preliminary geotechnical recommendations for the design of the project. No subsurface exploration or laboratory testing was performed as part of this "desktop" study. This study is preliminary in nature and not intended to provide design-level geotechnical data or recommendations.

1.3 SCOPE OF SERVICES

Our scope of services included:

- Acquisition of selected, existing, available geotechnical data relevant to the project area. The data collected and reviewed during this study are presented in Section 8 – References Cited of this report and relevant, available drill hole logs from previous studies are presented in Appendix A – Subsurface Information;
- Review of pertinent, selected regional geological data;
- Review of selected historical aerial photographs and topographic maps of the project region;
- Preparation of this report, which includes:

- A description of the proposed project;
- A description of site surface conditions observed during our site reconnaissance;
- A preliminary characterization of subsurface conditions likely to be encountered at proposed project pipeline improvement locations discussed in Section 1.1;
- California Building Code (CBC) seismic design criteria;
- Maps showing the proposed project improvements studied. Those maps are presented as Plates 3.1 through 3.3 – Project Improvements;
- A geologic map showing the projected surface distribution of geological materials within the project area. That map is presented as Plate 4 – Geologic Map;
- A soil survey map presented as Plate 5 – Soil Survey Map;
- A regional fault map presented as Plate 6 – Regional Fault Map;
- Preliminary geotechnical recommendations for:
    - Suitability of on-site materials for use as engineered fill;
    - Improvements at the spring;
    - Estimated bearing pressure for foundations;
    - Lateral earth pressures for retaining walls; and
    - Temporary excavations, shoring, and trench backfill.
- Appendices that present information reviewed for this study.

2 DATA REVIEWED

Data reviewed in preparation of this preliminary geotechnical study included historical aerial photographs, historical topographic maps, regional geological and hydrogeologic information, and subsurface information presented in geotechnical and geoenvironmental reports for studies in the project region. Private sources, WWE, Geotracker, U.S. Geological Survey, California Geological Survey, and other sources were contacted to obtain geotechnical data. The following sections discuss those data sources.

2.1 HISTORICAL AERIAL PHOTOGRAPHS & TOPOGRAPHY

Historical aerial photographs for the project areas were reviewed. Those aerial photographs were from the following years: 1968, 1998, 2005, 2009, 2010, 2012, 2014, and 2016, and were reviewed to estimate historical land uses that might affect geotechnical aspects of the proposed project improvements.

Topographic maps from the years 1921, 1951, 1963, 1974, 2012, 2015, and 2018 were also reviewed for this study.

2.2 REGIONAL GEOLOGICAL MAPS

Several regional geological maps were collected and reviewed for this study. Those maps include Dibblee and Minch (2008), Fraticelli et al. (2012), and Haydon (2014). The primary geologic map used for this study was Haydon (2014).

2.3 GEOTECHNICAL & ENVIRONMENTAL STUDIES

The project area is in a rural area with few sources available for existing geotechnical and environmental studies. We performed a search using the state's Geotracker (2020) and Envirostor (2020) databases and found no relevant information located near the proposed improvements. We also searched the Caltrans GeoDOG database (Caltrans 2020) for existing subsurface data at locations relevant to the proposed project. No archived geotechnical data were present close to proposed improvement areas.

The only relevant existing geotechnical information that was available for this study was for the design of the 140,000-gallon steel tank, where the pump station is proposed (SHN, 2007). A preliminary geologic evaluation of the overall Phillipsville CSD system was submitted by SHN (2006). In addition, design of a liner system above the location of the spring collection gallery was also available (SHN, 2008)

2.4 GROUNDWATER

We accessed the Department of Water Resources' Water Data Library (DWR, 2020a) and the Department of Water Resources' Well Completion Report Library (2020b) to obtain

groundwater information for the project area. No data were available for the proposed improvement areas from these databases.

2.5 SOILS SURVEY

Soil data for the project area were obtained from the Natural Resources Conservation Services Soil Survey website (NRCS, 2020).

3 FINDINGS

3.1 IMPROVEMENT AREA CONDITIONS

The project area is in a rural environment. The majority of the CSD system is located on relatively moderate to steeply inclined slopes, as shown on Plate 2. Those slopes are inclined at about 3:1 (horizontal:vertical; ~18°) to about 1.5:1 (~34°). Those slopes are moderately to heavily timbered and have thin to thick understory growth of trees, shrubs, and vines. Access roads and residential structures are present locally across these slopes and former skid trails and landings can be observed in various locations. Elevations of this area range from about 250 to about 1,100 feet, as shown on Plate 2. Drainage occurs as sheetflow or within drainage swales towards the north and west.

The remainder of the system is located on relatively flat terrain adjacent to the Eel River. These areas are improved with residences and farm structures and locally have been planted with agricultural crops and trees. Slopes in this area are inclined at less than 5 degrees. Drainage occurs as sheetflow towards the west.

3.2 GEOLOGIC CONDITIONS

3.2.4 Regional Geology

The project site is located in the Coast Ranges Geologic/Geomorphic Province of Northern California. The Coast Ranges province consists of an approximately 50-mile wide range of mountains extending from Santa Barbara County approximately 400 miles northward into Shasta and Humboldt Counties (Hines, 1952). It is bounded to the north by the Klamath Mountains province, to the south by the Transverse Ranges province, to the east by the Great Valley province, and to the west by the Pacific Ocean. The Coast Ranges province is chiefly composed of late Jurassic to recent formations and their topography is controlled by regional and local faults and folds. Along the coast, the Coast Ranges are stepped with a series of marine terraces representing uplifted wave-cut platforms and by emergent non-marine terraces along rivers and drainages.

3.2.5 Local Geologic Setting

The lower and relatively flatter portions of the project area are situated on nonmarine fluvial terrace deposits situated adjacent to the Eel River, as shown on Plate 4. These terraces are uplifted remnants of the former Eel River channel and flood plain. Terrace deposits consist predominately of silty sand to clayey sand with lesser amounts of sandy silt, and clay.

The upper portions of the project area and those where improvements are proposed are situated on moderately lithified sedimentary deposits of the Paleocene to late Eocene Yager Terrane (Dibblee & Minch, 2008; Fraticelli et al., 2012, Haydon, 2014), as shown on Plate 4.

The sediments within the Yager terrane consist of sheared argillite, interbedded sandstone, and conglomerate.

Overlying the Yager Terrane are landslide deposits, as shown on Plate 4. Relatively thin sequences of artificial fill are present within the project area and are not depicted on Plate 4.

3.3 SOILS

Based on information obtained from the NRCS Soil Survey (NRCS 2020), a total of seven soil series units are located in the project area. Those units are as follows:

SOIL UNITS UNDERLYING SEGMENTS	
Soil Unit No.	**Soil Unit Name**
159	Grannycreek-Parkland complex, 2 to 5 percent slopes
179	Eelriver and Cottoneve soils, 0 to 2 percent slopes
187	Pepperwood-Shivelyflat complex, 0 to 2 percent slopes
570	Canoecreek-Sproulish-Redwohly complex, 15 to 30 percent slopes
571	Canoecreek-Sproulish-Redwohly complex, 30 to 50 percent slopes
575	Canoecreek-Sproulish-Redwohly complex, 50 to 75 percent slopes
5508	Canoecreek-Coyoterock-Sproulish complex, 15 to 59 percent slopes

The distribution of those soil units across the area is shown on Plate 5. Those soils have the following reported characteristics:

SOIL SURVEY DATA									
Soil Unit	**USCS Symbol**	**Grain-Size (%)**			**Plasticity Index**	**Liquid Limit**	**K (cm/sec)**	**Corrosivity**	
		Clay	**Silt**	**Sand**				**Steel**	**Concrete**
159	MH	38.3	30.7	31.0	27.0	54.2	$1.7x10^{-6}$	High	Moderate
179	PT	17.6	69.3	13.1	5.7	22.6	$1.5x10^{-5}$	High	Low
187	SM	11.3	35.9	52.8	2.8	17.2	$1.3x10^{-5}$	High	Low
570	PT	25.8	42.6	31.6	9.8	30.5	$1.2x10^{-5}$	Moderate	Moderate
571	PT	26.8	40.5	32.8	10.6	31.3	$1.7x10^{-5}$	Moderate	Moderate
575	PT	17.9	39.5	42.6	5.9	23.1	$2.9x10^{-5}$	Moderate	Moderate
5508[1]	PT	21.0	25.6	53.4	13.3	31.5	$1.3x10^{-5}$	Moderate	Moderate

Obtained from NRCS (2020). If cell is empty, then no value was provided by NRCS (2020).
[1] – Soil unit on which tank and pump station are proposed.

3.4 SOILS CHARACTERISTICS

Reported engineering characteristics of underlying soil and rock materials were only found in SHN (2007). That report was prepared at the 140,000-gallon tank, where the proposed pump station is to be located. In the one drill hole advanced at that site, granular soils and sandstone were encountered with lesser amounts of interbedded fine-grained soils. Moisture

content of samples obtained from that drill hole ranged from 14.0 to 18.4 percent with an average moisture content of 16.3 percent. Dry densities ranged from 106 to 119 pounds per cubic foot (pcf) with an average of 113 pcf. Unconfined compression test values obtained from two samples were 1,901 and 3,209 pounds per square foot (psf). No other tests were performed for that study.

3.5 GROUNDWATER

Groundwater daylights at the spring. Groundwater was encountered at a depth of 23 feet in SHN (2007). No other reports of groundwater depth were found during this study.

4 GEOLOGICAL HAZARDS

4.1 FAULTING

The State of California designates faults as Holocene-age or Pre-Holocene-age depending on the recency of movement that can be substantiated for a fault. Fault activity is rated as follows:

FAULT ACTIVITY RATINGS		
Fault Activity Rating	**Geologic Period of Last Rupture**	**Time Interval (Years)**
Holocene-Active	Holocene	Within last 11,000 Years[1]
Pre-Holocene	Quaternary & Older	>11,000 Years[1]
Age Undetermined	Unknown	Unknown

[1] – Holocene is defined as 11,700 years before present by the International Commission on Stratigraphy. The California State Mining and Geology Board, which administers the review and application of the Alquist-Priolo Earthquake Fault Zoning Act, currently recognizes the Holocene as 11,000 years before present.

The California Geologic Survey (CGS) evaluates the activity rating of a fault in fault evaluation reports (FERs). FERs compile available geologic and seismologic data and evaluate if a fault should be zoned as Holocene-active, pre-Holocene, or age undetermined. If an FER evaluates a fault as Holocene-active, then it is typically incorporated into a Special Studies Zone in accordance with the Alquist-Priolo Earthquake Fault Zoning Act (AP). AP Special Studies Zones require site-specific evaluation of fault location for structures for human occupancy and require a habitable structure setback if the fault is found traversing a project site.

The region is not located within an Alquist-Priolo Earthquake Fault Zone and no Holocene-active faults are known to pass through the proposed project area (Jennings, 1994; California Geological Survey, 2020; U.S. Geological Survey, 2020). The site is located between the Holocene-active San Andreas and Bartlett Springs fault systems but is separated from those faults by about 17 and 14 miles, respectively. However, a number of Pre-Holocene and Age Undetermined faults are located in the project region, as shown on Plate 6.

4.2 CBC SEISMIC DESIGN RECOMMENDATIONS

We understand that the proposed project could be designed under the California Building Code (CBC, 2020) criteria. As such, at a minimum, improvements should be designed in accordance with the following seismic design criteria:

CBC SEISMIC DESIGN PARAMETERS			
California Building Code	**Parameter**	**Location**	
		Proposed Tank	**Proposed Pump Station**
Site Coordinates	Latitude	40.217956°	40.210957°
	Longitude	-123.777384°	-123.784316°
Section 1613.3.3 Table 1613.3.3(1)	Site Coefficient, F_a	1.2	1.2
Section 1613.3.3 Table 1613.3.3(2)	Site Coefficient, F_v	Null	1.4
Site Class Designation		D	C
Section 1613.3.1 Figure 1613.3	Seismic Factor, Site Class B at 0.2 Seconds, S_s	1.796	1.787
	Seismic Factor, Site Class B at 1.0 Seconds, S_1	0.862	0.859
Section 1613.3.3	Site Specific Response Parameter for Site Class B at 0.2 Seconds, S_{MS}	2.155	2.144
	Site Specific Response Parameter for Site Class B at 1.0 Seconds, S_{M1}	Null	1.203
Section 1613.3.4	$S_{DS}=2/3S_{MS}$	1.436	1.429
	$S_{D1}=2/3S_{M1}$	Null	0.802

4.3 LANDSLIDES

Landslides are present throughout the project region and within the CSD service area, as shown on Plate 4. Haydon (2014) mapped the landslide that underlies the spring, treatment building, three 5,000-gallon water tanks, and some of the project pipelines. The proposed tank will be situated on this landslide. That slope failure was designated as "Dormant-Young" but has morphology and surface expressions of an actively creeping failure. The landslide appears to be a debris flow or earth flow and is likely characterized by relatively slow, constant to seasonal downslope movement. The rate of that movement is unknown, as is the seasonal cycle of activation.

Other landslides (aside from the slide mapped by Haydon) are present throughout the CSD service area, except on the relatively flat terrace adjacent to the Eel River, as shown on Plate 4. Those slides were apparent geomorphically and from aerial photographs and topographical/hillshade expressions. Most of those slides have geomorphology that implies "Dormant-Young" to "Dormant-Mature". The proposed pump station is situated on one of

those landslides. No signs of active or incipient movement of that landslide were observed when we visited that site.

4.4 LIQUEFACTION

Liquefaction is described as the sudden loss of soil shear strength due to a rapid increase of soil pore water pressures caused by cyclic loading from a seismic event. In simple terms, it means that a liquefied soil acts more like a fluid than a solid when shaken during an earthquake. In order for liquefaction to occur, the following are needed:

- Granular soils (sand, silty sand, sandy silt, and some gravels);
- A high groundwater table; and
- A low density in the granular soils underlying the site.

If those criteria are present, then there is a potential that the soils could liquefy during a seismic event.

The adverse effects of liquefaction include local and regional ground settlement, ground cracking and expulsion of water and sand, the partial or complete loss of bearing and confining forces used to support loads, amplification of seismic shaking, and lateral spreading. In general, the effects of liquefaction on the proposed project could include:

- Lateral spreading;
- Vertical settlement; and/or
- The soils surrounding lifelines can lose their strength and those lifelines can become damaged or severed.

Lateral spreading is defined as lateral earth movement of liquefied soils, or soil riding on a liquefied soil layer, down slope toward an unsupported slope face, such as a creek bank, or an inclined slope face. In general, lateral spreading has been observed on low to moderate gradient slopes but has been noted on slopes inclined as flat as one degree.

The potential for liquefaction to occur in soils or rock materials underlying the proposed tank and pump station is anticipated to be low, but should be confirmed. If shallow groundwater and loose granular soils are found to be present beneath the spring and proposed tank site, then the potential for liquefaction, and especially lateral spreading of those soils, could exist.

4.5 EXPANSION POTENTIAL

There is a direct relationship between plasticity of a soil and the potential for expansive behavior, with expansive soil generally having a high plasticity. Thus, granular soils typically

have a low potential to be expansive, whereas, clay-rich soils can have a low to high potential to be expansive.

Plasticity Index (PI) tests were not performed in SHN (2007). A PI value of less than 15 was reported by NRCS (2020) for the soil unit underlying the proposed tank and pump station. Soils with those PIs correlate to soils having a low to medium expansion potential, as noted in the following table (Day, 1999):

EXPANSION POTENTIAL – PLASTICITY INDEX CORRELATION

Plasticity Index	Correlated Expansion Potential
0 – 10	Very Low
10 – 15	Low
15 – 25	Medium
25 – 35	High
35+	Very High

Taken from Day (1999)

4.6 CORROSION

Soil chemistry tests for evaluation of corrosion potential were not performed by SHN (2007). According to NRCS (2020), soils underlying the project area have a moderate potential to be corrosive to steel and concrete.

4.7 NATURALLY OCCURRING ASBESTOS

Ultramafic rock, such as serpentinite, amphibolite, peridotite, dunite, pyroxenite, hornblendite, etc., can contain asbestiform minerals, which are fibrous, silica-rich crystals that can cause lung cancer, mesothelioma, asbestosis, and other health-related issues, if present. Typically, six minerals within ultramafic rocks are responsible for the primary, naturally occurring asbestiform concerns for health-related issues: chrysotile, tremolite, actinolite, anthophyllite, crocidolite, and amosite. These minerals may or may not be present in ultramafic rocks; thus, the presence of ultramafic rock does not automatically indicate that there is a health hazard. The presence of asbestiform minerals can sometimes be discerned in the field based on visual examination of rock exposures but, most often, must be confirmed using laboratory testing.

Naturally occurring asbestos can be hazardous to human health if it is disturbed, becomes airborne and is inhaled. If NOA is not disturbed and fibers are not released into the air, then it is typically not considered a health hazard. Inhalation is the primary exposure route of concern, because breathing asbestos fibers may cause them to become trapped in the lungs. Ingestion is another, albeit less common, pathway of concern, because swallowing asbestos fibers may also cause the fibers to be trapped in body tissues. Asbestos is not absorbed

through the skin, so merely touching it does not pose a significant risk to human health. Asbestos fibers are not water soluble and do not move through groundwater to any appreciable extent. Based on studies of other insoluble particles of similar size, the expected migration rate of an asbestos fiber through soils by the forces of groundwater is approximately 1 to 10 centimeters (0.4 to 4 inches) per 3,000 to 40,000 years (New Hampshire DES, 2010). As such, asbestos is not considered a significant groundwater contaminant.

Higgins & Clinkenbeard (2005) do not note any reported incidences of NOA in Humboldt County and map ultramafic rocks outside of the area of the project. In addition, the Yager Terrane is sedimentary and not known for containing NOA. Based on this information, it is our opinion that there is a low potential for NOA to be present in the study area. If future explorations for improvements to the CSD's system encounter ultramafic rocks, it would be prudent to have those materials tested for NOA.

5 PRELIMINARY CONCLUSIONS & RECOMMENDATIONDS

5.1 GEOLOGIC HAZARDS

The geologic hazards that were identified during this preliminary study are: landslides and possible liquefaction within soils underlying the propose tank. Conclusions regarding the identified hazards are presented below. No additional geologic hazards that might adversely affect the proposed improvements were identified.

As discussed, landslide deposits underlie the spring and proposed tank and pump station locations. The landslide underlying the spring and proposed tank site has geomorphology indicative of an earth flow and could be actively creeping on an annual and seasonal basis. That landslide could become reactivated during a seismic event. Thus, in our opinion, there are risks associated with construction of a new tank at the proposed site. Because of the location of the spring and the CSD subscribers on the hills above Phillipsville, there may be no alternative for construction of a new tank other than at the identified location. WWE and the CSD should evaluate whether alternative locations are available and make a risk-based decision prior to committing to construct a tank at this site. That risk-based decision may not be possible until geotechnical work is performed to further characterize the underlying landslide's geotechnical conditions and until stability analyses are performed. Therefore, prior to construction of the tank, we recommend that subsurface exploration and slope stability evaluations be performed to evaluate whether the site is stable under static and seismic forces. In addition, it is our preliminary opinion that the tank site should be monitored prior to construction of the tank to see if movement is occurring and to help quantify both movement and deformation rates of the proposed tank site. This can be performed by installation of inclinometers and by establishment of ground survey points on the pad.

The geomorphology of the landslide underlying the proposed pump station appears older, implying that the landslide is dormant. The existing tank next to where the pump station is proposed was constructed over ten years ago and appears to have performed well. It is our preliminary opinion that the site is likely stable and suitable for construction of the pump station. However, slope stability evaluations were not performed at the site by SHN (2007) and should be performed, together with appropriate subsurface exploration, prior to construction of the pump station to confirm that the site will be stable under static and seismic forces.

If soils underlying the proposed tank site are found to be granular, loose to medium dense, and in the presence of shallow groundwater, then those soils could liquefy and laterally spread. We recommend that prior to construction of the tank, explorations be performed to

evaluate underlying soil types and consistencies, and to estimate the depth to groundwater so that liquefaction evaluations can be performed.

5.2 EXCAVATABILITY

The drill hole advanced by SHN (2007) penetrated to a depth of 31.5 feet using flight augers. It is our opinion that soils in the area of the spring, and proposed tank and pump station, should be excavatable using conventional heavy grading equipment in good working order.

5.3 RE-USE OF ON-SITE SOIL MATERIALS

Based on the reviewed drill hole log (SHN, 2007) and observations at the site, it is our preliminary opinion that the near-surface soils encountered at the project improvement sites should be useable for general engineered fill materials but likely not suitable for structure backfill. Over-size rock (greater than 3 inches in maximum dimension) may require screening from excavated soils prior to placement as general engineered fill.

5.4 IMPROVEMENT OF SPRING COLLECTION GALLERY & DRAINAGE

The following sections provide preliminary recommendations for improving the spring and surface drainage at the spring site

5.4.1 Collection Gallery

It appears that the existing collection gallery is capturing and transmitting spring water as intended but that the seal around the solid (nonperforated) transmission pipeline leading from the spring to the tank (spring box) immediately downslope from the gallery needs to be improved to reduce leakage of spring waters. A new seal should be installed to reduce that leakage. The new seal could consist of a bentonite cut-off wall placed around the pipeline and keyed into the adjacent trench sidewalls and subgrade, as illustrated on Plate 7 – Preliminary Spring Seal Details. We recommend the use of bentonite (or other similar low-permeability, flexible material) rather than cement slurry, concrete, or other semi-rigid materials, because if the bentonite is deformed due to slope creep, the bentonite clays have a better potential to self-heal and seal leaking water.

As shown on Plate 7, the proposed cut-off wall should be a minimum of two feet thick and be keyed a minimum of two feet into undisturbed native soils on the transmission pipeline trench sidewalls and subgrade. The top of the bentonite seal should extend to within 6 inches of the ground surface and should be covered with engineered fill materials.

5.4.2 Improvement of Surface Drainage

The ground surface above the existing spring collection gallery has previously been graded to remove up to about 7 feet of soils, creating a concave-shaped slot that collects surface waters directly above the gallery, as shown on Plate 7. Those surface waters have the potential to

pool and not drain efficiently downslope. The purpose for that grading is unknown, other than to possibly make installation of the gallery easier. SHN (2008) apparently recognized that the grading that had taken place had negatively impacted the spring. They designed a high-density polyethylene (HDPE) liner system to be installed above the graded area to collect and discharge surface waters away from the collection gallery. It is unknown why that liner system was never installed.

We recommend that the liner design from SHN (2008) be installed and that the ground surface above the collection gallery be regraded to reconstruct the original ground surface. When grading is performed, we recommend that the final graded surface have positive drainage downslope away from the collection gallery and that no areas should be left where surface waters can pool. We recommend that soils not be overly compacted, especially when within 5 vertical feet of the drainage gallery, so that the characteristics of the spring are not adversely impacted and to reduce the potential of damaging the collection gallery.

5.5 TANK & PUMP STATION FOUNDATIONS

The following sections provide preliminary geotechnical recommendations that are suitable for planning-level purposes. Additional geotechnical investigations should be performed in the future for design of the proposed improvements.

5.5.3 Allowable Foundation Bearing Pressures

A preliminary allowable bearing pressure of 1,500 psf for pump station and tank foundation elements resting on firm undisturbed soil or rock material is considered appropriate for preliminary design and cost estimating for this project. Design-level bearing pressures should be based on future geotechnical exploration, testing and analysis at specific sites.

5.5.4 Slab-On-Grade Design

All ground-supported slabs should be designed to support the anticipated loading conditions. Reinforcement for slabs should be designed to maintain structural integrity and should not be less than that required to meet pertinent code, shrinkage, and temperature requirements. A preliminary modulus of subgrade reaction (k_{s1}) of 150 pounds per cubic inch (pci) is considered appropriate for preliminary design and cost estimating purposes for mat-type foundations for this project. Design-level values should be based on future geotechnical exploration, testing and analysis at specific sites.

5.5.5 Lateral Earth Pressures

Retaining walls or buried earth-retaining structures must be designed to resist earth pressures exerted by the retained, compacted backfill plus any additional lateral force that will be applied due to surface loads placed at or near the wall. Preliminary equivalent fluid weights are presented below for planning-level purposes for static (non-earthquake) conditions.

Design-level values should be based on future geotechnical exploration, testing and analysis at specific sites.

PRELIMINARY LATERAL EARTH PRESSURES UNDER STATIC CONDITIONS		
Lateral Earth Pressure Condition	**Slope Inclination Above Structure**	**Equivalent Fluid Weight (pcf)**
		Drained
At-Rest	Flat	60
Active	Flat	40
At-Rest	2:1	90
Active	2:1	65

5.5.6 Sliding Resistance

For preliminary design and cost estimating purposes, a coefficient of friction of 0.35 is considered appropriate for ultimate sliding resistance generated through a compacted soil/concrete interface for on-site or imported engineered fill. If a membrane, such as polysheeting or PVC, is utilized between the foundations and/or slab, then the coefficient of friction between the foundations and/or slab and that sheeting should be established through consultation with the membrane manufacturer. Design-level values should be based on future geotechnical exploration, testing and analysis at specific sites.

5.5.7 Passive Resistance

For preliminary design and cost estimating purposes, ultimate passive earth pressures can be estimated using an equivalent fluid weight of 300 pcf for shallow foundation elements bearing against compacted soil surface. The lateral resistance should be based on the portion of the foundation extending below a depth of one foot below lowest adjacent finished grade. Design-level values should be based on future geotechnical exploration, testing and analysis at specific sites.

5.5.8 Safety Factors

Sliding resistance and passive pressure may be used together without reduction in conjunction with the following recommended safety factors. A minimum factor of safety of 1.5 is recommended for foundation sliding where sliding resistance and passive pressure are used together.

6 ADDITIONAL SERVICES

This report and its associated recommendations were intended to assist WWE during preliminary design and cost estimating phases of the project. This report is not sufficient for design-level geotechnical engineering on the proposed project and we recommend that additional exploration, laboratory testing, and geotechnical engineering be performed to provide those services to WWE as design of the project moves forward.

7 LIMITATIONS

This report has been prepared in substantial accordance with the generally accepted geotechnical engineering practice, as it existed in the site area at the time our services were rendered. No other warranty, either express or implied, is made.

Conclusions and recommendations contained in this report were based on the reported conditions encountered during our review of selected, available, published information collected during this study. No subsurface exploration or laboratory testing was performed by BAJADA to prepare this report. This study is applicable only to those project features described herein (see Section 1.1 – Project Understanding). Soil and rock deposits can vary in type, strength, and other geotechnical properties between reported points of observation and exploration. Additionally, groundwater and soil moisture conditions can also vary seasonally and for other reasons. Therefore, we do not and cannot have a complete knowledge of the subsurface conditions underlying the project area. The conclusions and recommendations presented in this report are based upon the findings at the points of exploration from others' studies, and interpolation and extrapolation of information between and beyond the points of observation, and are subject to confirmation based on the conditions revealed by future geotechnical exploration and by construction.

The scope of services provided by BAJADA for this project did not include subsurface investigation and/or evaluation of toxic substances, or soil or groundwater contamination of any type. If such conditions are encountered during site development, additional studies may be required. Further, services provided by BAJADA for this project did not include the evaluation of the presence of critical environmental habitats or culturally sensitive areas.

This report may be used only by our client and their agents and only for the purposes stated herein, within a reasonable time from its issuance. Land use, site conditions, and other factors may change over time that may require additional studies. In the event significant time elapses between the issuance date of this report and construction, BAJADA shall be notified of such occurrence in order to review current conditions. Depending on that review, BAJADA may require that additional studies be conducted and that an updated or revised report is issued.

Any party other than our client who wishes to use all or any portion of this report shall notify BAJADA of such intended use. Based on the intended use as well as other site-related factors, BAJADA may require that additional studies be conducted and that an updated or revised report be issued. Failure to comply with any of the requirements outlined above by the client or any other party shall release BAJADA from any liability arising from the unauthorized use of this report.

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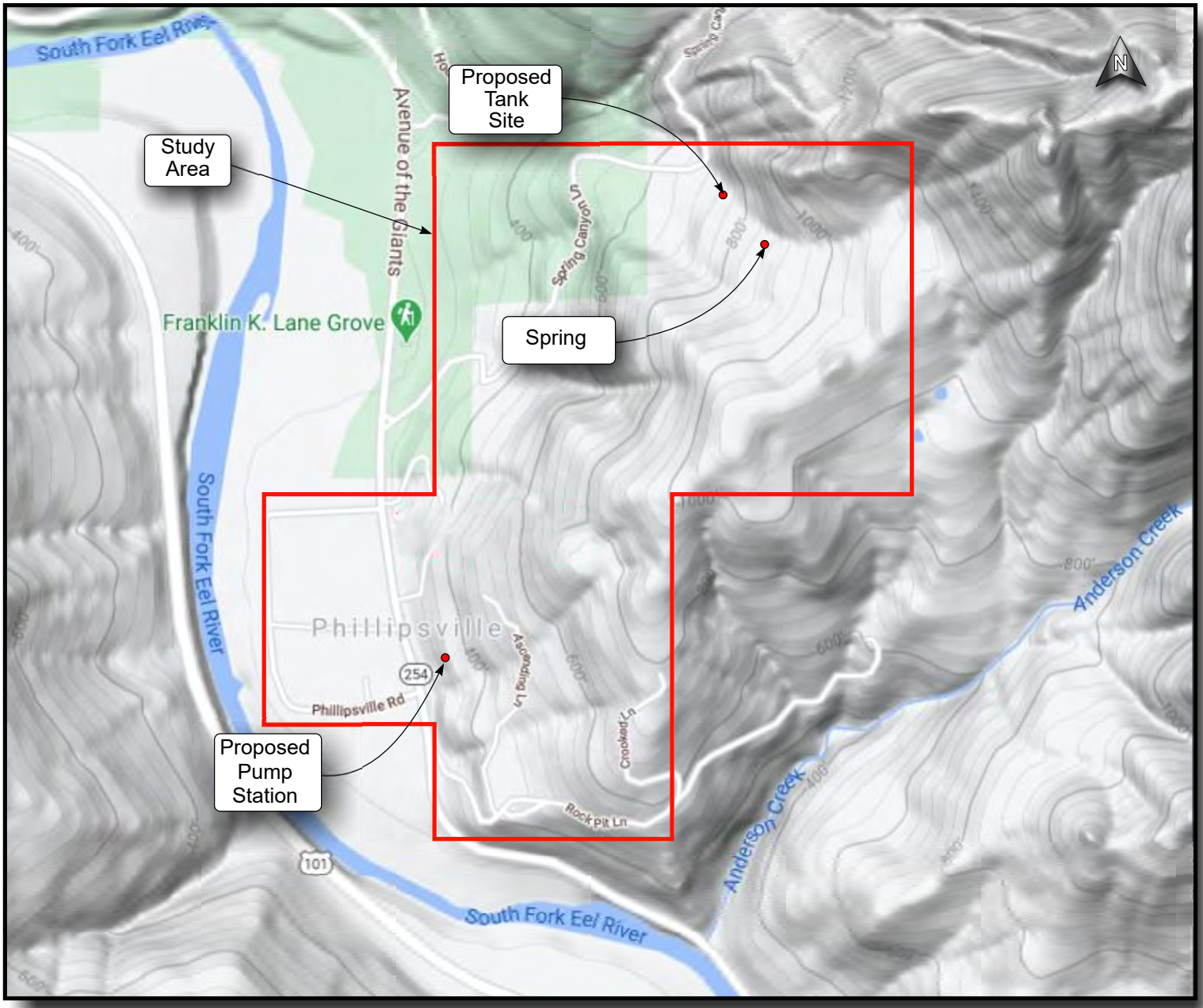
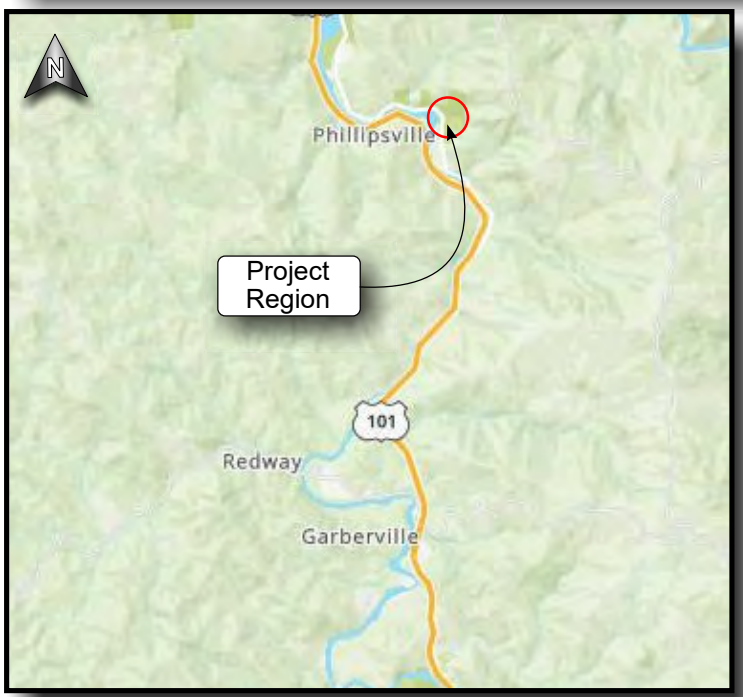




Base maps from MapQuest. Scale Undetermined.

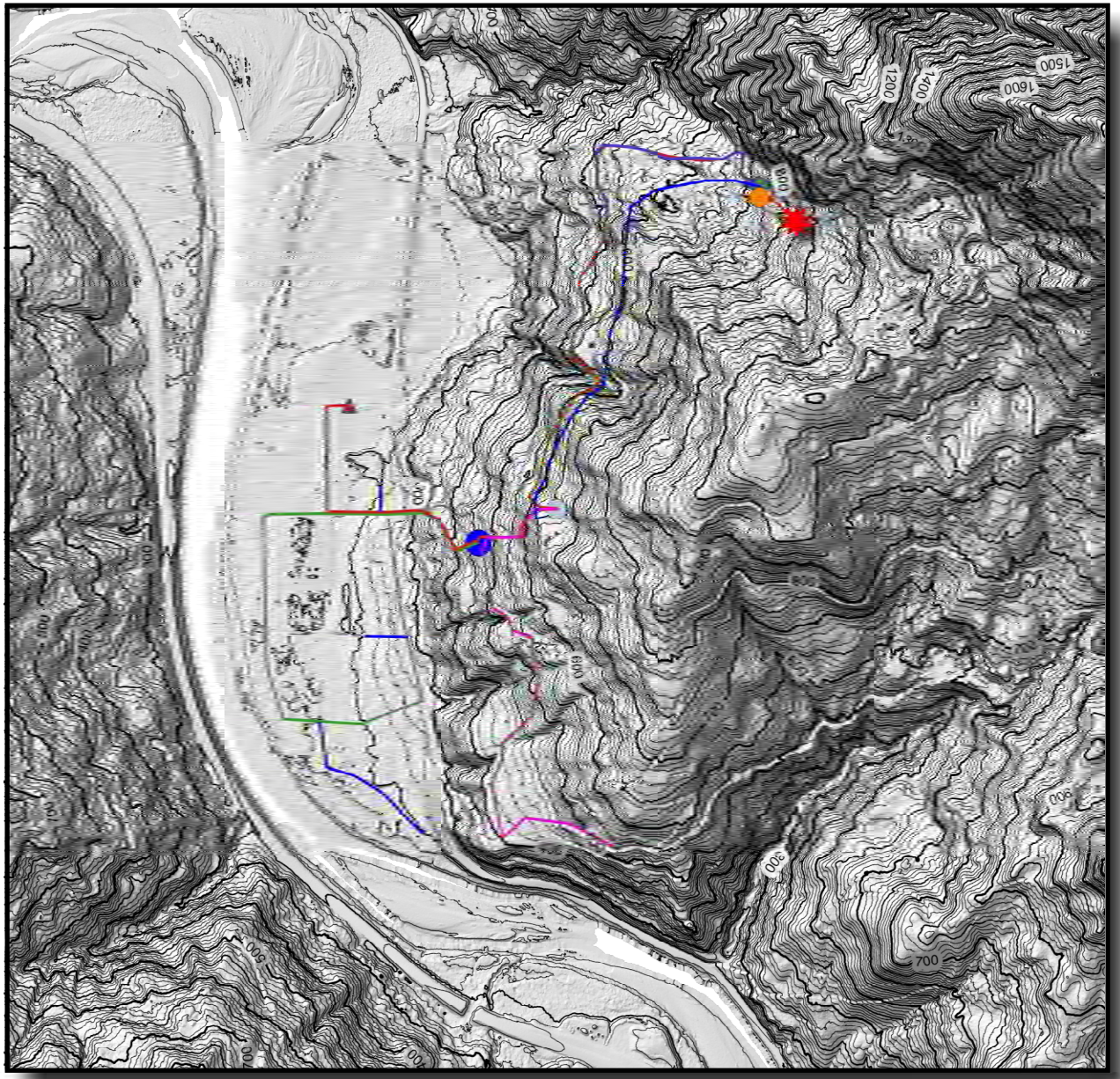
SITE LOCATION MAP

Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No. 1

BAJADA Geosciences, Inc.

Project no. 2001.0137



Spring
(3) 3K Gallon Tanks
3K Gallon Tank
140K Gallon Tank
Water Treatment Building
Water Well

1.5” Pipeline
2” Pipeline
3” Pipeline
6” Pipeline

0 1,000 2,000 ft

EXISTING WATER SYSTEM ELEMENTS

Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No.
2

BAJADA Geosciences, Inc.

Project no.
2001.0137

Qlso Older Landslide Deposits composed of displaced Yager Terrane

Base map from SHN (2008)

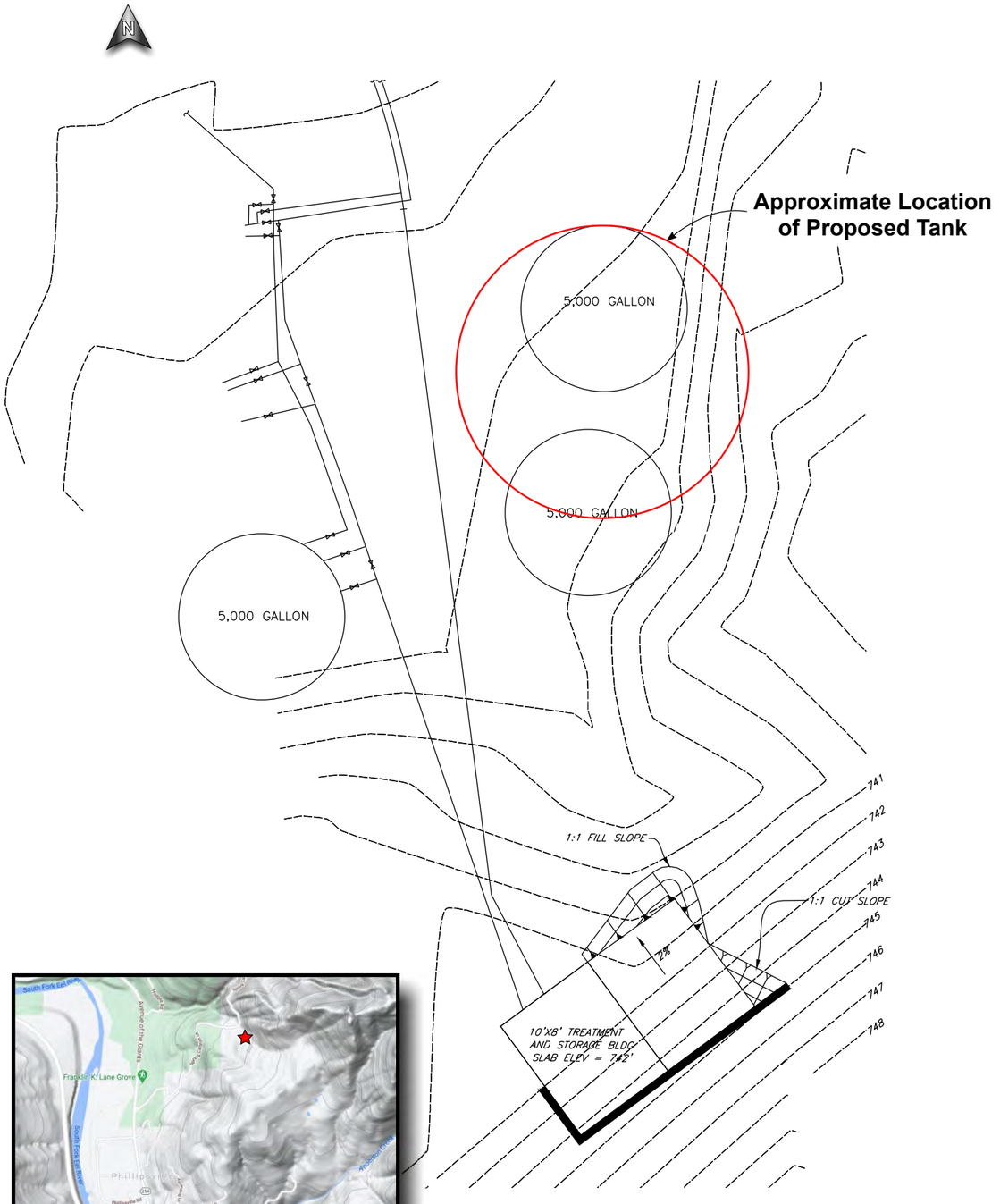
PROJECT IMPROVEMENT AREAS SPRING

Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No.
3.1

BAJADA Geosciences, Inc.

Project no.
2001.0137

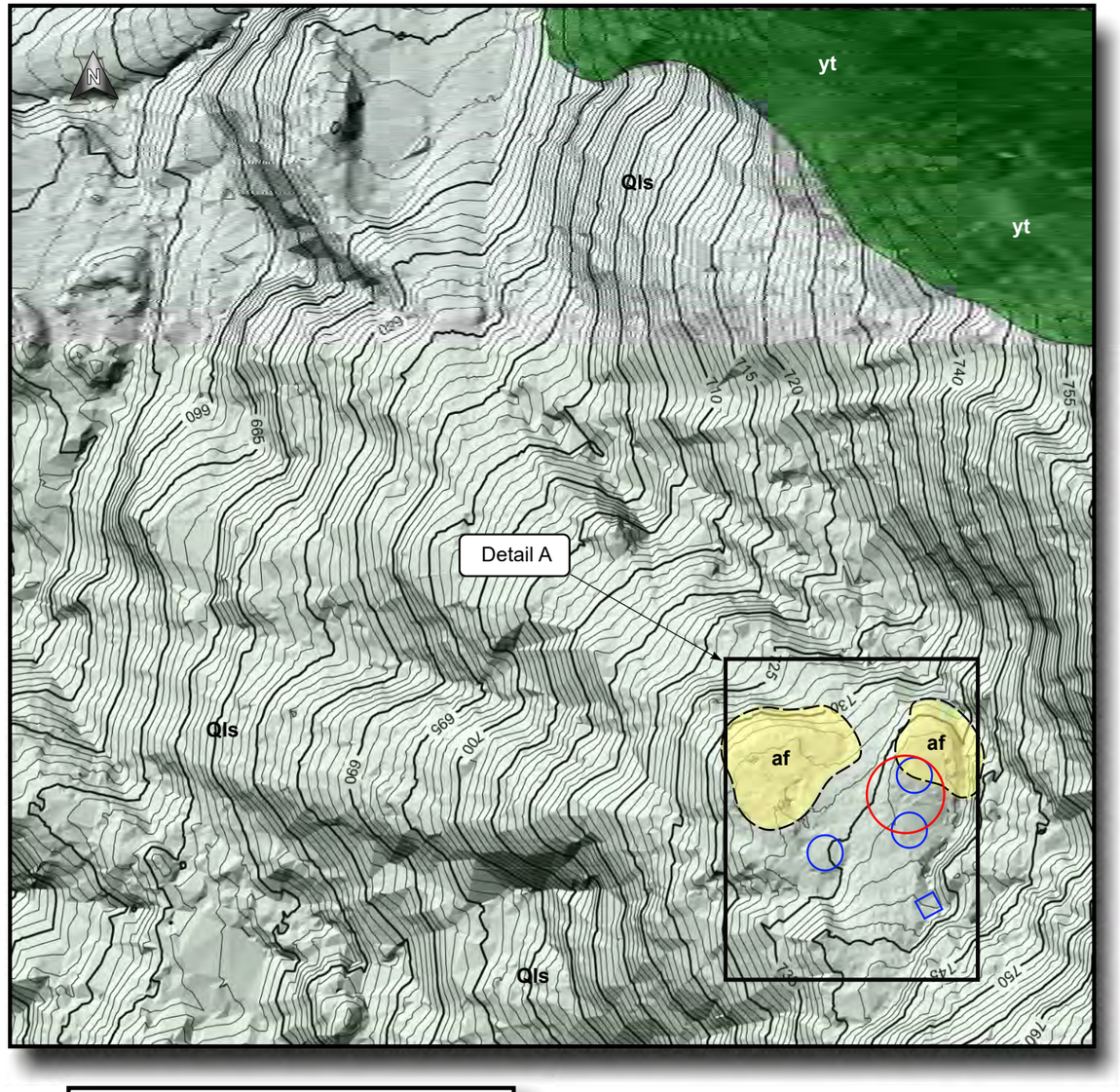


DETAIL A

0 5 10

Scale: 1”=10’
1:120

Base map from SHN (2008)



- Existing Tank
- Proposed Tank
- Existing Treatment Bulding
- Artificial Fill
- af — Artificial Fill
- Qls — Landslide Deposits
- yt — Yager Terrane

0 50 100 ft

Base map from open-source LiDAR

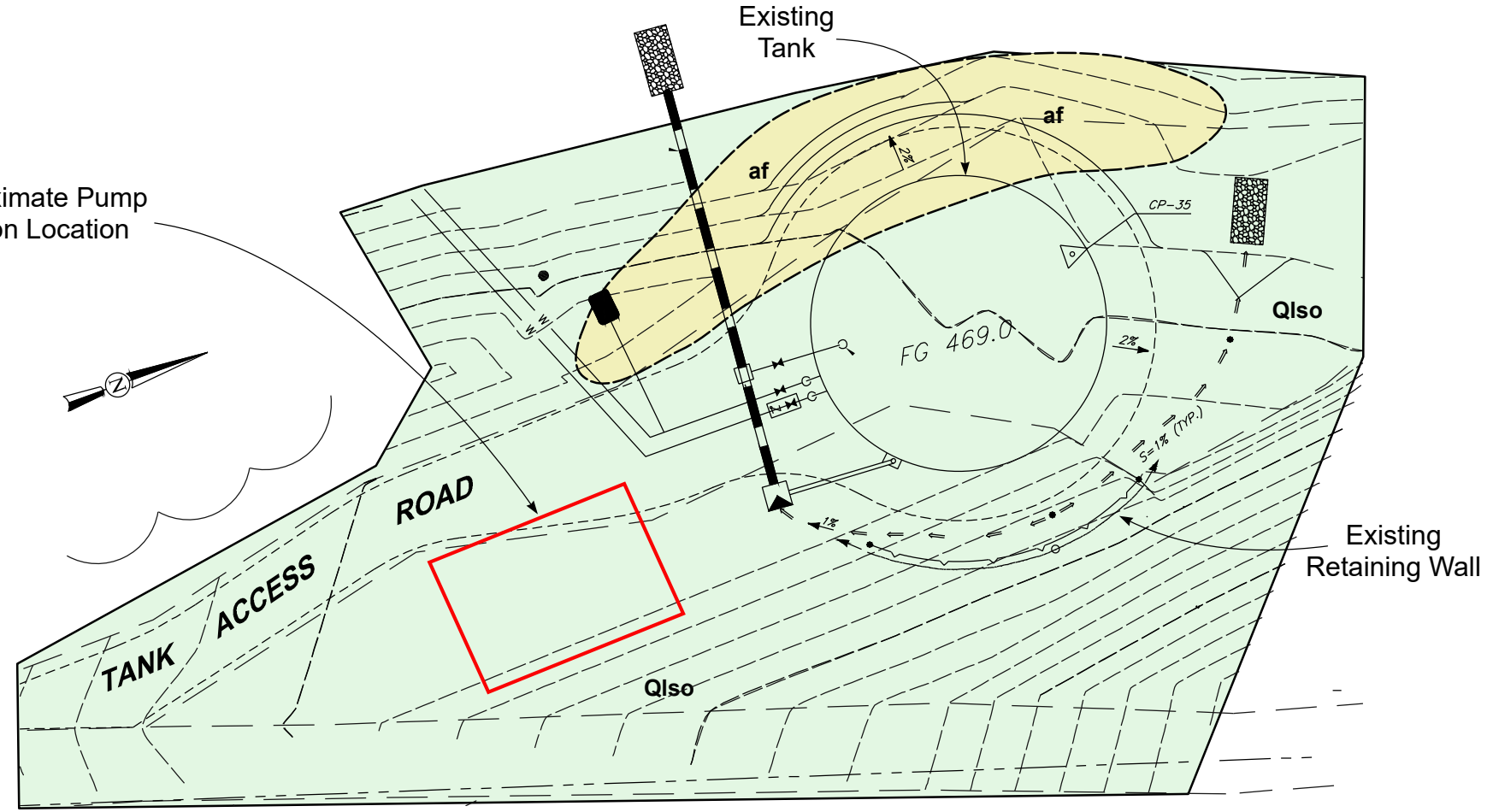
PROJECT IMPROVEMENT AREAS TANK

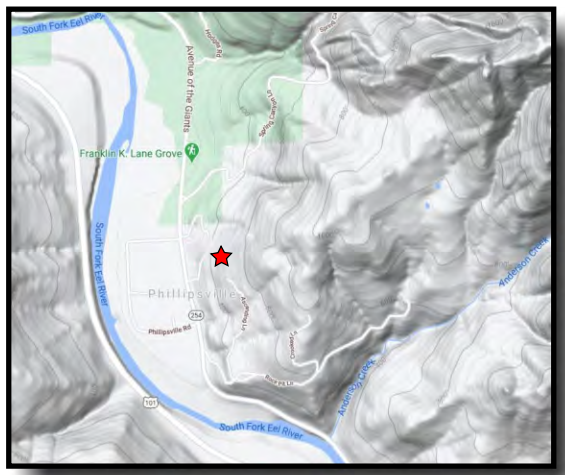
Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No. 3.2

BAJADA Geosciences, Inc.

Project no. 2001.0137





Base map from SHN (2008)

af	Artificial Fill
Qlso	Older Landslide Deposits composed of displaced Yager Terrane

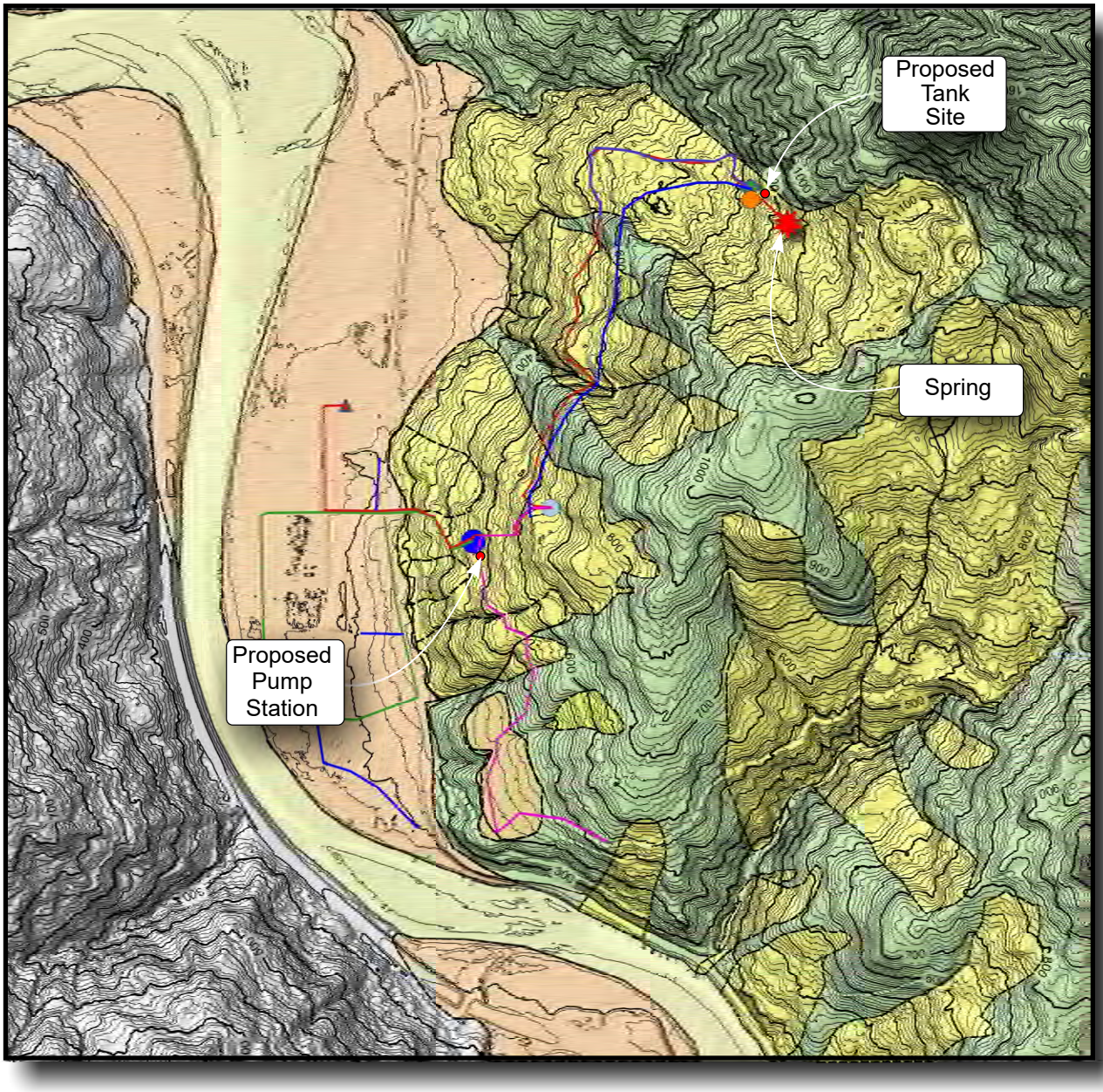
PROJECT IMPROVEMENT AREAS PUMP STATION

Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No.
3.3

BAJADA Geosciences, Inc.

Project no.
2001.0137



N

Spring
(3) 3K Gallon Tanks
3K Gallon Tank
140K Gallon Tank
Water Treatment Building
Water Well

1.5” Pipeline
2” Pipeline
3” Pipeline
6” Pipeline

Landslide Deposits
Active River Deposits
River Terrance Deposits
Yegar Terrane

0 1,000 2,000 ft

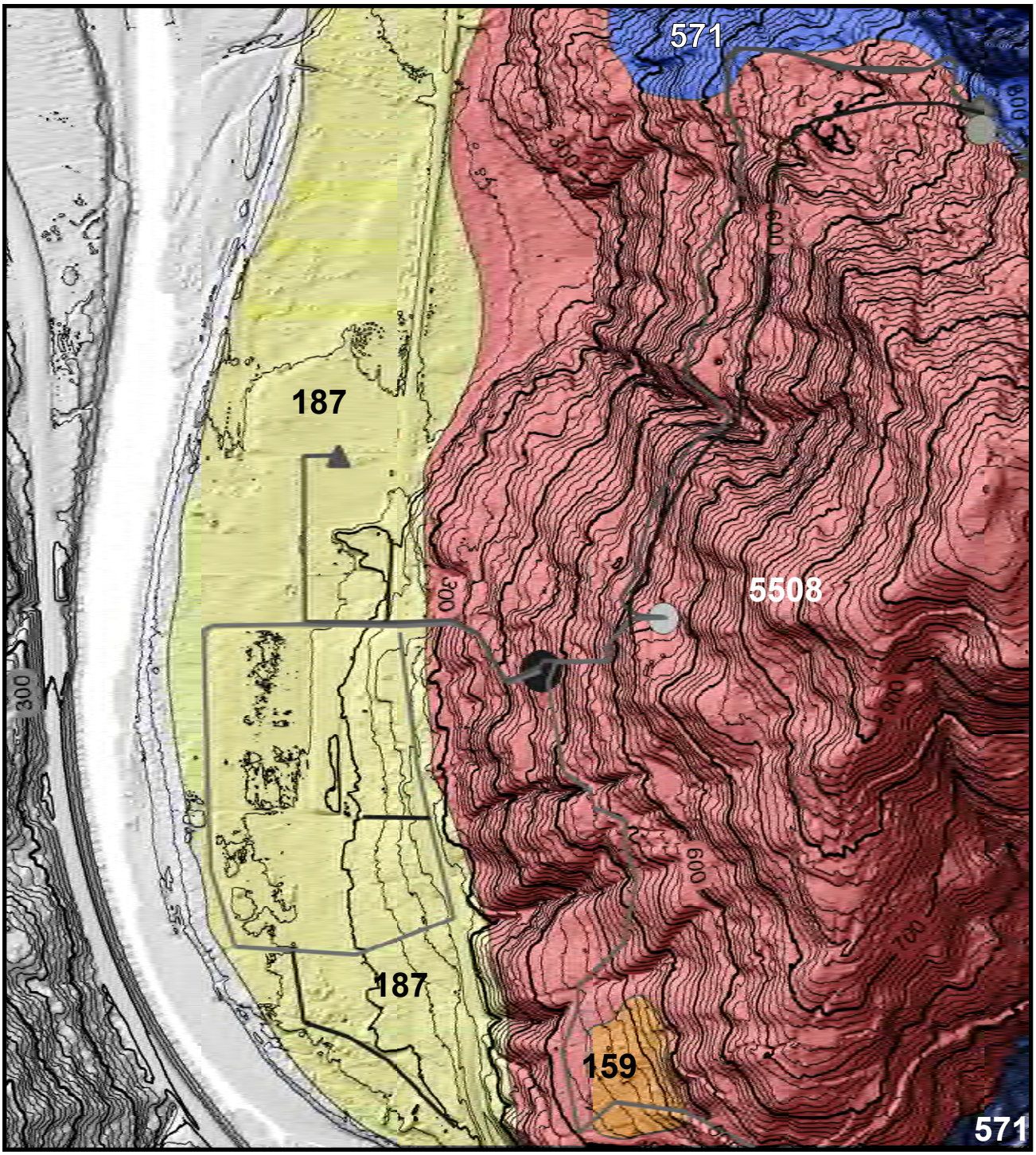
GEOLOGIC MAP

Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No.
4

BAJADA Geosciences, Inc.

Project no.
2001.0137



SOIL UNITS UNDERLYING SEGMENTS	
Soil Unit No.	Soil Unit Name
159	Grannycreek-Parkland complex, 2 to 5 percent slopes
179	Eelriver and Cottoneve soils, 0 to 2 percent slopes
187	Pepperwood-Shivelyflat complex, 0 to 2 percent slopes
570	Canoecreek-Sproulish-Redwohly complex, 15 to 30 percent slopes
571	Canoecreek-Sproulish-Redwohly complex, 30 to 50 percent slopes
575	Canoecreek-Sproulish-Redwohly complex, 50 to 75 percent slopes
5508	Canoecreek-Coyoterock-Sproulish complex, 15 to 59 percent slopes

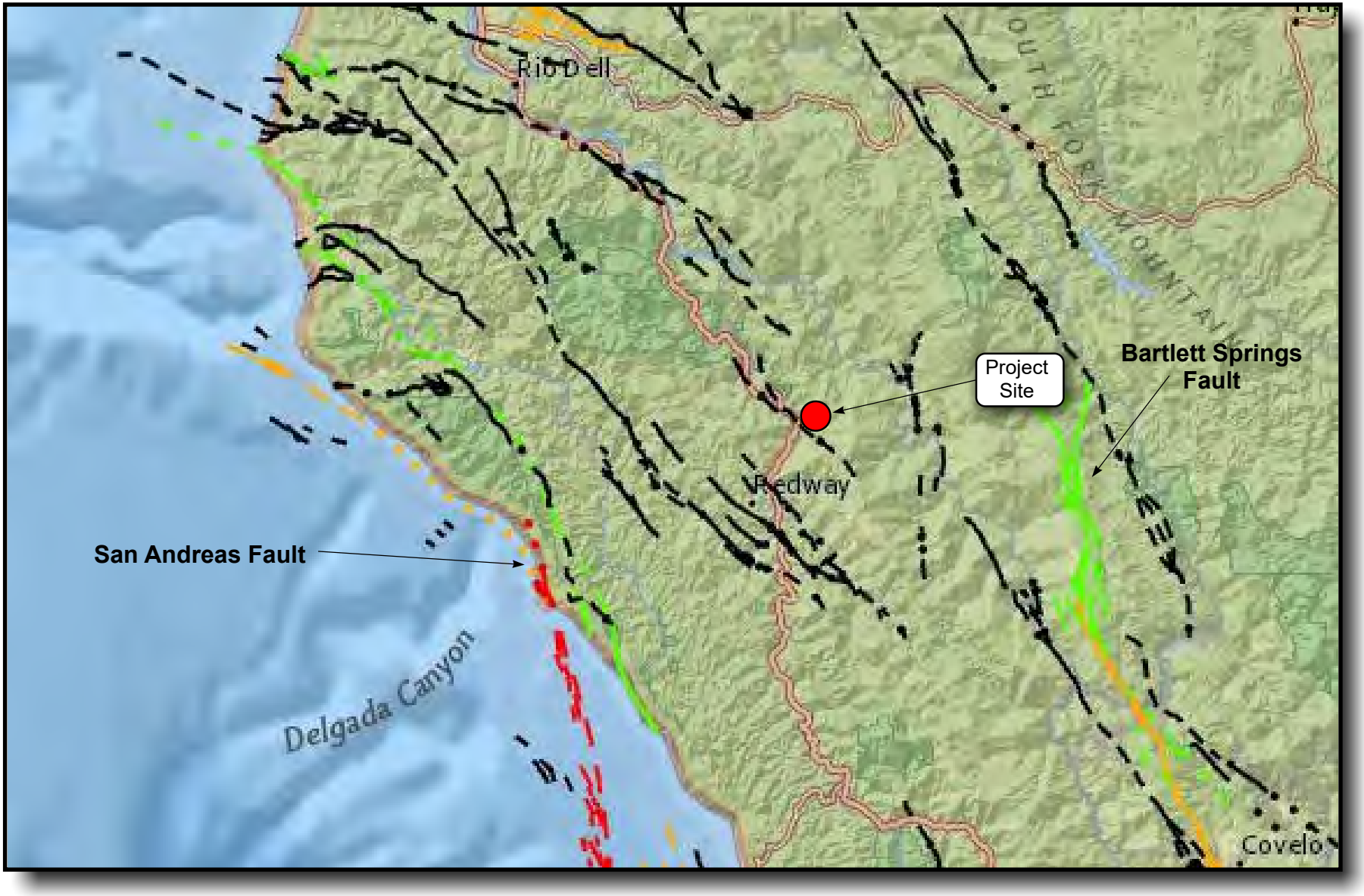
SOIL SURVEY MAP

Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No.
5

BAJADA Geosciences, Inc.

Project no.
2001.0137



Active	
Historic Displacement (last 200 years)	Holocene Displacement (last 11,700 years)
Potentially Active	**Inactive**
Late Quaternary Displacement (last 700,000 years)	Quaternary Fault (last 1.6 million years)

Map from USGS Interactive Fault Map

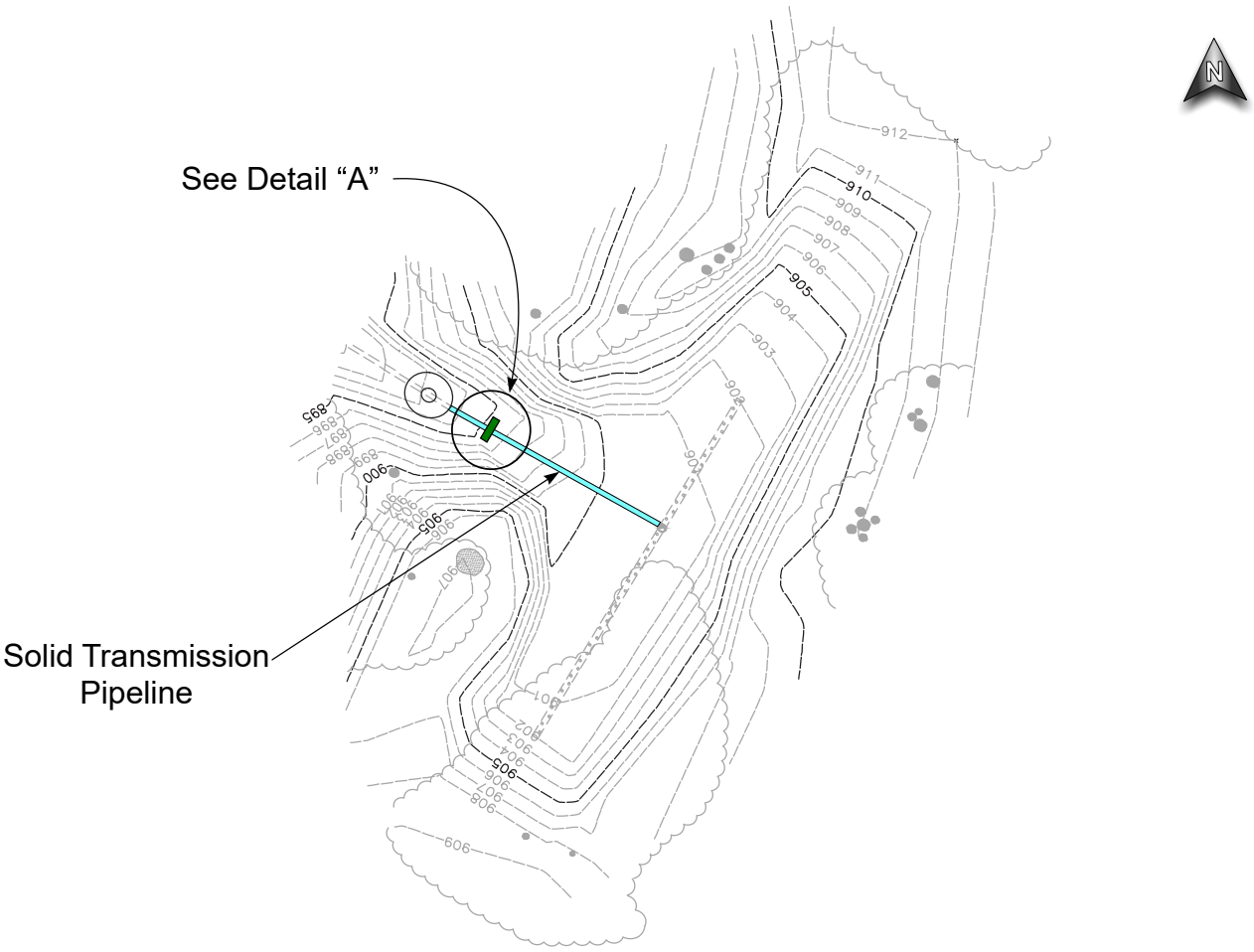
REGIONAL FAULT MAP

Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No. 6

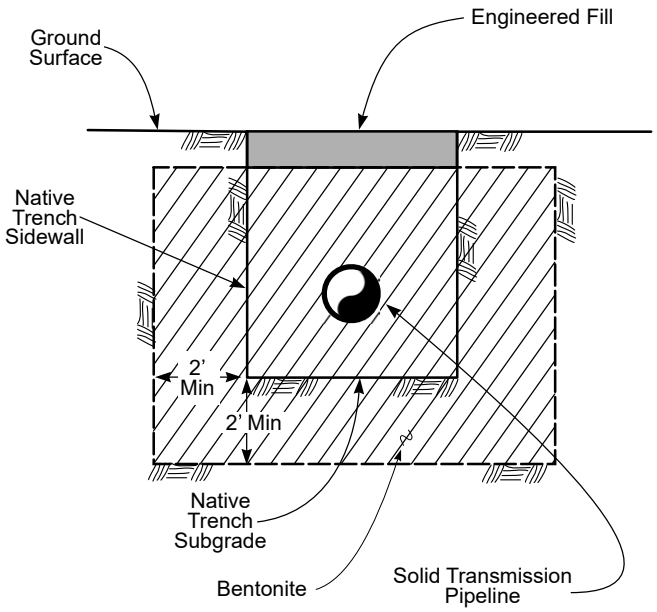
BAJADA Geosciences, Inc.

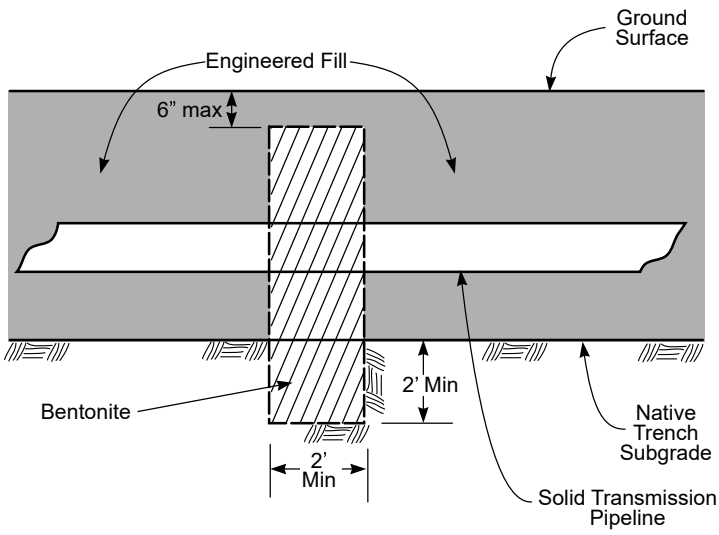
Project no. 2001.0137



Base map from SHN (2008). Scale not determined

DETAIL "A"





PRELIMINARY SPRING SEAL DETAILS

Phillipsville CSD Improvement Project
Water Works Engineers, LLC
Humboldt County, California

Plate No. 7

BAJADA Geosciences, Inc.

Project no. 2001.0137

Illustrative only. Not to Scale

APPENDIX A

Subsurface Information

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707/441-8855 • FAX: 707/441-8877 •shninfo@shn-engr.com

Technical Memorandum

Reference: 006167
Date: December 20, 2006
To: Brian Freeman
From: Gary Simpson
Subject: Preliminary Geologic Evaluation of the Proposed Phillipsville Community Water Infrastructure Upgrade

This technical memorandum describes the results of SHN Consulting Engineers & Geologists, Inc.'s preliminary geologic review of the proposed upgrade to the Phillipsville community water system. We visited the site on August 15, 2006, and conducted a general reconnaissance of the area encompassed by the principal elements of the existing and proposed water system. Specifically, we visited the spring source area, several existing and proposed tank sites, and existing and potential transmission pipeline alignments.

The principal geologic hazard that may affect the water system is landsliding. The project area is located in a complex geologic environment characterized by highly sheared, weak bedrock materials that are subject to high levels of annual precipitation. Topography of the site is characterized by low to moderate gradient slopes descending from the spring source area, the highest point in the system, to the lower elevation areas (near the Eel River) where most existing and future development has occurred. The area is subject to frequent moderate to strong seismic shaking. During our field reconnaissance, we observed several areas of apparent slope instability. The most significant mass wasting is occurring in a large area near the spring source, which is subject to active earthflow type landslide deformation. Areas of recent bank slumping were observed along several proposed pipeline alignments where they coincide with existing roads (that is, slumping in the cut bank along the inboard edge of the road).

Despite the presence of recent mass wasting in the project area, the extent of unstable ground is relatively localized. Therefore, it appears that the project is imminently feasible from a geologic and geotechnical standpoint, as long as the geologic limitations are considered in project design. We note that the existing intake and distribution system has been successfully constructed and maintained in the past without significant impact from localized slope instability. The areas of existing and potential landsliding are readily apparent, or can be located through detailed geologic analysis; these areas can in all likelihood be avoided.

Other aspects of the project appear relatively straightforward from a geotechnical standpoint. Soils at the project site appear rocky and should provide ample bearing capacity for placement and support of tanks. Existing tanks we observed during our reconnaissance had not been impacted by weak or soft soil issues. The project area does not appear subject to secondary seismic effects (soil liquefaction, etc.).

Future design-level geologic and geotechnical analysis will be required as this upgrade project evolves. Specific geotechnical (soils) data will need to be generated at proposed tank sites. Detailed geologic mapping of existing and potential unstable areas will aid in project layout.

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707/441-8855 • FAX: 707/441-8877 •shninfo@shn-engr.com

Technical Memorandum

Reference:	006167.200
Date:	November 14, 2007
To:	Brian Freeman
Copy to:	File
From:	John Dailey
Subject:	**Geotechnical Consultation Regarding Design and Construction of the New Water Tank Site for Phillipsville Community Water District**
Attachments:	Appendix A. Field Boring Log Appendix B. Laboratory Test Results

Introduction

This technical memorandum presents the results of our geotechnical consultation regarding design and construction of a new water tank for the Phillipsville Community Water District. We understand that the proposed water tank will have a 36-foot diameter and be approximately 18 feet in height, which will apply a pressure of about 1,140 pounds per square foot (psf). This pressure will be applied across the full diameter of the reservoir. We also understand that the approximately 140,000-gallon reservoir will be supported on a perimeter concrete ring foundation.

The water tank will be founded on an existing, nearly full bench pad that was constructed by excavating into the face of a moderate gradient, concave hillslope (Figure 1). This approximately 1,000-square foot pad appears to have been enhanced by drifting fill material over western margins of the pad onto the downslope hillside. The ascending slope to the west of the tank pad has an approximately 2.5 to 1 (horizontal to vertical) gradient; the cut slope to the east is inclined at an approximate 2 to 1 gradient.

The purpose of this technical memorandum is to describe the soil/rock types underlying the study area, and to provide conclusions and recommendations related to geotechnical aspects of project design and construction. Our scope of work included reviewing selected geotechnical and geological reports and maps pertinent to the project, conducting a site reconnaissance, drilling and collecting samples from one exploratory test boring, performing laboratory tests on soils samples, evaluating geologic and geotechnical data collected from the project area, formulating geotechnical conclusions and recommendations for design and construction of the proposed water tank foundation, and preparing this technical memorandum.

Field Investigation and Laboratory Testing

SHN initiated a geotechnical investigation to evaluate and characterize subsurface conditions in the project area on September 18, 2007. Our investigation involved supervising the advancement and sampling of a mechanical exploration boring in the footprint of the proposed water tank. The

boring was advance to a depth of 31.5 feet Below Ground Surface (BGS) using a continuous-flight auger drill rig. Soil and rock material encountered in the boring were logged in general accordance with the Unified Soil Classification System (see Figure 1 for boring location, and Appendix A for field boring logs).

Penetration resistance tests were conducted as the boring was advanced. The sampler-driving hammer consisted of a 140-pound, 30-inch drop, above-ground, rope on cathead unit. Two samplers were used: a modified California split spoon, with nominal inside diameter of 2.5 inches, which was used to collect relatively undisturbed samples; and a 1.4–inch inside diameter Standard Penetration Test (SPT) sampler. Both types of sampler are driven 18 inches in 6-inch increments; the *standard penetration resistance, N,* is the sum of the blows for the second and third increments for the SPT sampler. The observed blow counts required to drive both samplers are shown on the field boring logs, and were used for correlation with other data.

Selected samples were collected, and laboratory tests were conducted to correlate the soil properties and to evaluate their engineering characteristics. Moisture content, dry density, and unconfined compression tests were performed on selected samples.

See the attached field boring log for detailed soil descriptions, the penetration resistance test results, and laboratory index test results. The results of the unconfined compression strength tests are presented in "Appendix B: Laboratory Test Results."

Interpretation of Subsurface Conditions

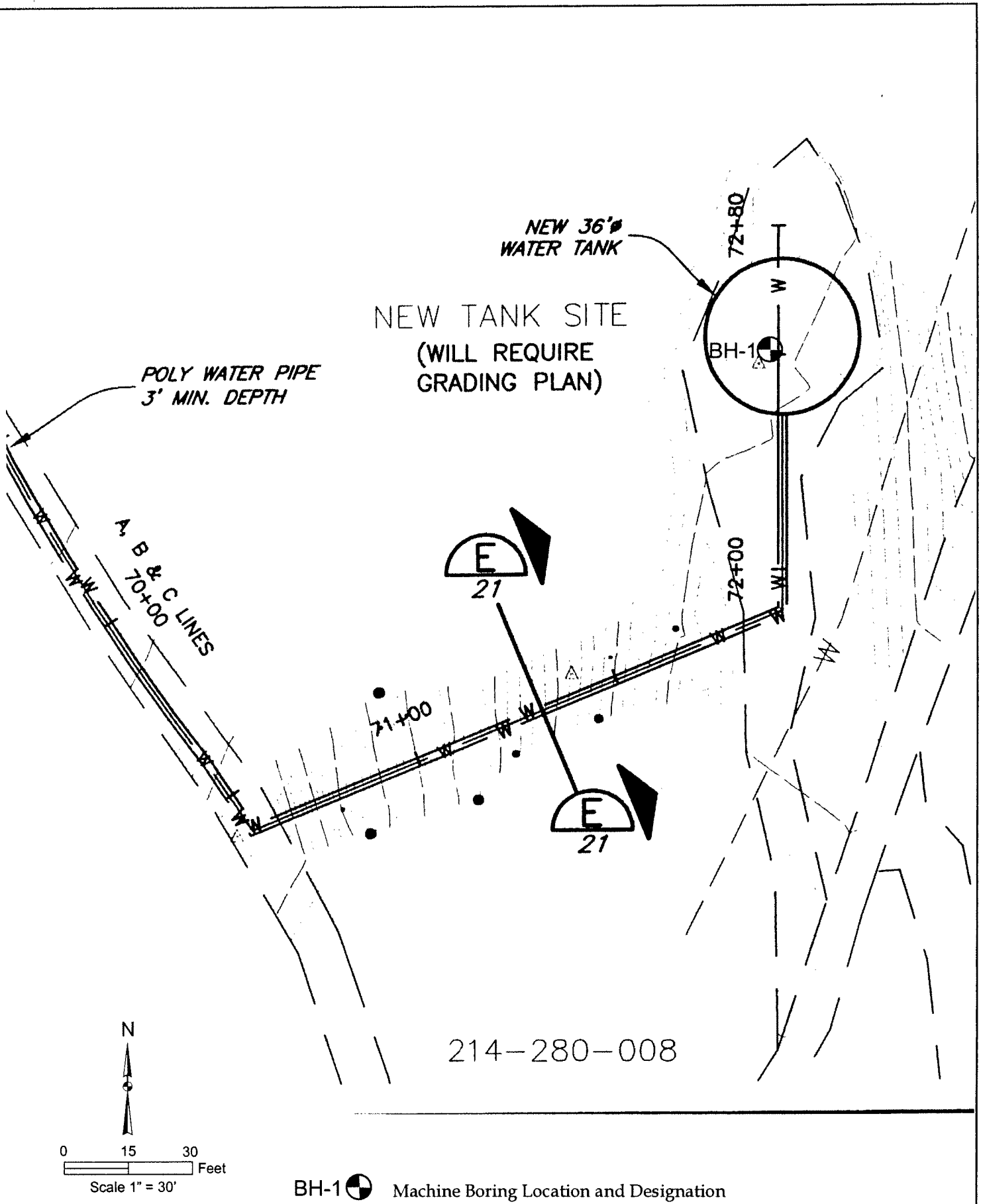
Soils underlying the tank site consist of Coastal Belt derived colluvium and intensely weathered blocks of greywacke/greenstone, which typically have the consistency of stiff to very stiff clays and dense clayey sands. Our exploratory boring revealed that the colluvial deposits beneath the water tank footing consists of medium stiff to stiff sandy clays and medium dense to dense clayey sands with gravels (rock fragments). At the location of exploratory boring BH-1, medium stiff to stiff sandy clays and medium dense to dense clayey sands with gravels (rock fragments) were encountered to the maximum depth explored of 31.5 feet. As discussed in the "Introduction," loose, unengineered sidecast fill was observed along the western perimeter of the pad.

At the time of the investigation, ground water stabilized in boring BH-1 at about 23 feet BGS approximately one-half hour following completion of drilling.

Design Recommendations

Site Preparation and Grading

Areas to be graded should be cleared of trees, brush, rubbish and debris, disturbed/soft/loose soils, and any uncontrolled existing fill (if encountered). Where the removal of trees is required, it



Consulting Engineers & Geologists, Inc.	Proposed Water Tank Phillipsville Community Water District Phillipsville, California	Site Plan SHN 006167.200
	November 2007 | Siteplan.cdr	Figure 1

will be necessary to remove all major root systems, and then backfill the excavations with properly placed structural fill, compacted to a minimum of 90 percent relative compaction. Additionally, excavate as required to accommodate design grades.

Following stripping and clearing operations, an excavation beneath the tank's perimeter foundation, and for 2 feet on either side, should be made to a depth of 18 inches below the bottom of the perimeter ring foundation. In addition, beneath the remainder of the tank bottom, the site should be excavated to at least 24 inches beneath the tank bottom elevation. Scarify and compact to a minimum of 90 percent relative compaction the upper 6 inches of exposed subgrade soils that are to receive structural fills. If zones of weak or saturated soils, or any existing unengineered fill are encountered during the recompaction process, they should be removed by further excavation to expose firm natural soil/rock, and replaced with properly compacted structural fill. This compaction procedure should be observed and approved in the field by the soil engineer.

The overexcavated area should be replaced with structural fill consisting of Caltrans specification Class 2 crushed aggregate base material. The structural fill should be placed in loose lifts (typically 6 to 8 inches) and compacted to a minimum of 90 percent relative compaction.

The ground surface around the reservoir perimeter should be sloped away, or other design measures should be implemented to provide positive surface water drainage away from the perimeter ring foundation areas.

Structure and utility trench backfill should be moisture conditioned, placed in lifts 8 inches or less in loose thickness, and mechanically compacted to at least 90 percent relative compaction.

General Seismic Design

The tank structure should be designed and built to withstand strong seismic shaking. The minimum standard for construction of the reservoir should be in accordance with the latest edition of the current building code for the most seismically active areas.

No active faults are mapped in the site vicinity, and the site is over 15 kilometers (km) from a Type B earthquake fault, the Garberville Fault, based on the 1997 Uniform Building Code (UBC) "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada." The following site-specific soil and seismic fault characteristic parameters based on the 2001 California Building Code (CBC) should be used.

Seismic profile type (Table 16-J)	S_C
Seismic source type (Table 16-U)	B
Closest distance from site to source	>15 km – Garberville Fault
Near source factor N_a (Table 16-S)	1.0
Near source factor N_v (Table 16-T)	1.0
Seismic coefficient C_a (Table 16-Q)	0.40
Seismic coefficient C_v (Table 16-R)	0.56

Foundations

Following site preparation as recommended, foundations may be constructed. The ring foundations should be at least 18 inches in width, and should be bottomed at least 18 inches below adjacent grade on compacted structural fill, as recommended above. Such foundations may be designed so they do not exceed an allowable bearing capacity of 3,000 pounds per square foot (psf) for dead plus long-term live loads. This value may be increased by one-third to account for the short-term effects of wind and/or seismic loading.

Footing lines that are located adjacent and generally parallel to utility trenches should extend below a 1 to 1 plane projected upward from the bottom of the trench. Two sacks per cubic yard concrete slurry can be used beneath the regular reinforced concrete foundations to effectively extend the foundations deeper in that regard.

A horizontal friction coefficient of 0.30 times the net vertical dead load may be used for the footing/soil contact. Frictional resistance may be calculated in conjunction with an allowable lateral passive pressure represented by an equivalent fluid weighing 300 pounds per cubic foot (pcf) for short-term loadings, such as lateral foundation resistance in response to wind or earthquake loadings. Lateral pressure can be calculated where footings bear laterally against properly compacted structural fill; however, passive pressure should be neglected within the upper 1 foot of fill, unless confined by other construction (asphalt or concrete).

The bottom of the water reservoir should be domed upward from the perimeter to the center, or some similar provision made, to allow differential settlement to occur without overstressing the tank bottom in tension. The settlement is anticipated to be greater at the center than at the perimeter. Due to the imposed loads, which will extend to depth well below the surface, some post-construction vertical settlement is anticipated. Total post construction settlement is estimated at ¾ inches near the center of the reservoir, and post-construction differential settlement is estimated at less than ½ inches between the center and the perimeter ring footing.

Retaining Walls

If retaining walls are required, they should be designed for active earth pressures, using an equivalent fluid pressure of 35 pcf for horizontal backfill, plus 2 psf for every 5-degree increase in slope of backfill behind the wall. Where an imaginary 1½ to 1 line projected down from foundations intersects retaining walls, the portion below the intersection should be designed for an additional surcharge of 100 psf. Where retaining wall backfill is subjected to vehicular traffic, the walls should be designed to resist an additional 2 feet of backfill.

Foundations for retaining walls should be designed in accordance with the recommendations presented above in the section on foundation support. The maximum toe pressure for retaining wall footings should not exceed total design load pressures for foundations. All foundations should be deepened to provide a minimum of 7 feet of lateral confinement between the footing and slope face, if applicable.

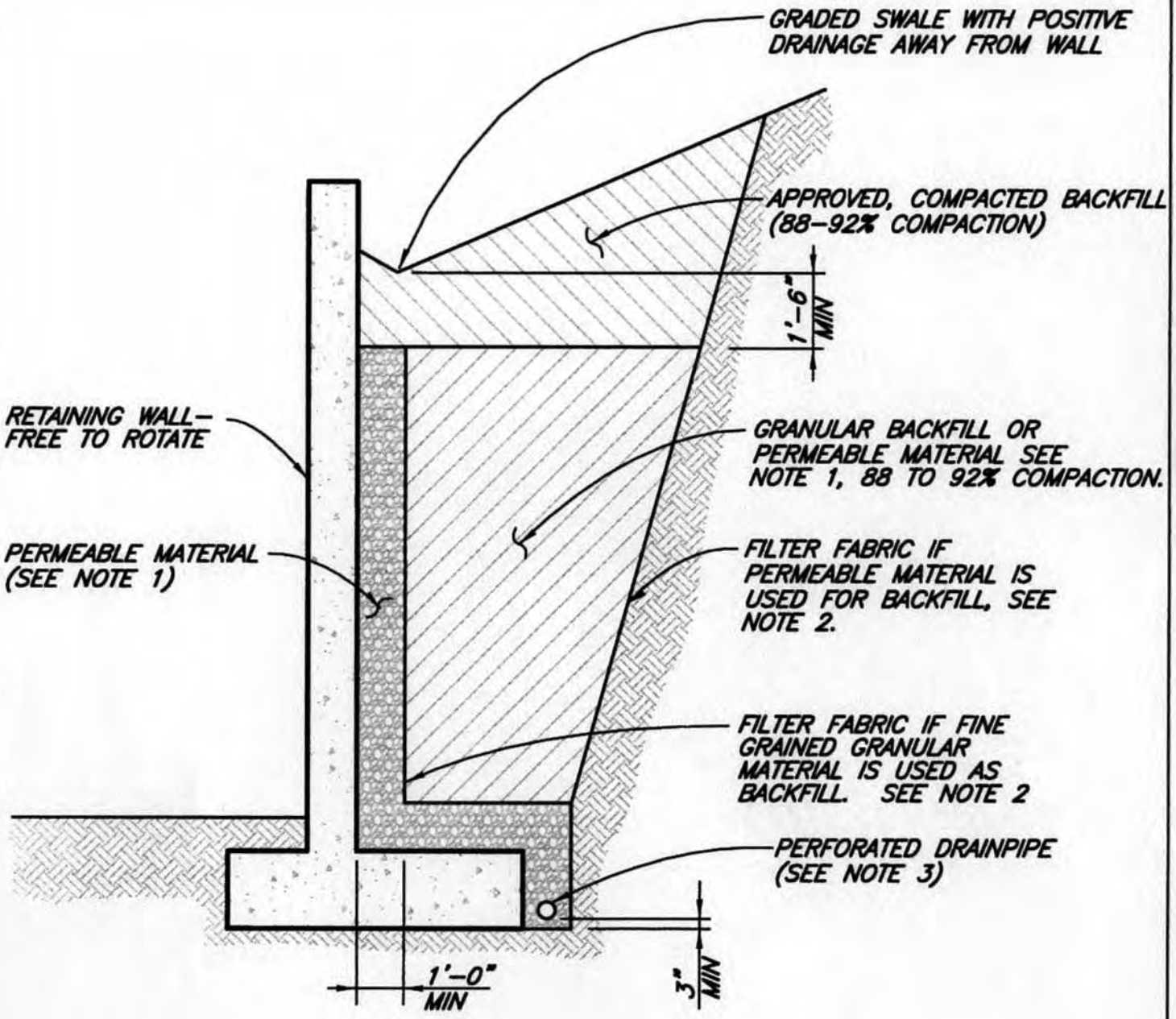
The design active pressures presented above are predicated on positive drainage being provided behind the retaining walls, to mitigate the potential for hydrostatic pressure build-up. Retaining walls should be provided with permanent drains to prevent the build-up of hydrostatic pressure.

The drains should consist of continuous blankets of clean, **free-draining** rock with collector pipes that drain to exterior outlets. Drainage details are shown on "Figure 2: Retaining Wall Backfill and Drainage Detail."

Select backfill behind retaining walls should be placed in thin lifts and compacted to at least 90 percent relative compaction. Light compaction equipment should be used to avoid overstressing the walls. Retaining walls will yield slightly during backfilling; therefore, walls should be backfilled prior to building on or adjacent to the walls.

Construction Phase Monitoring

In order to assess construction conformance with the intent of the recommendations presented in this technical memorandum, it is important that the soil engineer provide periodic inspections, together with field and laboratory testing, during site preparation and grading, including placement of structural fill, excavation of foundations, and installation of retaining walls, if required.



NOTES

1. PERMEABLE MATERIAL: SEPARATED FROM FINE–GRAINED SOIL BY FILTER FABRIC. USE DURABLE, FREE–DRAINING, CRUSHED GRANULAR MATERIAL, 100% PASSING THE 1½" SIEVE, AND NOT OVER 3% PASSING THE ¼" SIEVE.
2. FILTER FABRIC: USE 6 OZ. PER SQ. YARD MIN., NON–WOVEN, DESIGNED SPECIFICALLY TO RETAIN SOIL WHILE ALLOWING PASSAGE OF WATER.
3. PERFORATED DRAINPIPE: RIGID, DURABLE, 3" MIN. DIAMETER. HOLES DOWNWARD. GRAVITY DRAIN TO DAYLIGHT. 2% MIN. SLOPE.

NO SCALE

SHN Consulting Engineers & Geologists, Inc.	New Water Tank Phillipsville Community Services District Phillipsville, California	Retaining Wall Backfill and Drainage Detail SHN 006167.200
	November 2007	006167-200-retwall	Figure 2

Appendix A

Field Boring Log

Consulting Engineers & Geologists, Inc.

812 West Wabash, Eureka, CA 95501 ph. (707) 441-8855 fax. (707) 441-8877

PROJECT: Phillipsville water tank
LOCATION: Phillipsvillle, California
GROUND SURFACE ELEVATION: 469 feet
EXCAVATION METHOD: Mobile rig, 6" flight auger
LOGGED BY: SMB

JOB NUMBER: 006167.200
DATE DRILLED: 9/17/07
TOTAL DEPTH OF BORING: 31.5 feet
SAMPLER TYPE: Cal barrel, SPT
40" hammer

BORING NUMBER BH-1

DEPTH (FT)	BULK SAMPLES	SS SAMPLES	BLOWS PER 0.5'	USCS	PROFILE	DESCRIPTION	% Moisture	Dry Density (pcf)	Unc. Com. (psf)	U.C. (psf) by P.P.	% Passing 200	REMARKS
0.0												
-1.0												
-2.0												
-3.0			20	SC/CL		SAND, fine to coarse, clayey, with silt and fine to coarse gravel, dense, dry, dark yellow brown, TO CLAY, fine to coarse sandy, fine to coarse gravelly, medium stiff, dry, dark yellow brown to brown.						Logged at sample locations only below this depth
-4.0			30									Lots of rock fragments
			27									
-5.0			8									
			4									
-6.0			7			Becomes moist @ 5.5 feet.						
-7.0												
-8.0												
-9.0												
-10.0			11	SC		SAND, fine to coarse, clayey, gravelly, with silt, medium dense, moist, dark yellow brown.						Lots of weathered bedrock
			10									
-11.0			14				14.0	119	3209			
-12.0												
-13.0												
-14.0												
-15.0			5	SC		SAND, fine to coarse, clayey, gravelly, with silt, medium dense, wet, dark yellow brown.						
			5				16.2	106	1901			
-16.0			6									

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

FIELD LOG

Consulting Engineers & Geologists, Inc.

812 West Wabash, Eureka, CA 95501 ph. (707) 441-8855 fax. (707) 441-8877

PROJECT: Phillipsville water tank

LOCATION: Phillipsvillle, California

GROUND SURFACE ELEVATION: 469 feet

EXCAVATION METHOD: Mobile rig, 6" flight auger

LOGGED BY: SMB

JOB NUMBER: 006167.200

DATE DRILLED: 9/17/07

TOTAL DEPTH OF BORING: 31.5 feet

SAMPLER TYPE: Cal barrel, SPT
40" hammer

BORING NUMBER **BH-1**

DEPTH (FT)	BULK SAMPLES	SS SAMPLES	BLOWS PER 0.5'	USCS	PROFILE	DESCRIPTION	% Moisture	Dry Density (pcf)	Unc. Com. (psf)	U.C. (psf) by P.P.	% Passing 200	REMARKS
-17.0												
-18.0												
-19.0												
-20.0			6	SC/CL		SAND, fine to coarse, clayey, with silt and fine to coarse gravel, medium dense, wet with saturated layers, dark yellow brown, TO CLAY, fine to coarse sandy, with fine to coarse gravels, medium stiff, wet, dark yellow brown.	17.5	112				
-21.0			6									
-22.0			8									
-23.0 ▼												
-24.0												
-25.0			7	SC		SAND, fine to coarse, clayey, with silt and fine to coarse gravel, medium dense, saturated, dark yellow brown.	18.4	113				
-26.0			6									
-27.0			6									
-28.0												
-29.0												
-30.0			8	CL		CLAY, fine to coarse sandy, with silt, fine to coarse gravels, medium stiff, saturated, blue gray.	15.6	115				
-31.0			7									
-32.0			8			Bottom of hole @ 31.5 feet.						
-33.0												

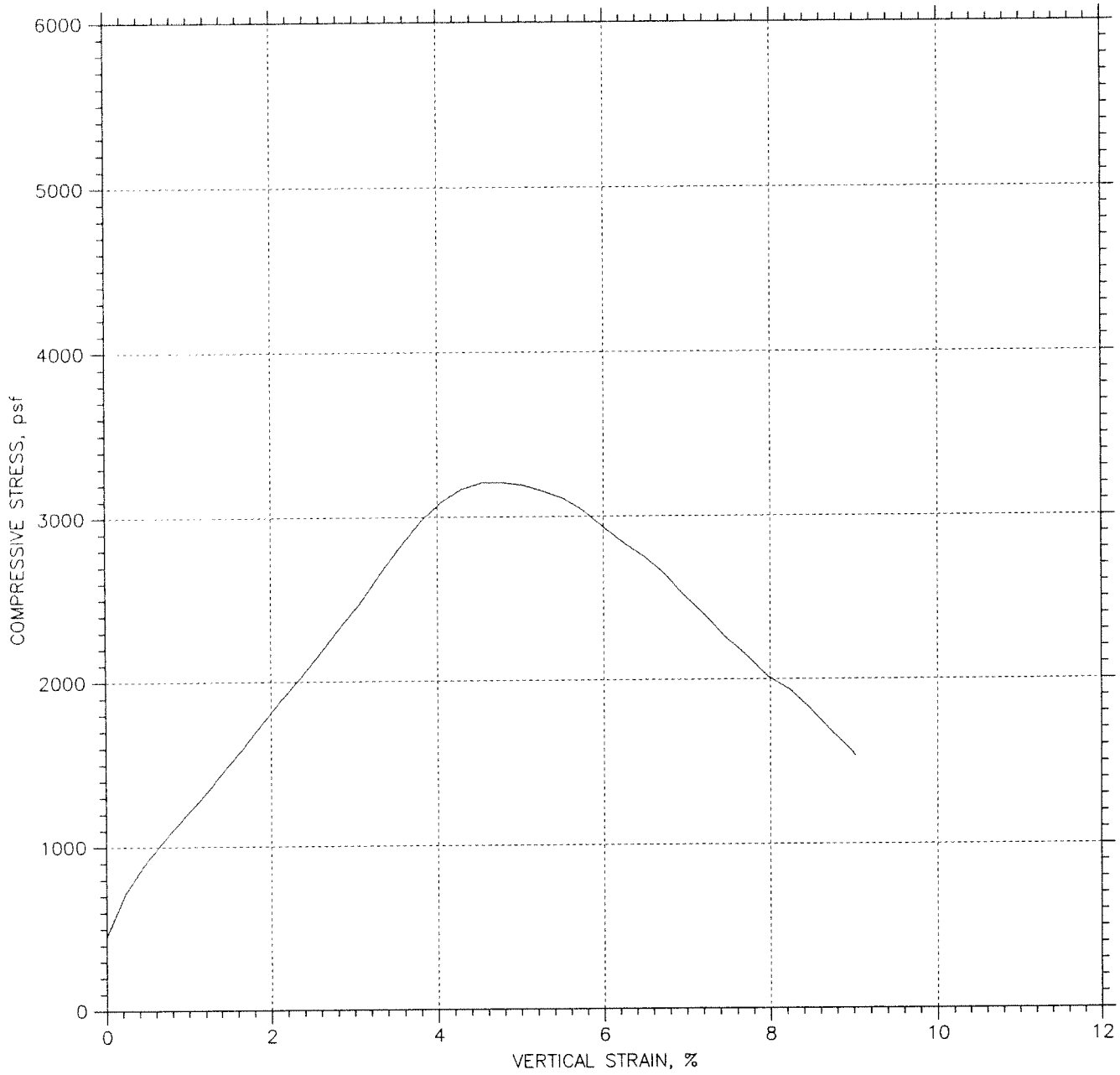
The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

FIELD LOG

Appendix B

Laboratory Test Results

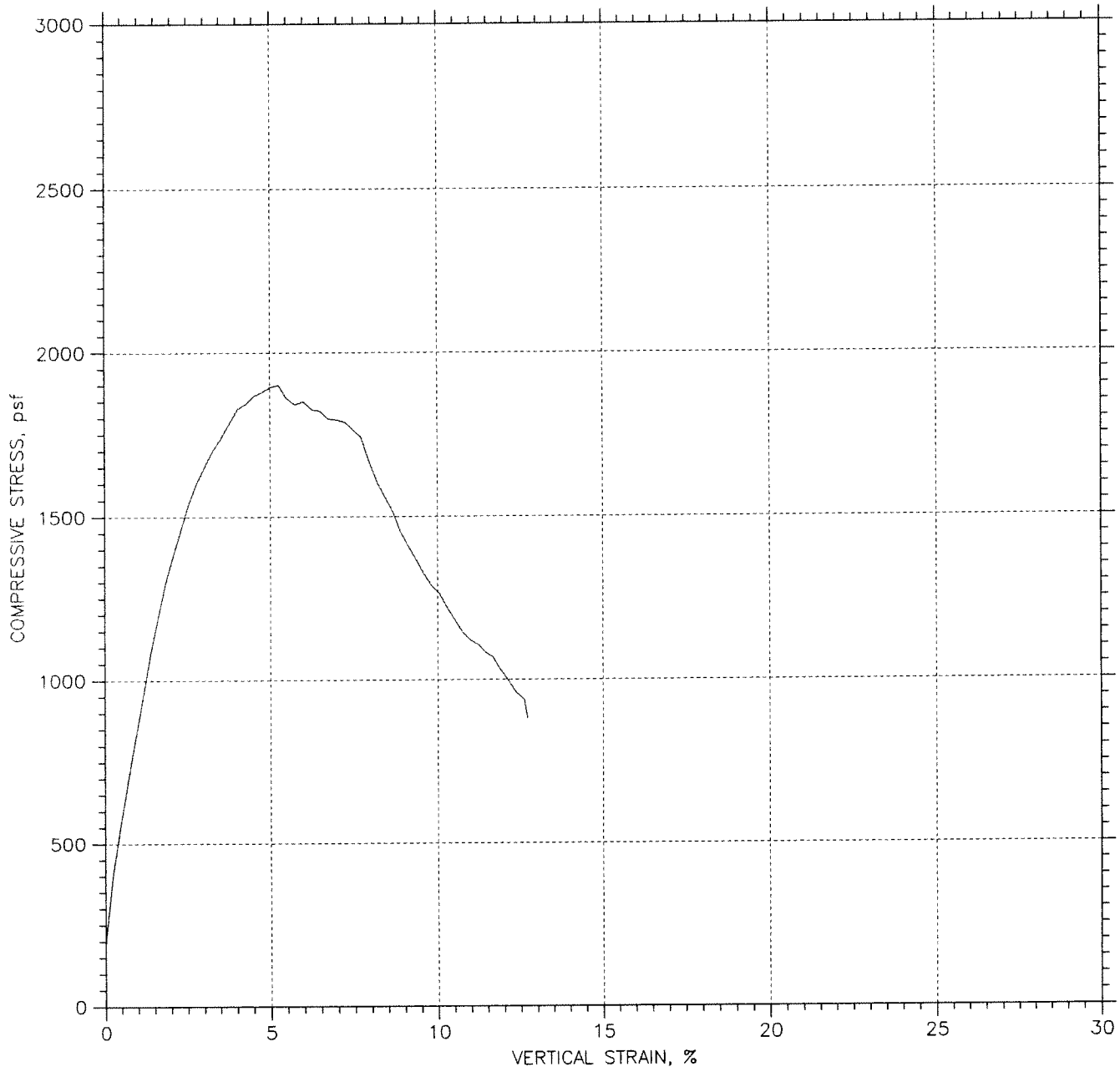
UNCONFINED COMPRESSION TEST REPORT



Project: Phillipsville Tank	Location: Phillipsville	Project No.: 006167
Boring No.: BH1	Tested By: JMA	Checked By: JB
Sample No.: 7-1248	Test Date: 10/15/07	Depth: 11-11.5
Test No.: 7-1248	Sample Type: 2.5" tube	Elevation:
Description: Brown Clayey Gravel		
Remarks:		

Tue, 16-OCT-2007 11:51:12

UNCONFINED COMPRESSION TEST REPORT



Project: Phillipsville Tank	Location: Phillipsville	Project No.: 006167
Boring No.: BH1	Tested By: JMA	Checked By: JR
Sample No.: 7-1249	Test Date: 10/15/07	Depth: 15.5-16
Test No.: 7-1249	Sample Type: 2.5" tube	Elevation:
Description: Brown Clayey Gravel		
Remarks:		

Wed, 17-OCT-2007 09:12:07

Appendix E – Boil Water Notice

Date: 2/7/2018

BOIL WATER NOTICE

Este informe contiene información muy importante sobre su agua potable.
Tradúzcalo o hable con alguien que lo entienda bien.

BOIL YOUR (SPRING) WATER BEFORE USING

Failure to follow this advisory could result in stomach or intestinal illness.

The treatment system used to treat Phillipsville's Spring source is not meeting State surface water treatment requirements. In addition, there was a bacteriological sample taken of the treated water on January 23, 2018, that tested positive for both total coliform and E.coli bacteria. Because of this, it is necessary to boil water from the Spring source prior to using it. We have physically disconnected the intertie between the Spring source and the Well source; therefore, customers using Well water only do not need to boil their water. Only customers using the Spring source need to boil their water.

Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

People who may have consumed the Spring water and are concerned should seek advice about drinking water from their health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at 1 (800) 426-4791.

DO NOT DRINK THE SPRING WATER WITHOUT BOILING IT FIRST: Bring all water to a boil, **let it boil for one (1) minute,** and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

We will inform you when tests show that water is safe to drink and you no longer need to boil your water. There is currently no estimated time that this situation will be resolved.

For more information you can call _____ or call the Phillipsville Community Services District Office at (707) 943-1650.

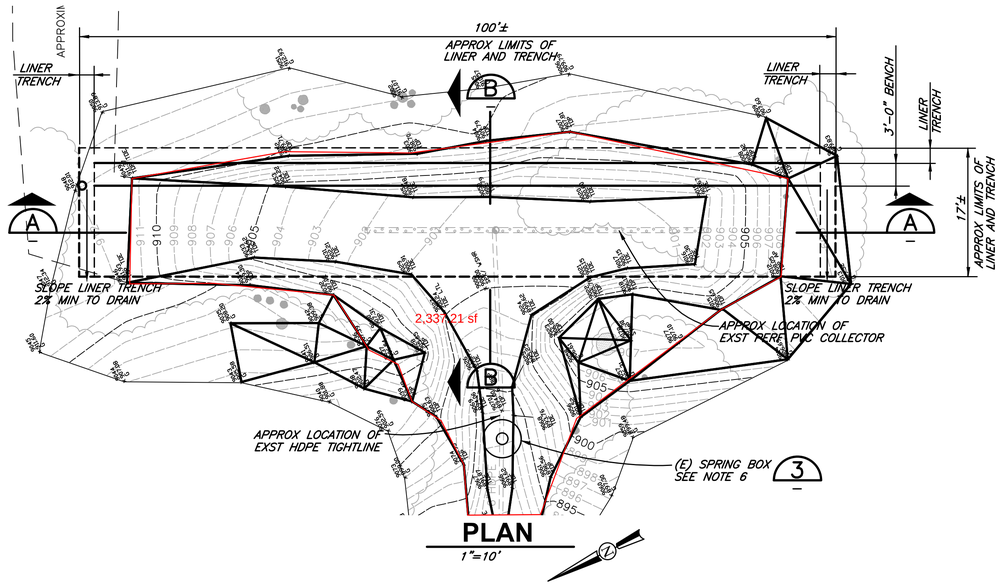
You may also contact the State Water Resources Control Board – Drinking Water Field Operations Branch-Klamath District Office at (530) 224-4800.

Phillipsville CSD, in collaboration with the State Water Resources Control Board Division of Drinking Water, is currently evaluating long term options that will address the issues preventing the Spring source from being properly treated. We appreciate your understanding during this process. Your health and well-being is our primary concern.

Please share this information with other people who drink this water, especially those who may not have received this notice directly.

Date Distributed _____

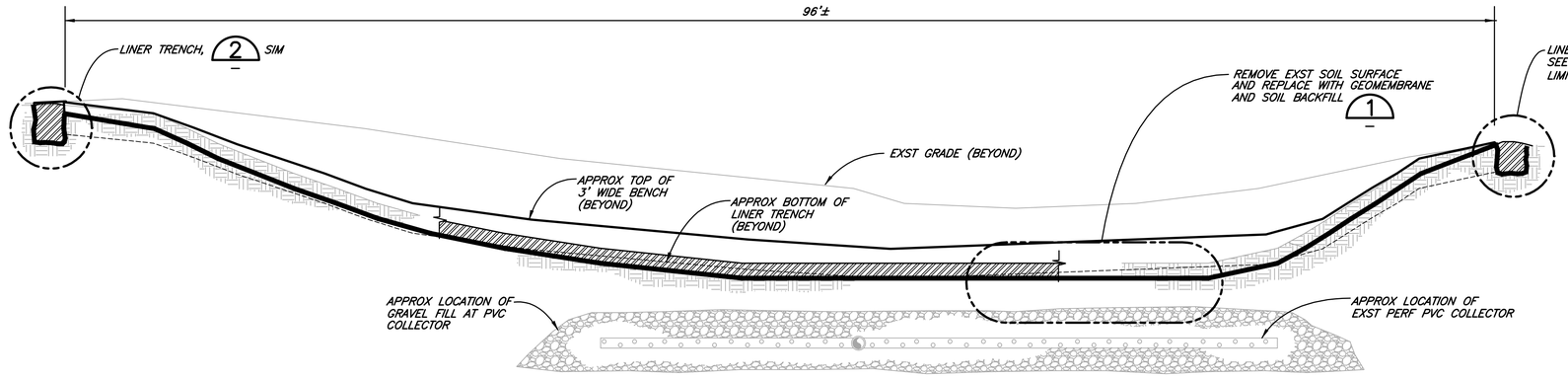
Appendix F – Spring Rehabilitation Drawings (2009)



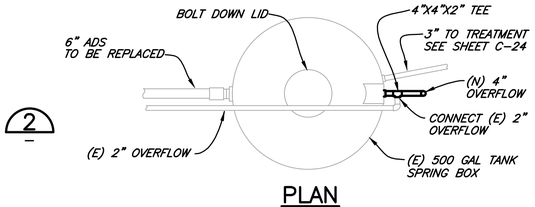
PLAN
1"=10'

CONSTRUCTION NOTES

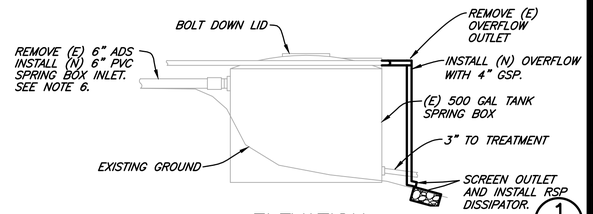
1. BACKFILL MATERIALS SHALL BE FREE OF BROKEN OR SHARP ROCKS, STICKS AND WOOD MATERIAL. BACKFILL MAY CONTAIN ROCKS WHICH ARE ROUNDED AND SMOOTH PROVIDING THEY DO NOT EXCEED 3/4" IN DIA.
2. BACKFILL PLACED ON TOP OF LINER SHALL NOT BE COMPACTED, REGRADE AND SEED WITH NATIVE GRASSES.
3. TEXTURED GEOMEMBRANE LINER SHALL BE PLACED OVER A PREPARED SUB-GRADE AS FOLLOWS: SURFACE SHALL BE SMOOTH AND FREE OF ANY ROCKS, STONES, STICKS, ROOTS, SHARP OBJECTS OR DEBRIS OF ANY KIND. NO OBJECTS GREATER THAN 3/8" IN DIAMETER SHALL BE PRESENT IN THE TOP 1" OF THE SURFACE TO BE COVERED BY THE GEOMEMBRANE. PREPARED SUBGRADE SHALL PROVIDE A FIRM, NON-YIELDING FOUNDATION FOR THE GEOMEMBRANE AND SHALL HAVE NO SUDDEN, SHARP OR ABRUPT CHANGES OR BREAKS IN GRADE. MATCH EXISTING TOPOGRAPHY AND GRADE TO DRAIN.
4. LINER SHALL BE GSE HD, TEXTURED GEOMEMBRANE HDPE, 40 MIL., 22'-6" IN WIDTH.
5. DURING CONSTRUCTION, CONTRACTOR SHALL TAKE EXTRA CARE TO PREVENT DAMAGE TO OR CONTAMINATION OF EXISTING SPRING COLLECTION SYSTEM AND PIPING. USE LOW PRESSURE EQUIPMENT, SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. REPLACE ±20' OF 6" HDPE FROM THE SPRING COLLECTOR OUTLET TO THE EXISTING SPRING BOX WITH 6" PVC (AWWA C900 CL 150). CONNECT (N) 6" PVC WITH FLEXIBLE FITTING AS APPROVED BY THE ENGINEER. TURN DOWN OVERFLOW PIPING. BOLT DOWN SPRING BOX LID TO PREVENT CONTAMINATION.



SECTION A
NO SCALE



PLAN



ELEVATION

DETAIL 3
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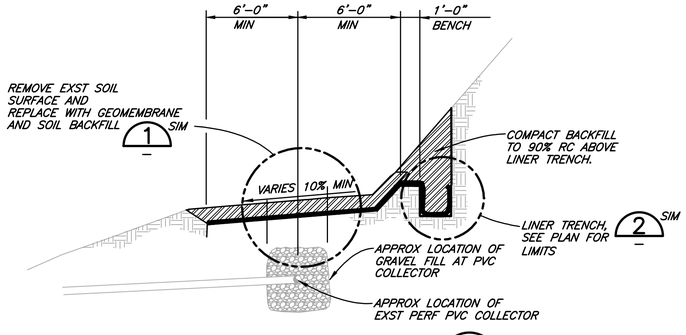

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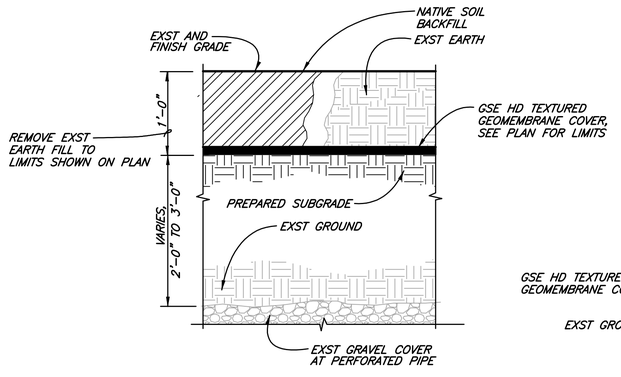

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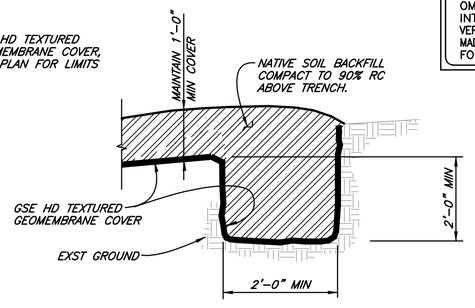

DETAIL 2
NO SCALE

RECORD DRAWING
THIS RECORD DRAWING HAS BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED AND FURNISHED BY OTHERS. THE ENGINEER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT AS A RESULT. FIELD VERIFICATION OF CRITICAL FACTS AND DATA MUST BE MADE IF THIS DOCUMENT IS TO BE USED AS A BASIS FOR FUTURE WORK.

REGISTERED PROFESSIONAL ENGINEER
BRIAN ALLEN FREEMAN
No. C59982
CIVIL
STATE OF CALIFORNIA

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SHN
CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash Eureka, CA 95501 FAX (707)441-8855 (707)441-8877

NO.	DATE	REVISION	BY

DSGN ARK DR RDW CHK ARK APVD

PHILLIPSVILLE COMMUNITY WATER DISTRICT
WATER INFRASTRUCTURE UPGRADE
PHILLIPSVILLE, CALIFORNIA

SPRING IMPROVEMENT PLAN, SECTION, DETAILS AND NOTES

SHEET C-23
27
DATE 6/2008
PROJ. NO. 006167.200

SAVED: 11/12/2012 5:10 PM BFREEMAN, PLOTTED: 11/12/2012 5:13 PM BRIAN FREEMAN
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Appendix G – Alternative Filtration Technology California Approval Letter

State of California—Health and Human Services Agency
Department of Health Services

California Department of Health Services

SANDRA SHEWRY
Director

ARNOLD SCHWARZENEGGER
Governor

June 9, 2005

Mr. Dan Mosley
Senior Sales & Technical Manager
Manager Potable Water Products Division
The Strainrite Companies, Inc.
65 First Flight Dr
Auburn, ME 04211-1970

Dear Mr. Mosley:

CDHS CONDITIONAL ACCEPTANCE OF AQUA-RITE POTABLE WATER FILTRATION SYSTEM AS AN ALTERNATIVE FILTRATION TECHNOLOGY

Based on the results of testing conducted by BioVir Laboratories and reported in "Particle Reduction Study for Strainrite's "AQUA-RITE" Potable Water Filtration System," (no publication date; signed April 2005) the Water Treatment Committee (WTC) of the California Department of Health Services' Drinking Water Program, will accept the use of the Strainrite Companies' AQUA-RITE Potable Water Filtration System as an alternative filtration technology to meet the physical removal requirements of the current California Surface Water Treatment Rule (SWTR).

The AQUA-RITE Potable Water Filtration System is accepted as an alternative SWTR filtration technology under California Code of Regulations, Title 22, Division 4, Environmental Health Chapter 17, Article 2, Section 64653(f) as configured in the BioVir report cited above with the HPM99-CC-2-SR prefilter in front of the HPM 99-CC-35-2-SR final filter (which according to your last e-mail will be manufactured, sold, and distributed as the HPM99-CCX-2-SR). Although not documented in the BioVir report, we understand the AQ2-2 vessel equipped with a "seal Rite" bag flange is a required component of this system and is used as the housing for the prefilter and final filter. We also understand that these filters have not been tested in other Strainrite housing and that it would be inappropriate to use these filters in housings other than the AQ2-2.

Review and approval for the proposed design of any water treatment system proposing to use your technology will be handled on a case-by-case basis by the Drinking Water Program's individual District offices or local primacy agencies. Since the Drinking Water Program's District Engineers are responsible for evaluating the source water quality to

be treated and issuing an operating permit, they will set the overall removal and inactivation requirements for a given installation. Design engineers proposing to use your alternative filtration technology should be aware that the minimum log removal requirements established by the SWTR are to be met using multiple treatment barriers. Your technology is recognized as being *one* component of this multiple barrier. Approval for the use of your technology in any drinking water application is granted through the domestic water supply permitting process.

The AQUA-RITE Potable Water Filtration System is granted the removal credits shown in Table 1, and is subject to the operating parameters identified in Table 2. As the unit was not challenged to demonstrate virus removal, the units receive no log virus removal credit (0-log) and are subject to the limitations outlined in California Code of Regulations, Title 22, Division 4, Environmental Health Chapter 17, Article 2, Section 64653(f and g).

Table 1 – Filter Removal Credit

Target Organism	**Removal Credit (log_{10})**
Giardia	3.0
Cryptosporidium	3.0
Virus	0.0

Table 2 – System Operating Parameters

Parameter	**Value**
Maximum Flowrate into system	20 gpm
Max Differential Pressure (as measured across the prefilter and final filter)	25 psid
Turbidity Performance Standards	0.1 NTU 95% of the time Not to exceed 0.5 NTU
Additional Design Criteria	1. Pressure relief to protect bag from an excessive pressure surge. 2. Filter to waste for 2 minutes after bag installation. 3. Means to measure the pressure drop across each filter.

Since the alternative filtration technology testing focused on pathogen removal (via a surrogate), only the pressure differential across the system was measured. Since the maximum pressure differential across the system (as measured across the prefilter and the final filter) is set as a condition of operation, we request specific guidance (e.g., pressure differential or other information) that the operators can use to indicate the final filter requires replacement. For example, your guidance should include, but not be limited to end of life or failure (partial or catastrophic). We are trying to avoid a situation in which an operator continually replaces the prefilter only because the final filter is not functioning properly. Similar guidance is requested for the prefilter.

Experience has led us to believe that bag filter systems may not be appropriate for water sources that contain high concentrations of submicron-sized particles (<2 μm). Before installing a new bag filter system, the source water should be evaluated to determine whether or not submicron-sized particles are present in concentrations that would prevent the bag filter from meeting the 0.1 NTU turbidity standard. Such an evaluation can be completed using either a pilot plant or a 2-μm paper/glass fiber filter in a laboratory setting. If the pilot plant or 2-μm lab filter does not reduce turbidity to less than 0.1 NTU the source may not be amenable to filtration using a bag filter.

Any changes made to any feature, part, or product used on the AQUA-RITE Potable Water Filtration System should be reported (in writing) to the Department in advance of making the changes to any production version of your system sold in California. The detail of your written notification will be reviewed to determine if additional performance testing will be required. Consequently the letter and its appendices should provide sufficient detail to satisfy the reviewing body. Should additional testing be required, the WTC will review all future study protocols. The WTC must approve all study protocols as a condition of accepting the final report. The WTC will also review the final report and, if appropriate, make testing and permit provision recommendations regarding any future changes.

It is our understanding that all the primary components (HPM99-CC-2-SR prefilter HPM99-CCX-2-SR final filter) are to be used once and then discarded (no backwashing; no chemical clean in place). We further understand that the components of the AQUA-RITE Potable Water Filtration System are undergoing NSF Standard 61 certification (drinking water components) and that the results will be released to this regulatory body as soon as they become available. In addition, we understand that no other treatment chemicals or additives will be used to enhance or modify the performance of these units at this time. Should this change, please contact us so we can provide you with guidance regarding the regulatory requirements that cover the use of NSF (or equivalent) certified chemicals.

We would appreciate guidance on steps our field engineers can take to track the HPM99-CC-2-SR prefilter and HPM99-CCX-2-SR final filter to ensure the products are not being reused in the systems.

As we have received a number of inquiries regarding your system, we would be willing to provide any contact information to utilities that you would be willing to provide. If other contacts, such as a local representative, are available, could you provide us with their contact information at your convenience (our listing of alternative filtration technologies is updated periodically, but not on any regular schedule).

Should you have any questions regarding the content of this letter, please feel free to contact me at (510) 849-5050.

Very truly yours,

Original signed by

Richard H. Sakaji, PhD, PE
Senior Sanitary Engineer

cc: WT Committee
chron

Appendix H – PG&E Delineation, Electrical Map

Pacific Gas & Electric Company

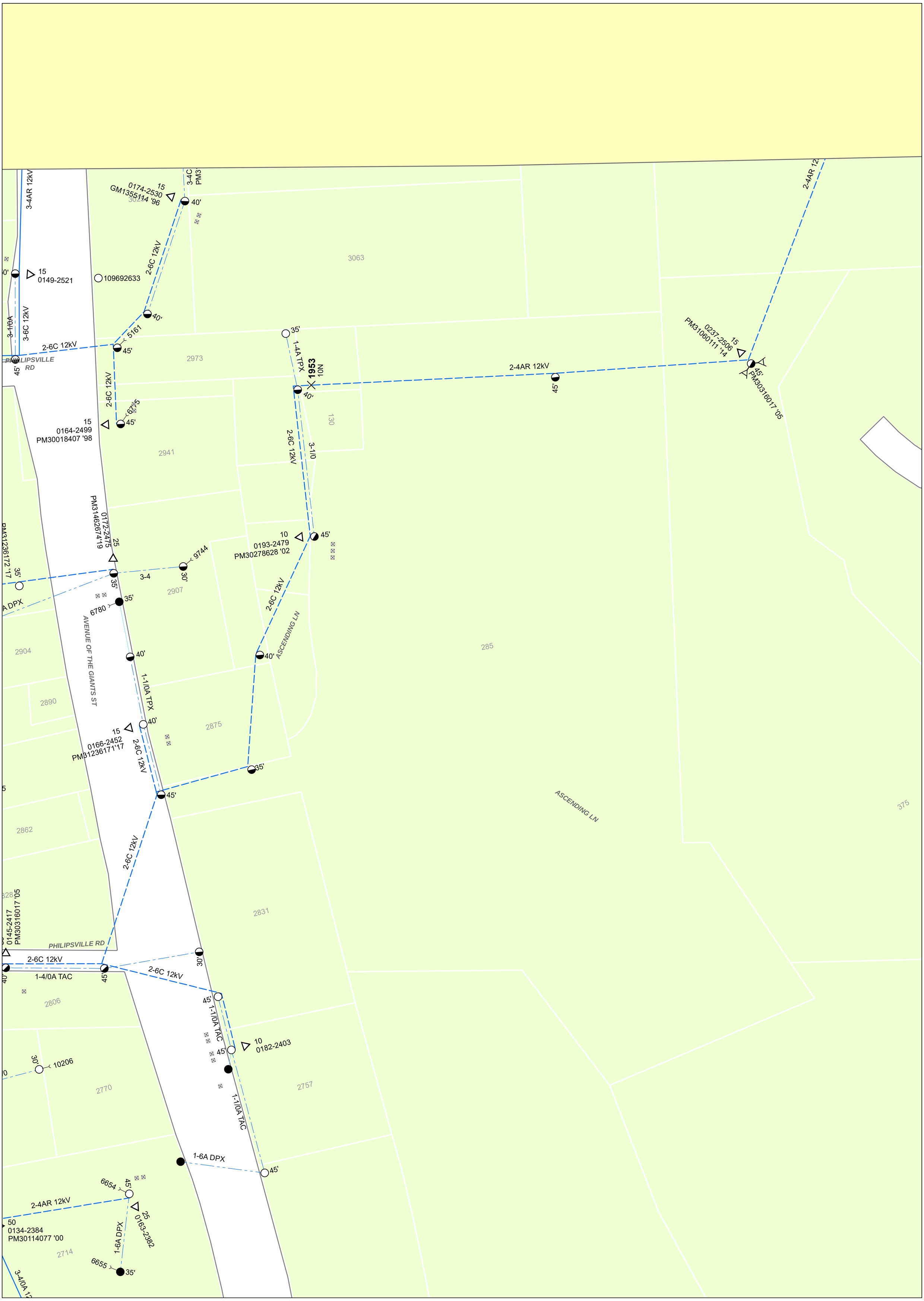
ELECTRIC DISTRIBUTION

1 inch = 60 feet

Printed on: 11/10/2020
Reference PG&E's GIS for the most current information.

**APPROXIMATE LOCATIONS
VERIFY BY HAND TOOLS
PACIFIC GAS AND ELECTRIC CO.**

**PLEASE CALL U.S.A. AT
LEAST 48 HOURS PRIOR TO
EXCAVATING IN THIS AREA
Dial 811**



Appendix I – Capital Cost Estimate

Phillipsville CSD
Spring Source Improvements Project
Preliminary Construction Estimate

Preliminary Improvements	Unit	Value	Material Unit Cost	Installation	Cost Estimate
Spring Site					
Spring Access Road Clearing	lump sum	1		$ 24,570	$ 24,600
Collection Gallery Seal Reconstruction	lump sum	1		$ 11,720	$ 11,700
Geomembrane Liner	sqft	2337	$ 1.5	$ 24,570	$ 28,100
Spring Slope Backfill	cuft	8180		$ 11,720	$ 11,700
Spring Water Treatment Plant					
WTP Piping Improvements	lump sum	1	$ 5,000	$ 11,720	$ 16,700
Cartridge Filter Vessel	each	1	$ 2,712	$ 3,530	$ 6,200
Cartridge Insert plus a spare	each	2	$ 270	$ -	$ 500
Strainrite Filter Vessels	each	2	$ 5,000	$ 3,530	$ 13,500
Strainrite Filter Inserts	each	6	$ 104	$ -	$ 600
Turbidimeter	each	2	$ 1,000	$ 446	$ 2,400
Controller	each	1	$ 1,000	$ 446	$ 1,400
Chlorine Analyzer	each	1	$ 1,000	$ 446	$ 1,400
Chemical Feed Pump	each	2	$ 600	$ 3,530	$ 4,700
Secondary Containment Pallet	each	1	$ 100	$ 232	$ 300
Combination PRV and Altitude Valve	each	1	$ 5,000	$ 446	$ 5,400
Chlorine Contact Pipeline	linear feet	180	$ 160	$ 3,530	$ 32,300
WTP Standby Generator	lump sum	1	$ 15,000	$ 11,720	$ 26,700
Upper Tank Site					
Demolish Plastic Tanks and Piping	lump sum	1		$ 3,530	$ 3,500
Demolish WTP piping and instrumentation	lump sum	1		$ 3,530	$ 3,500
Tank Concrete Pads	cyd	19	$ 100	$ 24,570	$ 26,500
Plastic Potable Water Storage Tanks	each	2	$ 32,181	$ 24,570	$ 88,900
Yard Piping	lump sum	1	$ 5,000	$ 24,570	$ 29,600
Generator Trailer Concrete Pad	cyd	74	$ 15	$ 3,530	$ 4,600
Gravel Surfacing	sqft	4000	$ 15	$ 11,720	$ 71,700
Chainlink Fencing	linear feet	300	$ 50	$ 24,570	$ 39,600
Level Transducers	each	2	$ 500	$ 3,530	$ 4,500
Distribution					
8" Diameter Fire Supression Main - Upper Zone	linear feet	5330	$ 30	$ 349,920	$ 509,800
Fiber Optic Cable	linear feet	5330	$ 10	Included	$ 53,300
8" Diameter Fire Supression Main - Middle Zone	linear feet	1000	$ 30	$ 14,496	$ 44,500
Fire Hydrants	each	12	$ 1,000	$ 24,570	$ 36,600
Leak Control Valve - Middle Zone	each	5	$ 3,000	$ 3,530	$ 18,500
Service Pressure Regulating Valve	each	5	$ 500	$ 3,530	$ 6,000
Middle Zone PRV	each	1	$ 5,000	$ 11,720	$ 16,700
Yard Piping - Middle Zone Tank Bypass	lump sum	1	$ 2,000	$ 3,530	$ 5,500
Lower Tank Site/Booster Pump Station					
PRV Station Servicing	lump sum	1		$ 11,720	$ 11,700
Pump Station Concrete Pad	cyd	4	$ 15	$ 11,720	$ 11,800
Supply Pump Station	lump sum	1	$ 50,000	$ 64,250	$ 114,300
High Flow Pump Package	lump sum	1	$ 50,000	$ 24,570	$ 74,600
CMU Building	sqft	200	$ 250	Included	$ 50,000
Yard Piping	lump sum	1	$ 15,000	$ 11,720	$ 26,700
Altitude Valve	each	1	$ 3,000	$ 3,530	$ 6,500
Flex Tend for Pump Suction	each	1	$ 5,000	$ 3,530	$ 8,500
Chainlink Fencing	linear feet	300	$ 50	$ 64,250	$ 79,300
Pump Station Standby Generator	lump sum	1	$ 100,000	$ 11,720	$ 111,700
Electrical Service Construction	linear feet	250	$ 10	$ 3,530	$ 6,000
Pump Station Control Panel	lump sum	1	$ 35,000	$ 3,530	$ 38,500
Well Site and Water Treatment Plant					
Demolish Interior Piping and Instrumentation	lump sum	1		$ 3,530	$ 3,500

Develop Existing Well	hour		8	$ 200	Included	$	1,600
Drill New Well	each		1	$ 100,000	Included	$	100,000
Well House Piping Improvements	lump sum		1	$ 1,000	$ 24,570	$	25,600
Chlorine Analyzer	each		1	$ 1,000	$ 446	$	1,400
Chemical Feed Pump	each		2	$ 600	$ 3,530	$	4,700
Secondary Containment Shed	lump sum		1	$ 2,250	$ 446	$	2,700
Well House Roof	sqft		100	$ 75	Included	$	7,500
Containment Shed Pad	cyd		1	$ 15	$ 3,530	$	3,600

Project Location		**Value**			**Cost Estimate**
Spring Site					$ 76,100
Spring Water Treatment Plant					$ 112,100
Upper Zone Tank Site					$ 272,400
Distribution					$ 690,900
Lower Zone Tank and Booster Pump Station Site					$ 627,900
Well Site and Water Treatment Plant					$ 150,600
Subtotal					*$ 1,930,000*
Design Contingency		30%			$ 579,000
General Conditions, Bonds, Taxes, and Insurance		9%			$ 173,700
Contractor Profit		7%			$ 135,100
Probable Construction Bid					**$ 2,817,800**
Construction Contingency		10%			$ 281,800
Total Probable Construction Cost					**$ 3,100,000**
Planning, Design and Project Management Costs					
Preliminary Engineering and Final Design					$ 321,721
Project Management		20%			$ 64,400
Engineering services during construction		10%			$ 310,000
Total Planning, Design and PM Costs					**$ 696,121**
Total Estimated Project Cost (Planning, Design and Construction)					**$ 3,796,000**
Cost per Connection					***$ 58,000***

QUOTATION NO. Q-000103_1-SRC

To: Sheila Magladry, Water Works Engineers
Project: Phillipsville
Sales: Sean Coholan

Date: December 7, 2020
Terms: Net 30 days
Freight: Prepay & Add

RE: Potable Water Storage Tank

TANK SYSTEM: Potable Water

With the following package:

Primary Tank (Quantity: 1)
12150 gallon Vertical 1.35 specific gravity wall thickness
Crosslinked Polyethylene (XLPE) with HDPE Interior Surface: NSF certified for potable water storage

Lid/Manway (Quantity: 1)
Cover Assembly 24" Strapped

Fill (Quantity: 1)
Bulkhead fitting Assembly 2" Socket x thread PVC/EPDM

Level Gauge (Quantity: 1)
Reverse Float Level Gauge PVC (without internal piping)

Restraint (Quantity: 1)
Seismic Restraint System – Galvanized steel, Includes base clips and cable sling. Does not include anchor bolts.
Includes P.E.'s stamped anchorage calculations

Overflow Fitting (Quantity: 1)
Bulkhead fitting Assembly 2" Socket x thread PVC/EPDM

Vent (Quantity: 1)
U-vent 6" PVC

Sidewall Discharge Fitting
BOSS_fitting (Bolted One-piece Sure Seal) 2" Assembly (polyethylene)/PVC/Stainless steel/EPDM
Includes Flexijoint Flexible Connection

WARRANTY:5 Years, Full Replacement, Non-Prorated

System Subtotal:	$27,181.00
Freight Estimate:	$3,500.00
Total	$32,181.00

Standard Delivery After Approval: 6 weeks
*Please note – Sales Tax is not included

MISCOwater's Terms and Conditions of Sale are attached and are, by reference, a part of this quote.
All Sales and contracts made by us are expressly subject to the conditions as shown hereon and on the back hereof. Stenographic and clerical errors subject to correction. Claims for shortages, defective goods, errors or allowances must be made within 30 days from date of invoice. This quotation shall be of no effect unless written acceptance is received by us within 30 days from the date hereof. We reserve the right to withdraw this quotation prior to our receipt of such acceptance.

Submitted By: Sean Coholan
5976 West Las Positas Blvd, Ste 226,
Pleasanton, CA 94588
925.225.1900

MISCOWATER – TW ASSOCIATES
TERMS & CONDITIONS OF SALE

1. ACCEPTANCE

When the Buyer signifies acceptance of this quotation by submission of a Purchase Order or signed MISCOWATER Quotation, it shall become a binding contract when accepted and signed by an authorized signer of the Seller (MISCOWATER). Any changes or amendments to this proposal made by the Buyer must have MISCOWATER's approval in writing to become a part of this contract.

2. DELIVERY

Any shipment or delivery date recited represents our best estimate, but no liability, direct or indirect, is assumed by MISCOWATER for failure to ship or deliver on such dates. Unless otherwise directed, MISCOWATER shall have the right to make early or partial shipments and invoices covering the same to Buyer shall be due and payable in accordance with payment terms hereof. FOB shall be origin.

3. APPROVAL DRAWINGS

Any preliminary drawings or literature attached to our quotation are for illustration purposes only to show approximate arrangements. Specific drawings and submittal data will be furnished for approval as required after receipt and acceptance of the Buyer's order. Fabrication of products or equipment ordered will not begin until approval and direction to proceed is received in writing.

4. PAYMENT

Payment terms, upon credit approval, are Net 30 Days from the date of each invoice issued for each partial or final shipment. Flowdown provisions are not accepted. Retention is not allowed. In the event any payment becomes past due, a charge of 1.5% will be assessed monthly.

5. TAXES AND BONDS

Taxes and bonds are NOT included in our pricing. Any applicable taxes or bonds will be added to the price and shown separately on each invoice.

6. CLAIMS AND BACKCHARGES

Buyer agrees to examine all materials immediately upon delivery and report to Seller (MISCOWATER) in writing any defects or shortages noted no later than 10 days following the date of receipt. The parties agree that if no such claim is made within said time, it shall be considered acceptable and in good order with respect to any defect or shortage which would have been revealed by such an inspection. In no event will MISCOWATER be responsible for any charge for modification, servicing, adjustment or for any other expense without written authorization from MISCOWATER prior to the performance of any such work.

7. SECURITY INTEREST & TITLE

Until all amounts due MISCOWATER have been paid in full, Seller shall retain a security interest in the product and have all rights of a secured party under the California Uniform Commercial Code, including the right to repossess the product or equipment without legal process.

8. WARRANTY

MISCOWATER warrants that the product furnished will be free from defects in material and workmanship when installed, operated and maintained under design conditions and in accordance with the manufacturer's written instructions. Warranties will expire (18) months after shipment or twelve (12) months after start-up, whichever occurs first. Expandable items such as filter or scrubber media are excluded from this warranty.

THIS WARRANTY, INCLUDING THE STATED REMEDIES, IS EXPRESSLY MADE BY SELLER AND ACCEPTED BY PURCHASER IN LIEU OF ALL OTHER WARRANTIES. SELLER MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE, WHICH EXTEND BEYOND THE DESCRIPTION OF THE PRODUCT HEREIN. SELLER WILL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL OR LIQUIDATED DAMAGES, AND IN NO EVENT SHALL BE LIABLE FOR ANY AMOUNT IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT PURCHASED ON THIS ORDER.

The foregoing is Seller's only obligation and Buyer's exclusive remedy for breach of warranty, and, except for gross negligence and willful misconduct, the foregoing is Buyer's exclusive remedy against Seller for all claims arising hereunder or relating hereto. Buyer's failure to submit a timely claim as provided shall specifically waive all claims for damages or other relief.

9. CANCELLATION

Should this order be cancelled, Buyer shall be obligated to pay for the level of work performed and products shipped. Work performed includes any engineering, calculations, preparation of submittals, drawings, and/or travel to job site in relation to this order.

10. FIELD WORK

Unless specifically stated on our quotation, installation, start-up service, supervision, operation and training are not included in our pricing of product.

11. COMPLETE AGREEMENT

These terms are intended by the parties as a final expression of their agreement and are intended also as a complete and exclusive statement of the terms of their agreement. No course or prior dealings between the parties and no usages of the trade shall be relevant to supplement or explain any term used in this agreement. This agreement supersedes all prior representations and agreements with respect to the matters set forth herein and may be modified only by a written agreement to and signed by each of the parties.

MISCOWATER: _____ By: _____

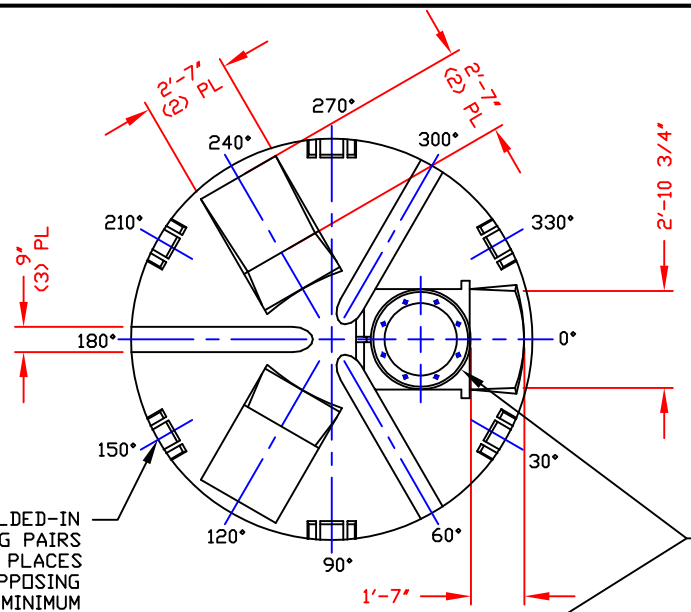
Title: _____ Title: _____

Date: _____ Date: _____

NON-CONTROLLED COPY

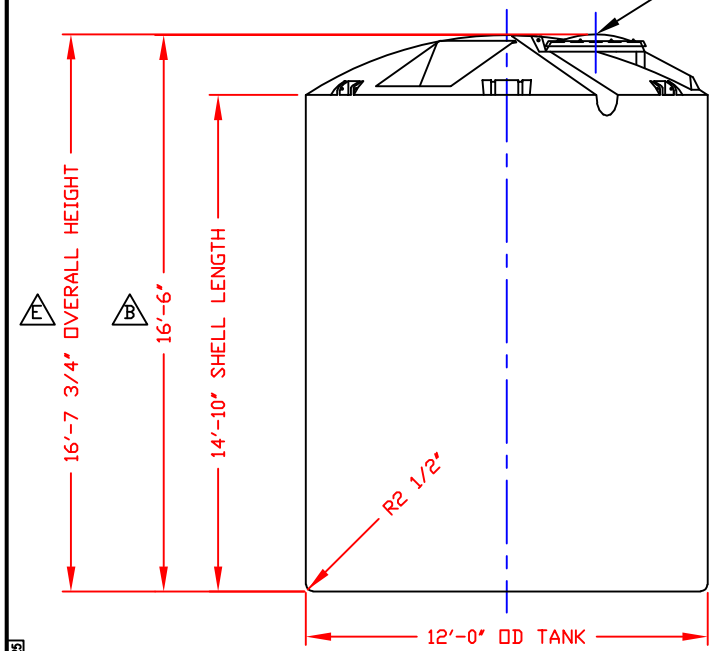
INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE

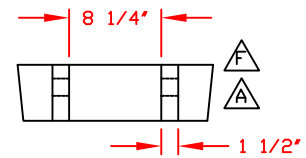
VERIFY REV LEVEL OF PAPER COPY WITH REV LEVEL ON PPC WEB SITE



A MOLDED-IN LIFTING LUG PAIRS (6) PLACES USE (4) OPPOSING PAIRS MINIMUM FOR LIFTING (SEE DETAIL)

D STANDARD COVER:
24"/(8) BOLTS MANWAY COVER/PE (SHOWN)
STOCK NO. 3218 OR
24"/STRAPPED MANWAY COVER/PE
STOCK NO. 3217
(OPTIONAL 24" COVERS AVAILABLE)





LIFTING LUG DETAIL
(6) PLACES
SCALE: 1"=1'-0"

NOTES
1. THIS IS A COMPUTER GENERATED DWG. DO NOT REVISE BY HAND.
2. DIMENSIONS WILL VARY ±3% DUE TO VARIATIONS IN MULTIPLE MOLDS & CONDITIONS PREVALENT DURING MANUFACTURE & USAGE.
3. NO MOLDED IN GALLONAGE MARKERS THIS TANK.

NOTE: G MUST USE FLEXIBLE CONNECTIONS ALL LOWER SIDEWALL FITTINGS

C

CALCULATED CAPACITIES/ VOLUME IN U.S. GALLONS		
DESIGN CAP	DOME VOL	TOTAL VOL
12189	640	12829

REV "G" ADDED FITTING NOTE BY:JB 2/13/03 CK:MBW
REV "F" REVISED LIFTING LUG DETAIL BY:JB 1/14/03 CK:WM
REV "E" ADDED DIMENSION BY:JB 10/22/02 CK:MBW
REV "D" REVISED DOME & MWY CONFIGURATION BY:MBW 8/28/02 CK:JB
REV "C" REVISED CALCULATED CAPACITY BY:JB 4/1/02 CK:MBW
REV "B" DID SAY 16'-7 1/2" BY:JB 4/1/02 CK:MBW
REV "A" ADDED LIFTING LUGS & DETAIL BY:JB 4/1/02 CK:MBW

DWG TITLE: 12150 GALLON UPRIGHT TANK

SCALE: 1/4"=1'-0"

DATE: 10/17/19

PolyProcessing SOLUTIONS, SIMPLIFIED.
Western Region
P.O. Box 80
9055 South Ash Street
French Camp, CA 95231
(209) 982-4904
FAX (209) 982-0455

DR: B. HARPER

CK:

SHEET: 1 OF 1

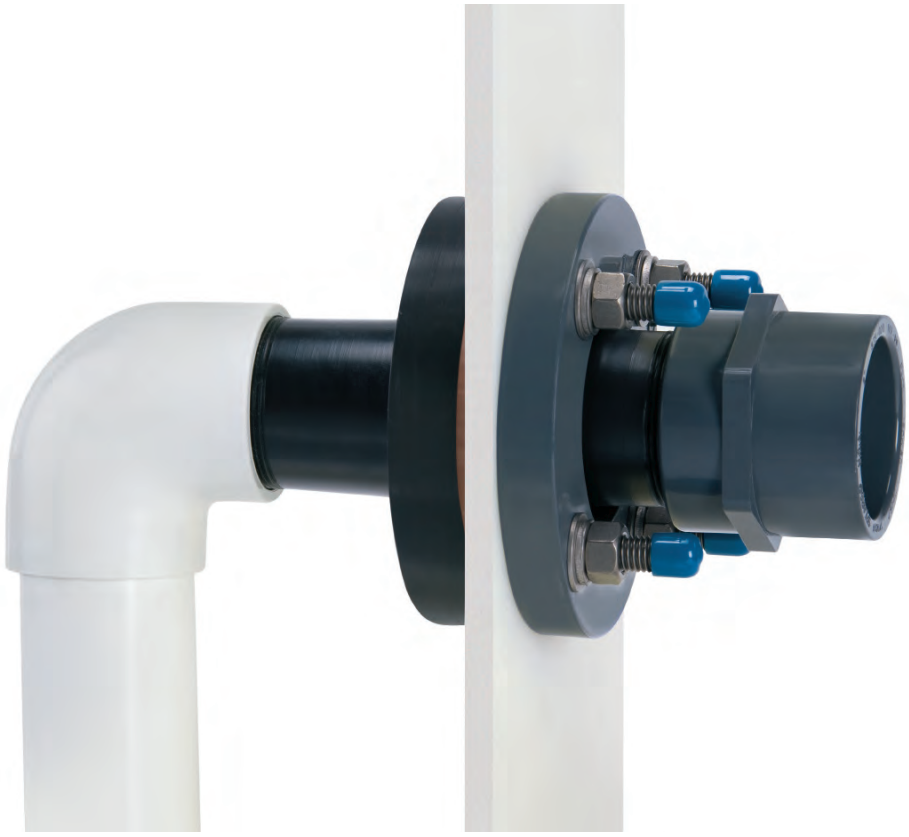
COMPUTER FILE: VERT-12150

REV: G

B-25

B.O.S.S. ® Fitting

Bolted One-Piece Sure Seal Prevents Leaks



The B.O.S.S. ® Fitting adds value to your tank system

1. One-piece design reduces the seal point to a single gasket.
2. Polyethylene construction assures you of the same chemical compatibility as your tank.
3. Innovative backing ring design reduces stress on the fitting and makes it three times stronger than similar plastic fittings.
4. Easy to maintain and troubleshoot because the pipe connection is extended beyond the sidewall of the tank.

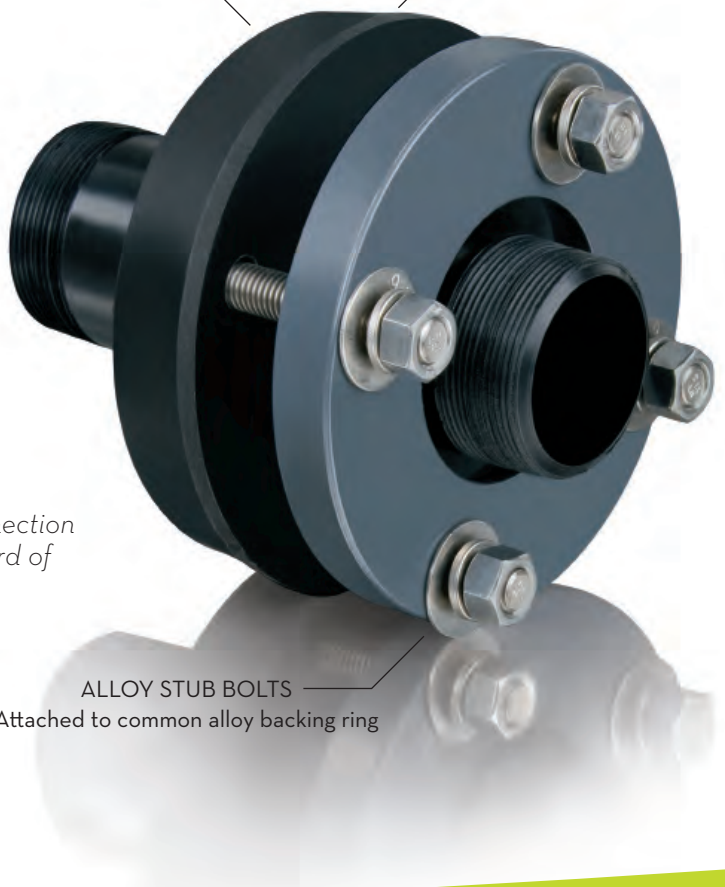
CALIFORNIA
8055 S. Ash St.
French Camp, CA 95231
866.765.9957

LOUISIANA
P.O. Box 4150
2201 Old Sterlington Rd.
Monroe, LA 71203
Tel: 866.765.9957
sales@polyprocessing.com

VIRGINIA
161 McGhee Rd.
Winchester, VA 22603
866.765.9957

About the One-Piece Design

- An innovative design that protects the cross section of the OR-1000® tank systems.
- Made of polyethylene and available in 1", 2", and 3" sizes.
- Three alloy options available: 316 Stainless Steel, Titanium and C-276.
- Installed through the tank wall as with any standard bulkhead fitting.
- Comes fully assembled and factory tested.
- Streamlined fitting: one full-face gasket is the single sealing point and internal and external connection nipples are molded into the fitting.
- Assured chemical compatibility through the use of polyethylene construction.
- Increased strength by connecting all of the stud bolts to a robust common-alloy backing ring.



As with all fittings, a flexible connection is required on the bottom one-third of the sidewall.

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www.polyprocessing.com

FLEXIJOINT® EXPANSION JOINT

These flexible PTFE connectors and tremor barriers are designed to compensate for expansion and contraction, and isolate the vibration and shock that could damage a tank. Their low spring rate protects stress-sensitive connections.

- Made of pure 100% virgin PTFE resin
- Ethylene's exclusive Fluorforming™ process guarantees multiple convolution walls of consistently uniform thickness for any size.
- Features T-Band™ root and sidewall support and protection from over-compression
- LimitLinks™ stainless steel cables protect from over-expansion.

Bolts: 316 stainless steel, titanium, C-276, Alloy 400

Gaskets Available: EPDM, Viton® and Viton® GF

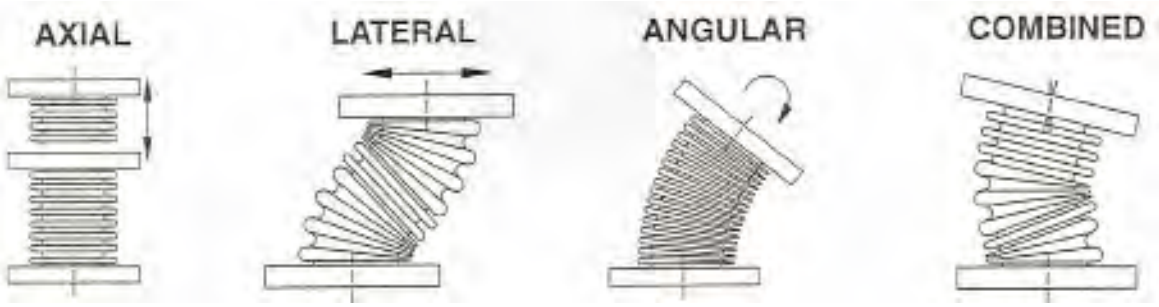
See Poly Processing Installation and Operation Guide for complete details.

CALIFORNIA
8055 S. Ash St.
French Camp, CA 95231

LOUISIANA
P.O. Box 4150
2201 Old Sterlington Rd.
Monroe, LA 71203
Tel: 866.590.6845
sales@polyprocessing.com

VIRGINIA
161 McGhee Rd.
Winchester, VA 22603

Performance specifications



» Axial Compression ≥ .67″
» Axial Extension ≥ 0.67″
» Lateral Deflection ≥ 0.51″
» Angular Deflection ≥ 14°
» Torsional Rotation ≥ 4°

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Rever se Fl oat L evel G auge:

An Inside Look at the Reverse Float Level Gauge

Knowing the liquid level in a chemical storage tank is important for a number of reasons. You have to know when to order more chemical, and

properties and/or operational requirements. A
helpful in that it lets you know, from the outside of the system, how much chemical is in your tank.

Why Design a Level Gauge

A level gauge of any kind monitors the liquid level of what is being stored in the polyethylene tank. There are several types of gauges including clear tube level gauges, ultrasonic level gauges, etc. While Poly Processing works with many types of level indication, in almost all cases we

How a Reverse Float Level Gauge Works

As the tank is

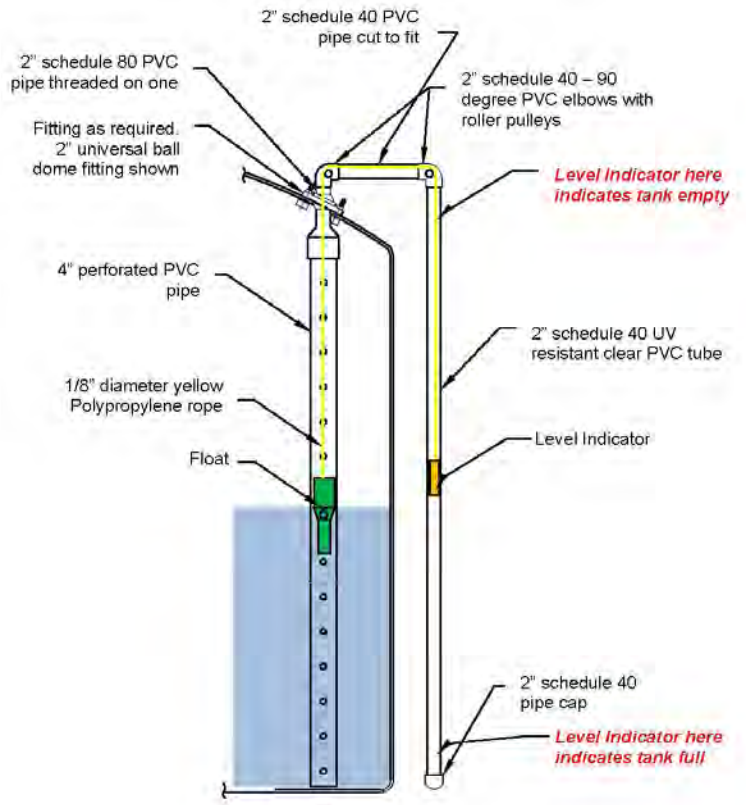
indicator on the outside to move down. This is done using a pulley system with polypropylene rope and PVC rollers inside of PVC elbows. As the tank
This is why

California
8055 S. Ash St.
French Camp, CA 95231
Tel: 877.325.3142

Louisiana
P.O. Box 4150
2201 Old Sterlington Rd.
Monroe, LA 71203
Tel: 866.590.6845
sales@polyprocessing.

Virginia
161 McGhee Rd.
Winchester, VA 22603
Tel: 877.633.6416

Reverse Float Level Gauge (continued):



When the tank is full, the visual indicator is at the bottom of the tank and when the tank is empty it is at the top. It is reverse of the level it indicates and has many advantages as discussed below.

The Value Behind a Reverse Float Level Gauge

simple system which does not require chemical on the outside of the tank to give the user a reading. The

tank including double walled SAFE-Tanks. Some of the many advantages include:

- No sidewall tank penetrations or chemical exposure needed
-
-
- No stains on clear pipe from chemicals or UV attack
- No siphoning of the tank if the pipe breaks due to chemical in the pipe
- No chemicals burns or chemical spurts on personnel
- The chemical resistant rope used for the assembly is polypropylene
- Elbows and rollers inside of the elbows are made of high quality PVC
- Reverse calibration tape can be added for tank capacity
- level sensor
- Standard or Free Standing Pipe supports are available

Appendix J – Operation and Maintenance Cost Estimates

Current O&M Cost Estimate

Item	Units	Value
WTP		
Average Daily Demand	gpd	6,971
Hypochlorite Dose	mg/L	2
Mass Feed Rate	ppd	0.12
Hypochlorite Cost	$/lbs	$ 6
Annual Operations Cost	*$/yr*	*$ 270*
Replace Cartridge Filters	No	4
Average Maintenance Interval	weeks	4.5
Maintenance Frequency	times/yr	12
Average Filter Replacement Cost	$/filter	$ 92
Annual Maintenance Cost	*$/yr*	*$ 4,400*
Annual O&M Cost	**$/yr**	**$ 4,700**
Lower Zone Tank		
Maintenance Item		Cleaning and Inspection
Maintenance Interval	yr	10
Maintenance Cost	*$/event*	*$ 3,500*
Maintenance Item		Recoating
Maintenance Interval	yr	20
Maintenance Cost	*$/event*	*$ 56,000*
Annual O&M Cost	**$/yr**	**$ 3,200**
Well Pump		
Average Daily Demand	gpd	13,094
Well Pump Capacity	gpm	35
Well Pump Horsepower	hp	7.5
Daily Run Time	hr	6
Power Draw	kWhr	34.9
Annual Pump Operating Cost	*$/yr*	*$ 1,700*
Hypochlorite Dose	mg/L	3
Mass Feed Rate	ppd	1.26
Hypochlorite Cost	$/lbs	$ 6
Annual Hypochlorite Cost	*$/yr*	*$ 2,930*
Annual O&M Cost	**$/year**	**$ 4,600**
Employee Cost		
Operator Cost	$/hr	$15
Hours Worked	hr/week	14
Annual Cost	$/yr	$ 10,900
Supervisor Cost	$/hr	$20
Hours Worked	hr/week	20
Annual Cost	$/yr	$ 20,800
Employee Cost	*$/yr*	*$ 31,700*
Combined Annual O&M Cost	**$/year**	**$ 44,200**

Spring and Well WTPs O&M Cost Estimate

Item	Units	Value
WTP		
Average Daily Demand	gpd	40,821
Hypochlorite Dose	mg/L	4
Mass Feed Rate	ppd	1.36
Hypochlorite Cost	$/lbs	$ 6
Annual Operations Cost	*$/yr*	*$ 3,200*
Cartridge Filter Replacement Frequency	times/yr	4
Pre-Filter Replacement Cost	*$270*	$ 1,080
Post-Filter Replacement Frequency	times/yr	13
Post-Filter Replacement Cost	*$104*	$ 1,352
O-Ring Replacement	no/yr	1
O-Ring Replacement Cost	*$30*	$ 30
Chem Pump Replacement Frequency	times/yr	1
Chem Pump Replacement Cost	*$600*	$ 600
Annual Maintenance Cost	*$/yr*	*$ 3,062*
Annual O&M Cost	**$/yr**	**$ 6,300**
Lower Zone Tank		
Maintenance Item		Cleaning and Inspection
Maintenance Interval	yrs	10
Maintenance Cost	*$/event*	*$ 3,500*
Maintenance Item		Recoating
Maintenance Interval	yrs	20
Maintenance Cost	*$/event*	*$ 56,000*
Annual O&M Cost	**$/yr**	**$ 3,200**
Well Pump		
Well Supply	gal/yr	22,315
Well Pump Capacity	gpm	60
Annual Pump Run Time	hr	6
Well Pump Horsepower	hp	7.5
Power Draw	kWhr	34.7
Annual Pump Operation Cost	$/yr	$ 1,600
Daily Well Pump Supply	gpd	61
Hypochlorite Dose	mg/L	4
Mass Feed Rate	ppd	0.002
Operating Days	d	0.26
Hypochlorite Cost	$/lbs	$ 6
Annual Hypochlorite Cost	$/yr	$ -
Annual Operating Cost	*$/year*	*$ 1,600*
Chem Pump Replacement Frequency	times/yr	$ 1
Chem Pump Replacement Cost	*$600*	$ 600
Annual Maintenance Cost	*$/year*	*$ 600*
Annual O&M Cost	**$/year**	**$ 2,200**
Employee Cost		
Operator Cost	$/hr	$15
Hours Worked	hr/week	14
Annual Cost	$/yr	$ 10,900
Supervisor Cost	$/hr	$20
Hours Worked	hr/week	20
Annual Cost	$/yr	$ 20,800
Employee Cost	*$/yr*	*$ 31,700*
Total Annual O&M Cost	**$/year**	**$ 43,400**

Filter Type	Replacement Cost	Change Frequency (weeks)	Replacements per Year	Annual Replacement Cost
Existing				
Bag Prefilter	$ 104	3	17	$ 1,800
Bag Postfilter	$ 104	6	9	$ 900
Total				$ 2,700
Proposed				
Cartridge Prefilter	$ 270	12	4	$ 1,170
Bag Prefilter	$ 104	6	9	$ 900
Bag Postfilter	$ 104	12	4	$ 450
Total				$ 2,520

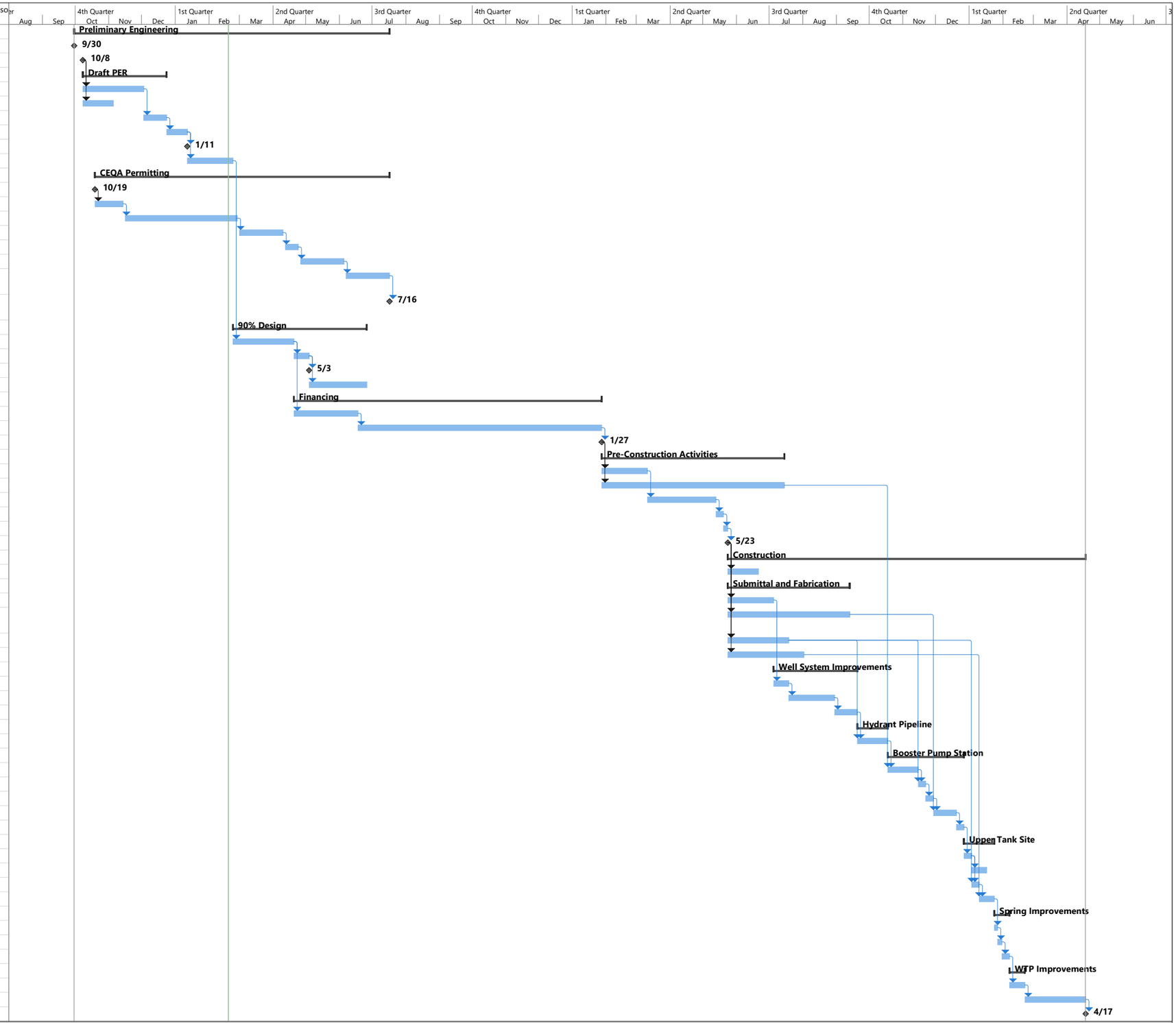
Well and Booster Pump O&M Costs

Item	Units	Value
Lower Zone Tank		
Maintenance Item		Cleaning and Inspection
Maintenance Interval	yr	10
Maintenance Cost	*$/event*	*$ 3,500*
Maintenance Item		Recoating
Maintenance Interval	yr	20
Maintenance Cost	*$/event*	*$ 56,000*
Annual O&M Cost	**$/yr**	**$ 3,200**
Booster Pump		
Average Daily Demand	gpd	6971
Flow Rate	gpm	50
Daily Run Time	hr	2.3
Horsepower	hp	7.5
Power Draw	kWhr	13
Daily Operating Cost	$/day	$ 1.69
Annual Operations Cost	*$/yr*	*$ 600*
Various Pump Maintenance	$/yr	$ 300
Annual Maintenance Cost	*$/yr*	*$ 300*
Annual O&M Cost	**$/yr**	**$ 900**
Well		
Average Daily Demand	gpd	20,074
Well Pump Capacity	gpm	60
Daily Pump Run Time	hr	5.58
Well Pump Horsepower	hp	7.5
Power Draw	kWhr	31.2
Annual Pumping Cost	$/yr	$ 1,500
Hypochlorite Dose	mg/L	4
Mass Feed Rate	ppd	0.67
Hypochlorite Cost	$/lbs	$ 6
Annual Hypochlorite Cost	$/yr	$ 1,554
Annual Operations Cost	*$/yr*	*$ 3,100*
Chem Pump Replacement Frequency	no/yr	1
Chem Pump Replacement Cost	$600	$ 600
Annual Replacement Cost	$/year	$ 600
Annual Maintenance Cost	*$/yr*	*$ 3,700*
Annual O&M Cost	**$/year**	**$ 6,800**
Employee Cost		
Operator Cost	$/hr	$15
Hours Worked	hr/week	14
Annual Cost	$/yr	$ 10,900
Supervisor Cost	$/hr	$20
Hours Worked	hr/week	20
Annual Cost	$/yr	$ 20,800
Employee Cost	*$/yr*	*$ 31,700*
Combined Annual O&M Cost	**$/year**	**$ 42,600**

Method of Operation	Current Operation	Spring/Well Operation	Well/Booster Pump Operation
Spring WTP	$ 4,700	$ 6,300	$ -
Lower Zone Tank	$ 3,200	$ 3,200	$ 3,200
Booster Pump Station	$ -	$ -	$ 900
Well Pump and WTP	$ 4,600	$ 2,200	$ 6,800
Employee Cost	$ 31,700	$ 31,700	$ 31,700
Total Annual O&M Cost (Harmsco Filters)	$ 44,200	$ 43,400	$ 42,600

Appendix K – Preliminary Project Schedule

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessor
1		**Preliminary Engineering**	**208 days**	**Wed 9/30/20**	**Fri 7/16/21**	
2		Kickoff Meeting	0 days	Wed 9/30/20	Wed 9/30/20	
3		Site Visit	0 days	Thu 10/8/20	Thu 10/8/20	
4		**Draft PER**	**55 days**	**Thu 10/8/20**	**Wed 12/23/20**	
5		Alternatives Analysis	2 mons	Thu 10/8/20	Wed 12/2/20	3
6		Geotechnical Study	1 mon	Thu 10/8/20	Wed 11/4/20	3
7		Finalize Draft PER	3 wks	Thu 12/3/20	Wed 12/23/20	5
8		Agency Review	13 days	Thu 12/24/20	Mon 1/11/21	7
9		Review Meeting	0 days	Mon 1/11/21	Mon 1/11/21	8
10		Final PER	30 days	Tue 1/12/21	Mon 2/22/21	8
11		**CEQA Permitting**	**195 days**	**Mon 10/19/20**	**Fri 7/16/21**	
12		Kickoff Meeting	0 days	Mon 10/19/20	Mon 10/19/20	
13		Initial Study	1 mon	Mon 10/19/20	Fri 11/13/20	12
14		Mitigated Neg Dec Draft	75 days	Mon 11/16/20	Fri 2/26/21	13
15		Internal Review (Lead Agency)	30 days	Mon 3/1/21	Fri 4/9/21	14
16		Update MND	10 days	Mon 4/12/21	Fri 4/23/21	15
17		Public Comment Period	30 days	Mon 4/26/21	Fri 6/4/21	16
18		State Board Respond to Comments and Finalize MND	30 days	Mon 6/7/21	Fri 7/16/21	17
19		Notice of Determination posted with County Clerk and State Clearinghouse	0 days	Fri 7/16/21	Fri 7/16/21	18
20		**90% Design**	**89 days**	**Tue 2/23/21**	**Fri 6/25/21**	
21		60% Design	2 mons	Tue 2/23/21	Mon 4/19/21	10
22		Review 60% Design	2 wks	Tue 4/20/21	Mon 5/3/21	21
23		Review Meeting (60% Design)	0 days	Mon 5/3/21	Mon 5/3/21	22
24		90% Design	39 days	Tue 5/4/21	Fri 6/25/21	22
25		**Financing**	**203 days**	**Tue 4/20/21**	**Thu 1/27/22**	
26		Application for Construction Financing	43 days	Tue 4/20/21	Thu 6/17/21	21
27		Application Processing	8 mons	Fri 6/18/21	Thu 1/27/22	26
28		Award of Construction Financing	0 days	Thu 1/27/22	Thu 1/27/22	27
29		**Pre-Construction Activities**	**120 days**	**Fri 1/28/22**	**Thu 7/14/22**	
30		Complete 100% Design	6 wks	Fri 1/28/22	Thu 3/10/22	28
31		PGE New Service Application	6 mons	Fri 1/28/22	Thu 7/14/22	28
32		Bidding Period	45 days	Fri 3/11/22	Thu 5/12/22	30
33		Bid Review	5 days	Fri 5/13/22	Thu 5/19/22	32
34		Contractor Selection	2 days	Fri 5/20/22	Mon 5/23/22	33
35		Notice to Proceed (Construction)	0 days	Mon 5/23/22	Mon 5/23/22	34
36		**Construction**	**235 days**	**Tue 5/24/22**	**Mon 4/17/23**	
37		Mobilize	1 mon	Tue 5/24/22	Mon 6/20/22	35
38		**Submittal and Fabrication**	**80 days**	**Tue 5/24/22**	**Mon 9/12/22**	
39		General Submittals	6 wks	Tue 5/24/22	Mon 7/4/22	35
40		Booster Pump Station Submittal and Fabrication	4 mons	Tue 5/24/22	Mon 9/12/22	35
41		Pipe Submittal and Delivery	2 mons	Tue 5/24/22	Mon 7/18/22	35
42		Tank Submittal and Fabrication	10 wks	Tue 5/24/22	Mon 8/1/22	35
43		**Well System Improvements**	**55 days**	**Tue 7/5/22**	**Mon 9/19/22**	
44		Well House Improvements	10 days	Tue 7/5/22	Mon 7/18/22	39
45		Drill Well	30 days	Tue 7/19/22	Mon 8/29/22	44
46		Redevelop Well	15 days	Tue 8/30/22	Mon 9/19/22	45
47		**Hydrant Pipeline**	**20 days**	**Tue 9/20/22**	**Mon 10/17/22**	
48		Pipeline Installation	1 mon	Tue 9/20/22	Mon 10/17/22	41,46
49		**Booster Pump Station**	**50 days**	**Tue 10/18/22**	**Mon 12/26/22**	
50		New PGE Service Installation	1 mon	Tue 10/18/22	Mon 11/14/22	31,48
51		Yard Piping	5 days	Tue 11/15/22	Mon 11/21/22	41,50
52		Foundation	5 days	Tue 11/22/22	Mon 11/28/22	51
53		Booster Pump Station Installation	3 wks	Tue 11/29/22	Mon 12/19/22	52,40
54		Booster Pump Station Startup	1 wk	Tue 12/20/22	Mon 12/26/22	53
55		**Upper Tank Site**	**20 days**	**Tue 12/27/22**	**Mon 1/23/23**	
56		Tank Site Demo	5 days	Tue 12/27/22	Mon 1/2/23	54
57		Tank Foundation	10 days	Tue 1/3/23	Mon 1/16/23	56
58		Yard Piping	5 days	Tue 1/3/23	Mon 1/9/23	56,41
59		Tank Installation	2 wks	Tue 1/10/23	Mon 1/23/23	58,42
60		**Spring Improvements**	**10 days**	**Tue 1/24/23**	**Mon 2/6/23**	
61		Spring Access Road Clearing	3 days	Tue 1/24/23	Thu 1/26/23	59
62		Spring Excavation	2 days	Fri 1/27/23	Mon 1/30/23	61
63		Spring Improvements	5 days	Tue 1/31/23	Mon 2/6/23	62
64		**WTP Improvements**	**10 days**	**Tue 2/7/23**	**Mon 2/20/23**	
65		WTP Improvements	10 days	Tue 2/7/23	Mon 2/20/23	63
66		Contract Completion and Close-Out	2 mons	Tue 2/21/23	Mon 4/17/23	65
67		Contract Complete	0 days	Mon 4/17/23	Mon 4/17/23	66



Appendix C

Biological Resources Evaluation (HELIX Environmental Planning 2021a)

HELIX Environmental Planning, Inc.
11 Natoma Street
Suite 155
Folsom, CA 95630
916.3635.8700
www.**helixepi**.com

February 24, 2021 Project # WWE-06

Sheila Magladry, P.E.
Water Works Engineers, LLC.
760 Cypress Avenue, Suite 201
Redding, CA 96001

Subject: Biological Resources Evaluation Letter Report for the Phillipsville Community Services District Water System Improvements Project, Humboldt County, CA

Dear Ms. Magladry,

HELIX Environmental Planning, Inc. (HELIX) has prepared this biological resources evaluation letter report for the proposed Phillipsville Community Services District (PCSD) Water System Improvements Project in the community of Phillipsville in Humboldt County, California. The purpose of our biological resources evaluation is to evaluate the potential for regionally occurring special-status plant and animal species and/or other sensitive biological habitats to occur in the project site and/or be impacted by the proposed project. This letter report has been prepared in support of California Environmental Quality Act (CEQA) documentation for the proposed project and describes the methods and results of our biological resources evaluation.

PROJECT LOCATION AND DESCRIPTION

The proposed project is located in the community of Phillipsville, California, in the southern portion of Humboldt County, approximately 8 miles north of Garberville. The project site is located in Sections 12 and 13, Township 3 South, Range 3 East, and Sections 7 and 18, Township 3 South, Range 4 East of the U.S. Geological Survey (USGS) 7.5-minute "Miranda, Ca" quadrangle map. The site is accessed by state highways 101 and 254 and is adjacent to the South Fork of the Eel River. The community of Phillipsville is bound to the north and south by Humboldt Redwoods State Park. Refer to **Figure 1** for a vicinity graphic of the project site and **Figure 2** for a location map of the project site. (Note: all figures are located in **Appendix A** for ease of reference).

The PCSD serves approximately 300 residents through 66 services connections. There are two water sources supplying the PCSD: a spring (which is influenced by surface water and is gravity fed to a portion of the system's customers) and a well (that supplies pumped water to the remaining customers). A potable water treatment system for the spring was installed in approximately 2012; the treatment system is adequate to meet surface water treatment standards, but there is inadequate chlorine contact time. The PCSD is currently under a boil water notice for not meeting sufficient chlorine contact time

requirements. In addition, the spring source is in jeopardy of potential land movement and at times (i.e., during the summer months) is inadequate to supply its customers. The proposed project includes an evaluation of the system conditions and an analysis of alternatives to improve drinking water supply and water quality. Figure 3 is a site plan.

Specific project improvements will include, but may not be limited to:

- Physical improvements to the existing groundwater spring, including regrading/recontouring of the surrounding surface and pipe gallery.
- Approximately 1-mile of surface roadway improvement to the unnamed spring access road, including grading and felled tree clearance.
- System improvements to the existing water treatment plant building, footprint, and piping.
- Installation of water storage facilities to increase system redundancy and to provide for necessary fire flows. Improvements include geotechnical engineering improvements to stabilize slopes, storage tank and appurtenances installation, and institutional controls.
- Minor modifications to existing distribution piping and trenching for new transmission main.
- Installation of a booster pump station in a small fiberglass container to provide for system redundancy.
- Improvements to the existing well and well house.

METHODS

Studies conducted in support of this report included a special-status species evaluation and a biological reconnaissance survey.

Special Status Species Evaluation

Regulations pertaining to the protection of biological resources at the project site are summarized in Attachment B. For the purposes of this report, special-status species are those that fall into one or more of the following categories, including those:

- Listed as endangered or threatened under the Federal Endangered Species Act (FESA; including candidates and species proposed for listing);
- Listed as endangered or threatened under the California Endangered Species Act (CESA; including candidates and species proposed for listing);
- Designated as rare, protected, or fully protected pursuant to California Fish and Game Code;
- Designated a Species of Special Concern (SSC) by the California Department of Fish and Wildlife (CDFW);
- Considered by CDFW to be a Watch List species with potential to become an SSC;
- Defined as rare or endangered under Section 15380 of the California Environmental Quality Act (CEQA); or,
- Having a California Rare Plant Rank (CRPR) of 1A, 1B, 2A, 2B, or 3.

In order to evaluate special-status species and/or their habitats with the potential to occur in the project site and/or be impacted by the proposed project, HELIX obtained lists of special-status species known to occur and/or having the potential to occur in the proposed project site and vicinity from the U.S. Fish

and Wildlife Service (USFWS; USFWS 2020), the California Native Plant Society (CNPS; CNPS 2020), and the California Natural Diversity Database (CNDDB; CDFW 2020). Attachment C includes these lists of special-status plant and animal species occurring in the project region and Attachment D includes an evaluation of the potential for these species to occur in the project site.

Reconnaissance Survey

A biological resources reconnaissance survey was conducted by HELIX Wildlife Biologist, Stephanie McLaughlin, M.S. on November 11, 2020 between the hours of 0900 and 1400 hours. Weather during the reconnaissance survey was foggy in the morning, eventually clearing in the afternoon, with temperatures ranging from 55 to 65 degrees Fahrenheit. A complete list of plant and animal species observed in the study area was prepared during the biological resources reconnaissance and is included as Attachment E. The project site was assessed to identify the habitat type(s) present and its potential to support special-status plant and wildlife species. The survey consisted of a pedestrian survey of the project site and the surrounding area.

RESULTS

Environmental Setting

The project site is located in rural, unincorporated Humboldt County. The majority of the study area is located on the east side of Phillipsville. Humboldt Redwoods State Park, an approximately 17,000-acre area of publicly accessible nature preserves managed by California State Parks, is located approximately 3-miles north of the project site. The South Fork of the Eel River passes along the west side of Phillipsville. Land uses including and surrounding the project site are in agricultural, residential agricultural, and timber use primarily, in addition to the Humboldt Redwoods State Park.

Site Conditions

The existing spring source collection system and associated pipe gallery and overflow tank are built into a hillside. Though the spring is contained within a pond liner and clay fill soil used for stabilization, the spring in jeopardy of potential land movement due to the high landslide risk in the area. The spring is accessed from the east by a heavily rutted dirt road off of Rock Pit Lane, which features a large gravel staging area at its terminus.

The water treatment plant (WTP) consists of a gravel pad featuring three 3,000-gallon water storage tanks and an associated water treatment building. The site is accessed via a steep gravel driveway off of Spring Canyon Road. All proposed alterations to the WTP are to remain within the current footprint of the WTP.

A 140,000-gallon water storage tank and associated infrastructure is located at the southern end of the project site, off of Ascending Lane. It is proposed that a booster pump station will be installed in a small building or enclosure in the foreground of the 140,000-gallon tank. An additional water storage tank is proposed to be installed on a site located off of Spring Canyon Road. The potential tank site is located on a graded, gravel pad covered in a geotextile tarp.

Water is transported to Phillipsville CSD residents via existing High Density Poly Ethylene (HDPE) pipes installed above ground. Any proposed additional HDPE lines will also be installed above grade.

A well serves as a secondary water source for the Phillipsville CSD. The well house and associated infrastructure is located in Phillipsville on the east side of the Avenue of the Giants Highway.

Topography

The project site has a diverse topographical profile. The topography of the project is roughly divided into two zones: a relatively flat plain adjacent to the South Fork Eel River and west of State Route 254, and steeply sloping hillsides east of State Route 254. Much of the hillsides are densely forested, with redwoods being common in the area. The project site consists of steeply sloping hillsides with graded flats for PCSD infrastructure. Elevations on the project site range from approximately 200 to 600 feet above Mean Sea Level (MSL).

Soils

The property includes three soil mapping units (NRCS 2020): Canoecreek-Coyoterock-Sproulish complex, 15 to 50 percent slopes; Canoecreek-Sproulish-Redwohly complex, 50 to 75 percent slopes, warm; and Sproulish-Canoecreek-Redwohly complex, 30 to 50 percent slopes. Hydric soils from the National Hydric Soils List for Humboldt County are not present (NRCS 2015).

Canoecreek-Coyoterock-Sproulish complex, 15 to 50 percent slopes occurs at mountain slopes and ridges and is a colluvium derived from sandstone and/or mudstone and/or residuum weathered from mudstone and/or sandstone. A typical profile is slightly decomposed plant material from 0 to 1 inches, gravelly loam from 1 to 4 inches, gravelly loam from 4 to 8 inches, very gravelly loam 8 to 16 inches, very gravelly loam from 16 to 37 inches and extremely gravelly sandy loam from 37 to 79 inches; the depth to water table is more than 80 inches. This soil mapping unit covers the majority of the project site.

Canoecreek-Sproulish-Redwohly complex, 50 to 75 percent slopes, warm occurs at mountain slopes and is a colluvium and residuum derived from sandstone, mudstone, and conglomerate. A typical profile is slightly decomposed plant material from 0 to 4 inches, very gravelly loam from 4 to 13 inches, very gravelly loam from 13 to 30 inches, very gravelly loam 30 to 47 inches, very gravelly loam from 47 to 61 inches and very gravelly loam from 61 to 71 inches; the depth to water table is more than 80 inches.

Sproulish-Canoecreek-Redwohly complex, 30 to 50 percent slopes occurs at mountain slopes and is a colluvium derived from mudstone and/or colluvium derived from sandstone and/or residuum weathered from mudstone and/or residuum weathered from sandstone. A typical profile is slightly decomposed plant material from 0 to 1 inches, moderately decomposed plant material from 1 to 2 inches, gravelly loam from 2 to 12 inches, loam 12 to 22 inches, clay loam from 22 to 35 inches, very paragravelly silty clay loam from 35 to 47 inches, and very paragravelly silty clay loam from 47 to 71 inches; the depth to water table is more than 80 inches.

Hydrology

The project site is in the Butte Creek-South Fork Eel River hydrologic unit (HUC12: 180101060405). There are no aquatic features on the project site; however, the South Fork of the Eel River passes along

the west side of Phillipsville and drainages that flow into the South Fork of the Eel River border the project site on the northern and southern sides.

Habitat Types/Vegetation Communities

There are two natural habitat types/vegetation communities on the site: developed and north coast coniferous forest. A list of all plant and animal species observed during the site reconnaissance is included as Attachment E. Representative site photographs taken on November 11, 2020 are included as Attachment F.

Developed

Developed areas in the project site include existing facilities and access roads as well as habitat along the dirt access roads and at the proposed tank locations. These areas are all moderately disturbed and are dominated by a mix of native and non-native species. Vegetation cover varies from sparse to moderate. Dominant shrubs include coyote bush (*Baccharis pilularis*), Himalayan blackberry (*Rubus armeniacus*), scotch broom (*Cytisus scoparius*), and hairy manzanita (*Arctostaphylos columbiana*). Herbaceous species consist of sweet vernal grass (*Anthoxanthum odoratum*), wild oats (*Avena fatua*), and dogtail grass (*Cynosurus echinatus*).

North Coast Coniferous Forest

This habitat is a tall dense, mixed needle-leaved evergreen forest in dense stands dominated by Douglas fir (*Pseudotsuga menziesii*) and interspersed with canyon live oak (*Quercus chrysolepis*), Pacific madrone (*Arbutus menziesii*), bigleaf maple (*Acer macrophyllum*), tanoak (*Notholithocarpus densiflorus*) and California bay (*Umbellularia californica*). Dominance by Douglas fir declines with age, but this may require centuries due to this species extreme longevity. Site factors include well-drained, moist sites that experience summer fog but very little winter snow fall. Precipitation ranges from 50 to 160 inches, with less than 10 percent falling in summer. The understory ranges from sparse with dense leaf litter and small woody debris, to moderately shrub-dominated with hairy honeysuckle (*Lonicera involucrata*), western sword fem (*Polystichum munitum*), Scotch broom (*Cytisus scoparius*) and Himalayan blackberry (*Rubus armeniacus*).

All of the project elements occur within or adjacent to north coast coniferous forest, which generally occurs at the edges of the developed habitat. The spring source is located within North Coast coniferous forest habitat. The spring is a subterranean feature that has been encased in a pond liner and outflows through a PVC pipe. Due to land movement there is some seepage from the spring source onto the soil surface, creating a moist environment without producing any aquatic features.

Special Status Species Evaluation

A total of 12 regionally occurring special-status plant species and 14 regionally occurring special-status wildlife species were identified during the database queries and desktop review and are evaluated in Attachment D.

Special Status Plant Species

A total of 12 regionally occurring special-status plant species were identified during the database queries and desktop review. The project site provides suitable habitat for two special-status plant species: white-flowered rein orchid and coast fawn lily. These species are discussed below. Special-status species determined to have no potential to occur on the project site or that are not expected to occur in the project site and be impacted by the proposed project (Attachment D) are not discussed further in this report.

White-flowered Rein Orchid

Federal status – none
State status – none
Other status – CRPR 1B.2

Species Description

White-flowered rein orchid is a perennial herb that occurs in broadleaved upland forests, lower montane coniferous forests, and North Coast coniferous forests, sometimes on serpentinite. This species is found in forest duff, on mossy banks, rock outcrops, and muskeg at elevations ranging from 30 – 1310 meters above mean sea level. White-flowered rein orchid blooms from May-September (sometimes March) (CNPS 2020).

Survey History

No known surveys have been conducted within the project site for this species and the biological reconnaissance survey was conducted outside of the blooming season. There are four reported occurrences of white-flowered rein orchid on the Miranda USGS quad. The closest reported occurrences are approximately 4,000 feet west of the site. All of the occurrences are west of the South Fork Eel River.

Habitat Suitability

Suitable habitat occurs within the north coast coniferous forest on the project site, likely restricted to the area around the spring site.

Potential for Impacts

Although white-flowered rein orchid is not known to occur in the project site there is a potential that it could occur due to the presence of suitable habitat. If this plant species were to occur in the project site, project activities would have the potential to result in adverse impacts. Adverse impacts could occur if mechanical equipment or workers directly crushed, trampled, or uprooted sensitive plants and indirect impacts could occur through soil compaction, alteration of hydrology, and increased erosion and sedimentation resulting from ground disturbance.

The recommended mitigation measures for special-status plants in the following section would reduce potential impacts to this species to less than significant.

Coast Fawn Lily

Federal status – none
State status – none
Other status – CRPR 2B.2

Species Description

Coast fawn likely is a perennial bulbiferous herb found on mesic soils and streambanks in bogs and fens, broadleafed upland forest, and North Coast coniferous forest from 0 - 1600 meters above mean sea level. Coast fawn lily blooms March – July (occasionally August). Associated species include Douglas fir, tanoak, and Pacific madrone (CNPS 2020).

Survey History

No known surveys have been conducted within the project site for this species and the biological reconnaissance survey was conducted outside of the blooming season. There is one reported occurrence of coast fawn lily on the Miranda USGS quad. This occurrence is located approximately 2 miles north of the site in a streambank along Fish Creek. The area is in commercial timber production.

Habitat Suitability

Suitable habitat occurs within the north coast coniferous forest on the project site, likely restricted to the area around the spring site.

Potential for Impacts

Although coast fawn lily is not known to occur in the project site there is a potential that it could occur due to the presence of suitable habitat. If this plant species were to occur in the project site, project activities would have the potential to result in adverse impacts. Adverse impacts could occur if mechanical equipment or workers directly crushed, trampled, or uprooted sensitive plants and indirect impacts could occur through soil compaction, alteration of hydrology, and increased erosion and sedimentation resulting from ground disturbance.

The recommended mitigation measures for special-status plants in the following section would reduce potential impacts to this species to less than significant.

Special Status Animal Species

A total of 14 regionally occurring special-status wildlife species were identified during the database searches and desktop review. There are no reported occurrences of special-status animal species on or immediately adjacent to the site. The site provides suitable habitat for one special-status wildlife species: Cooper's hawk as well as habitat for other migratory birds and raptors. These species are discussed briefly below. In addition, although there is no habitat on the project site for either species, northern spotted owl and marbled murrelet are discussed due to the presence of reported occurrences within 0.25 mile of the project site (northern spotted owl) and designated Critical Habitat in the project site (marbled murrelet). The remaining special-status species determined to have no potential to occur

on the project site or that are not expected to occur in the project site and be impacted by the proposed project (Attachment D) are not discussed further in this report.

Special-status Birds

Cooper's Hawk

Federal status – none
State status – CDFW watch list
Other status – none

Species Description

Cooper's hawk inhabits open woodlands or forest edges, where it can hunt birds in flight. Nests sites are mainly in riparian stands of deciduous trees, such as are found in canyon bottoms and flood plains, and in live oak trees.

Survey History

Cooper's hawk was not observed in the project site during the biological reconnaissance survey. There is one reported occurrence of Cooper's hawk on the Miranda quad; this reported occurrence is approximately 2 miles north of the site where this species was observed in 2005.

Habitat Suitability

North coast coniferous forest in the project site provides some suitable nesting habitat for Cooper's hawk. This species could also forage in the project site.

Potential for Impacts

Foraging hawks are highly mobile and would move away from any disturbance associated with the project activities and would not be affected. If Cooper's hawk were to nest in the project site, project activities such as grading or downed tree removal during the breeding season (February 1 through August 31) could result in injury or mortality of eggs and chicks directly through destruction or indirectly through forced nest abandonment due to noise and other disturbance.

The recommended mitigation measures for migratory birds and raptors in the following section would reduce potential impacts to this species to less than significant.

Northern Spotted Owl

Federal status – Threatened
State status – none
Other status – CDFW Species of Special Concern

Species Description

Northern spotted owl lives in old-growth coniferous forests and rocky canyons, preferring mature forests with large, old trees, multiple canopy layers, and downed woody debris. In the Sierra Nevada the spotted owl is found in Sierran mixed conifer forests at mid-elevations and ponderosa pine forests, blue oak-gray pine woodlands, and valley foothill riparian forests at lower elevations (Shuford and Gardali 2008). Spotted owls also inhabit old growth coastal coniferous forest. Suitable habitat for northern spotted owl consists of dense, multilayer, mature forest with greater than 70 percent canopy closure preferred for nesting and greater than 50 percent canopy closure preferred for foraging (Verner et al. 1992). Nests are placed in tree cavities, broken-topped trees, and platforms, such as abandoned raptor or squirrel nests. Adults do not build their own nests (Zeiner et al. 1990).

Survey History

No northern spotted owl or potential nests for this species were observed in the project site during the biological reconnaissance survey. There is a reported occurrence of northern spotted owl approximately 0.25 mile east of the project site where this species was observed nesting in 2000. The northern spotted owl activity center includes a nest sighting and a sighting of a pair of northern spotted owls.

Habitat Suitability

The north coast coniferous forest in the project site does not provide suitable nesting habitat for northern spotted owl. The project site lacks dense, mature, multi-layer old growth forest and is disturbed.

Potential for Impacts

No impacts to northern spotted owl are anticipated as a result of the proposed project. Suitable nesting habitat is not present in or adjacent to the project site. Project activities would not be expected to disrupt northern spotted owl activity centers east of the site due to the limited ground disturbance and nature of the activity. Pre-construction surveys will be conducted for migratory birds and raptors. If northern spotted owl is observed, coordination will be conducted with USFWS and CDFW to determine the appropriate nest buffer based on the location of the nest and the type of construction activity occurring within 0.25 mile of the nest.

The recommended mitigation measures for migratory birds and raptors in the following section would reduce potential impacts to this species to less than significant.

Marbled Murrelet

Federal status – Threatened
State status – Endangered
Other status – None

Species Description

This species is pelagic, except during nesting season where it will use old-growth, multi-layered canopied forests up to 50 miles inland from the coast. When nesting trees are not present, this species will nest

on the ground or amongst rocks. In California, nesting typically occurs in coastal redwood forest or Douglas fir forests (USFWS 2016).

Survey History

No marbled murrelet or potential nest sites for this species were observed in the project site during the biological reconnaissance survey. There are no reported occurrences of marbled murrelet on the Miranda USGS quad. The closest reported occurrence of marbled murrelet in the CNDDB is approximately 7.5 miles northwest of the site along the southern boundary of Humboldt Redwoods State Park.

Habitat Suitability

The north coast coniferous forest in the project site does not provide suitable nesting habitat for marbled murrelet. The project site lacks dense, mature, multi-layer old growth forest and is disturbed. The very northern portion of the project site along Spring Canyon Road overlaps designated Critical Habitat for this species; however, the site lacks the primary constituent elements of critical habitat including old growth trees with the presence of deformities and/or large branches to use as a nesting platform.

Potential for Impacts

No impacts to marbled murrelet or designated Critical Habitat are anticipated as a result of the proposed project. Suitable nesting habitat is not present in or adjacent to the project site. No tree removal is anticipated to occur within designated Critical Habitat. Pre-construction surveys will be conducted for migratory birds and raptors. If marbled murrelet is observed, coordination will be conducted with USFWS and CDFW to determine the appropriate nest buffer based on the location of the nest and the type of construction activity occurring within proximity to the nest.

The recommended mitigation measures for migratory birds and raptors in the following section would reduce potential impacts to this species to less than significant.

Migratory Birds and Raptors

As noted in Attachment B, migratory and non-game birds are protected during the nesting season by California Fish and Game Code. The project site and immediate vicinity provides nesting and foraging habitat for a variety of native birds such as mourning dove (*Zenaida macroura*), black phoebe (*Sayornis nigricans*), and northern flicker (*Colaptes auratus*). Nests were not observed during surveys; however, the survey was conducted outside of the bird nesting season and a variety of migratory birds have the potential to nest in and adjacent to the site, in trees, shrubs and on the ground in vegetation.

Project activities such as clearing and grubbing during the avian breeding season (February 1 through August 31) could result in injury or mortality of eggs and chicks directly through destruction or indirectly through forced nest abandonment due to noise and other disturbance. Needless destruction of nests, eggs, and chicks would be a violation of the Fish and Game Code and a significant impact.

The recommended mitigation measures for nesting migratory birds and raptors in the following section would reduce potential impacts to these species to less than significant.

RECOMMENDED MITIGATION MEASURES

Special-Status Plants

Prior to any construction-related ground disturbance occurring in areas of suitable habitat for special-status plants, focused surveys shall be completed to determine the presence or absence of these species on the project site. The surveys shall be floristic in nature and shall be seasonally timed to coincide with the blooming period of these species (May to September; white-flowered rein orchid) and (March to July; coast fawn lily). If special-status species are not found during the focused surveys, then no further action is required.

- If special-status plants are documented on the site, a report shall be submitted to CNDDB to document the status of the species on the site. If the project is designed to avoid impacts to special-status plant individuals and habitat, no further mitigation for these species would be necessary.

- If special-status plants are documented on the site and project impacts to these species are anticipated, consultation with CDFW shall be conducted to develop a mitigation strategy. The proponent shall notify CDFW, providing a complete description of the location, size, and condition of the occurrence, and the extent of proposed direct and indirect impacts to it. The project proponent shall comply with any mitigation requirements imposed by CDFW. Mitigation requirements could include but are not limited to, development of a plan to relocate the special-status plants (seed) to a suitable location outside of the impact area and monitoring the relocated population to demonstrate transplant success or preservation of this species or its habitat at an on or offsite location.

Migratory Birds and Raptors

If project activities such as vegetation removal activities commence during the avian breeding season (February 1 – August 31), a qualified biologist should conduct a pre-construction nesting bird survey no more than 7 days prior to initiation of project activities. The survey area should include suitable raptor nesting habitat within 500 feet of the project boundary (inaccessible areas outside of the project site can be surveyed from the site or from public roads using binoculars or spotting scopes). Pre-construction surveys are not required in areas where project activities have been continuous since prior to February 1, as determined by a qualified biologist. Areas that have been inactive for more than 14 days during the avian breeding season must be re-surveyed prior to resumption of project activities. If no active nests are identified, no further mitigation is required. If active nests are identified, the following measure should be implemented:

- A suitable buffer (e.g. northern spotted owl and marbled murrelet – coordinate with USFWS and CDFW; 300 feet for common raptors; 100 feet for non-raptors) should be established by a qualified biologist around active nests and no construction/decommissioning activities within the buffer should be allowed until a qualified biologist has determined that the nest is no longer active (i.e. the nestlings have fledged and are no longer reliant on the nest, or the nest has failed). Encroachment into the buffer may occur at the discretion of a qualified biologist. Any encroachment into the buffer should be monitored by a qualified biologist to determine whether nesting birds are being impacted.

CONCLUSION

Under contract with Water Works Engineers, HELIX conducted a biological site assessment to evaluate potential impacts to sensitive biological resources that could occur as a result of the PCSD Water System Improvements Project in the unincorporated community of Phillipsville, Humboldt County, California. No special-status species were documented on the site. Two special-status plant species and one special-status raptor species have the potential to occur on the project site and/or be impacted by the proposed project. In addition, nesting raptors and other migratory birds were determined to have the potential to occur in the project site and/or be impacted by the proposed project. Recommended avoidance and minimization measures are provided to avoid/reduce impacts to these species.

We appreciate the opportunity to assist you on this project. Please contact me with any questions at 916-365-8700.

Sincerely,

Stephen Stringer, M.S.
Principal Biologist

Attachments:

A – Figures
B – Regulatory Context
C – Database Query Results
D – Potential for Regionally Occurring Special-status Species
E – Species Observed on the Property
F – Site Photographs

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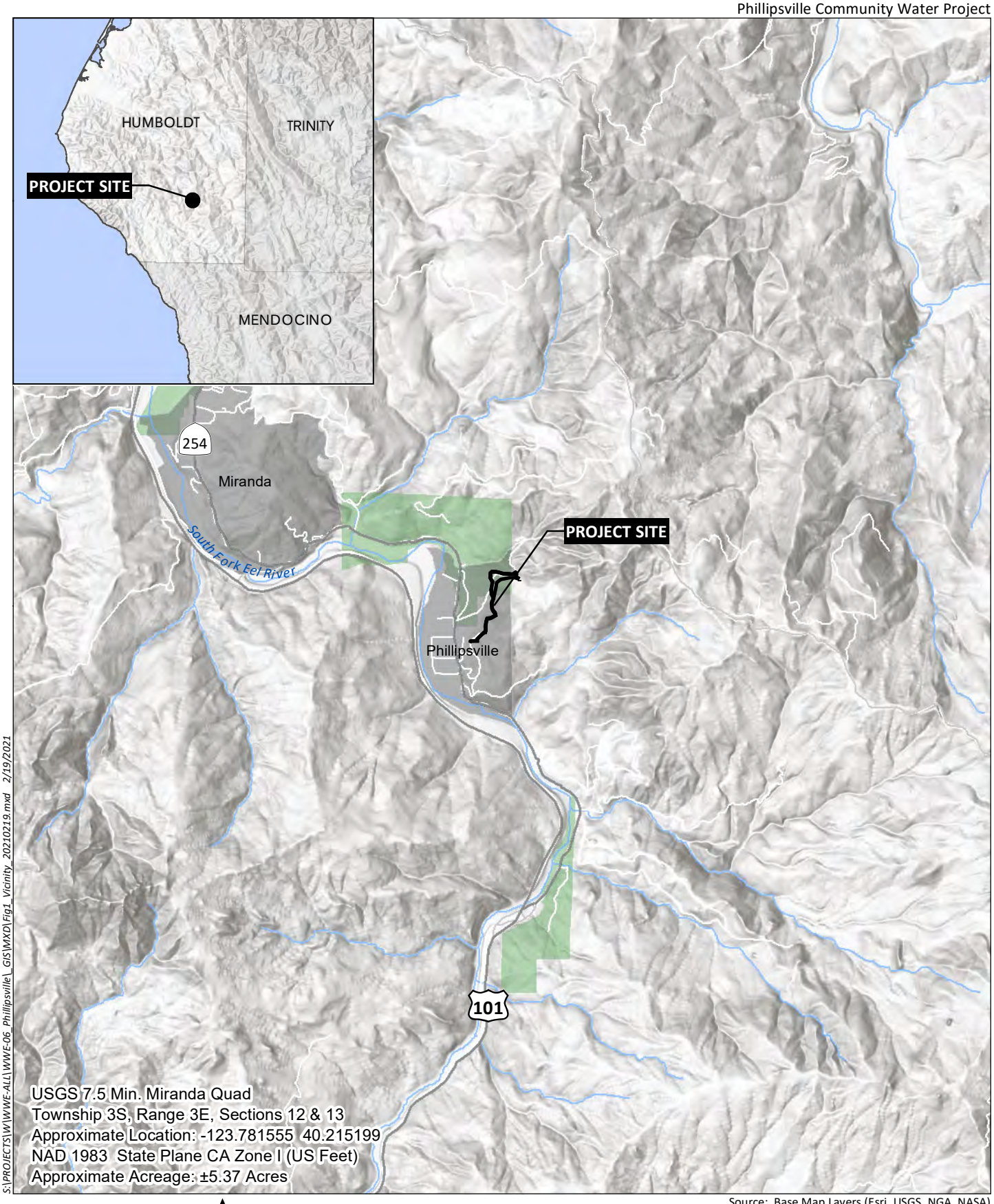
Attachment A

Figures



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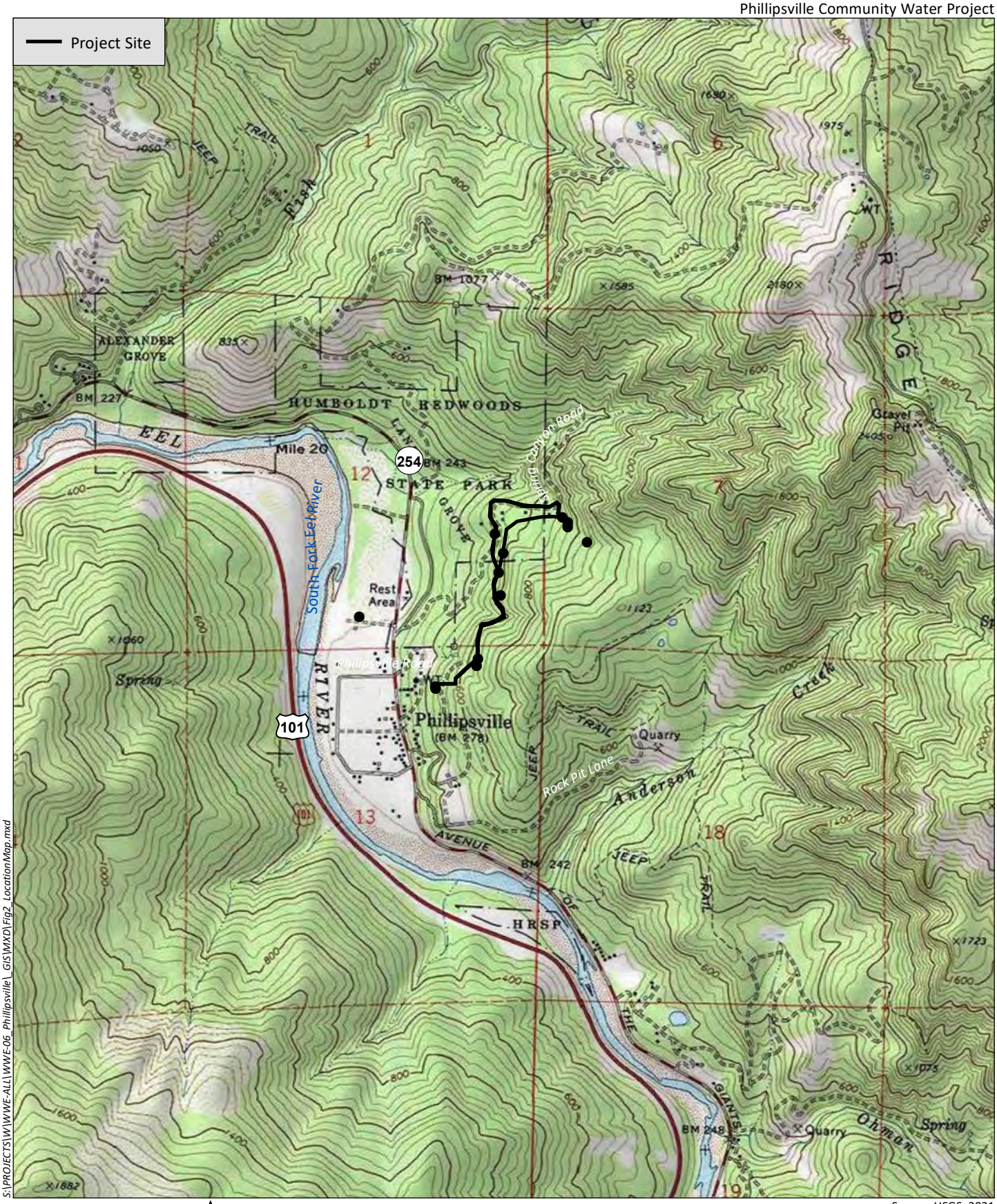
Source: Base Map Layers (Esri, USGS, NGA, NASA)

HELIX Environmental Planning

Vicinity Map

Figure 1



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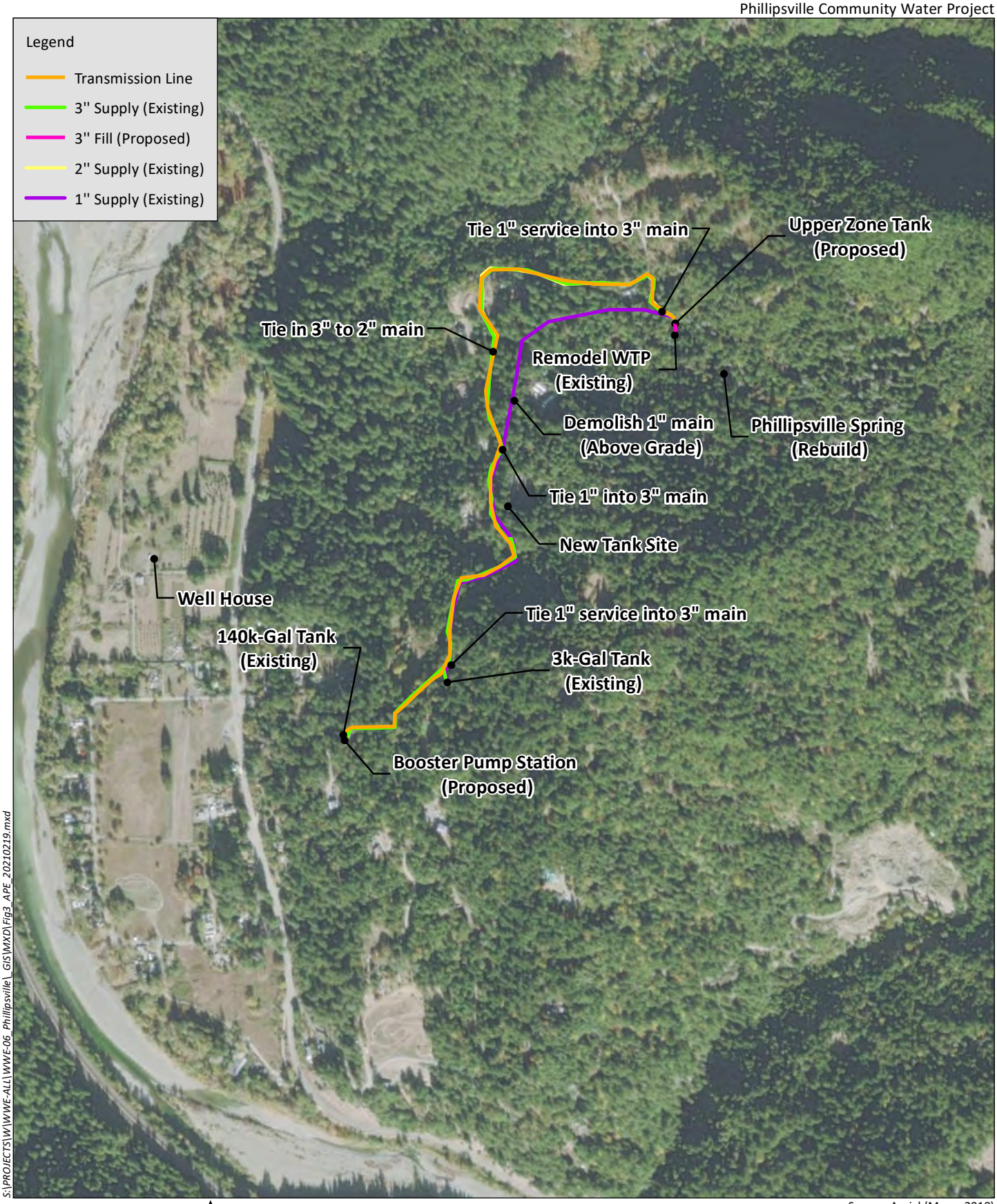
Source: USGS, 2021

HELIX Environmental Planning

Project Location Map

Figure 2



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0 800 Feet

Source: Aerial (Maxar 2018)

HELIX Environmental Planning

Site Plan

Figure 3

Attachment B

Regulatory Context

Regulatory Setting

Policies, regulations, and plans pertaining to the protection of biological resources on the project site are summarized in the following sections.

Federal Requirements

Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) enforces the provisions stipulated within the Federal Endangered Species Act of 1973 (FESA; 16 USC 1531 *et seq*.). Species identified as federally threatened or endangered (50 CFR 17.11, and 17.12) are protected from take, defined as direct or indirect harm, unless a Section 10 permit is granted to an entity other than a federal agency or a Biological Opinion with incidental take provisions is rendered to a federal lead agency via a Section 7 consultation. Pursuant to the requirements of FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally-listed species may be present in the study area and determine whether the proposed project will jeopardize the continued existence of or result in the destruction or adverse modification of critical habitat of such species (16 USC 1536 (a)[3], [4]). Other federal agencies designate species of concern (species that have the potential to become listed), which are evaluated during environmental review under the National Environmental Protection Act (NEPA) or California Environmental Quality Act (CEQA) although they are not otherwise protected under FESA.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 established federal responsibilities for the protection of nearly all species of birds, their eggs, and nests. The Migratory Bird Treaty Reform Act of 2004 further defined species protected under the act and excluded all non-native species. Section 16 U.S.C. 703–712 of the Act states "unless and except as permitted by regulations, it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill" a migratory bird. A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. Currently, there are 836 migratory birds protected nationwide by the Migratory Bird Treaty Act, of which 58 are legal to hunt. The U.S. Court of Appeals for the 9th Circuit (with jurisdiction over California) has ruled that the MBTA does not prohibit incidental take (952 F 2d 297 – Court of Appeals, 9th Circuit 1991).

Clean Water Act

Any person, firm, or agency planning to alter or work in waters of the U.S., including the discharge of dredged or fill material, must first obtain authorization from the U.S. Army Corps of Engineers (USACE) under the Clean Water Act (CWA; 33 USC 1344). Permits, licenses, variances, or similar authorization may also be required by other federal, state, and local statutes. Section 10 of the Rivers and Harbors Act prohibits the obstruction or alteration of navigable waters of the U.S. without a permit from USACE (33 USC 403).

Waters of the U.S. include certain wetlands; wetlands are defined in 33 CFR Part 328 as:

"those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Section 401 of the CWA requires that an applicant for a federal license or permit that allows activities resulting in a discharge to waters of the U.S. also obtain a state certification that the discharge complies with all applicable water quality standards, limitations, and restrictions. The Regional Water Quality Control Board (RWQCB) administers the certification program in California and no license or permit may be issued until certification has been granted.

Section 402 establishes a permitting system for the discharge of any pollutant (except dredged or fill material) into waters of the U.S.

Section 404 establishes a permit program administered by USACE that regulates the discharge of dredged or fill material into waters of the U.S. (including wetlands). Implementing regulations by USACE are found at 33 CFR Parts 320-332. The Section 404 (b)(1) Guidelines were developed by the USEPA in conjunction with USACE (40 CFR Part 230), allowing the discharge of dredged or fill material for non-water dependent uses into special aquatic sites only if there is no practicable alternative that would have less adverse impacts.

State Requirements

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code Sections 2050 to 2097) is similar to the FESA. The California Fish and Wildlife Commission is responsible for maintaining lists of threatened and endangered species under CESA. CESA prohibits the take of listed and candidate (petitioned to be listed) species. "Take" under California law means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch capture, or kill (California Fish and Game Code, Section 86). The California Department of Fish and Wildlife (CDFW) can authorize take of a state-listed species under Section 2081 of the California Fish and Game Code if the take is incidental to an otherwise lawful activity, the impacts are minimized and fully mitigated, funding is ensured to implement and monitor mitigation measures, and CDFW determines that issuance would not jeopardize the continued existence of the species. A CESA permit must be obtained if a project will result in the "take" of listed species, either during construction or over the life of the project. For species listed under both FESA and CESA requiring a Biological Opinion under Section 7 of the FESA, CDFW may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the Fish and Game Code.

California Code of Regulations Title 14 and California Fish and Game Code

The official listing of endangered and threatened animals and plants is contained in the California Code of Regulations Title 14 §670.5. A state candidate species is one that the California Fish and Game Code has formally noticed as being under review by CDFW to include in the state list pursuant to Sections 2074.2 and 2075.5 of the California Fish and Game Code.

Legal protection is also provided for wildlife species in California that are identified as "fully protected animals." These species are protected under Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species at any time. CDFW is unable to authorize incidental take of fully

protected species unless any such take authorization is issued in conjunction with the approval of a Natural Community Conservation Plan that covers the fully protected species (California Fish and Game Code Section 2835).

California Environmental Quality Act

Under the California Environmental Quality Act of 1970 (CEQA; Public Resources Code Section 21000 *et seq*.), lead agencies analyze whether projects would have a substantial adverse effect on a candidate, sensitive, or special-status species (Public Resources Code Section 21001(c)). These "special-status" species generally include those listed under FESA and CESA, and species that are not currently protected by statute or regulation, but would be considered rare, threatened, or endangered under the criteria included CEQA Guidelines Section 15380. Therefore, species that are considered rare are addressed under CEQA regardless of whether they are afforded protection through any other statute or regulation. The California Native Plant Society (CNPS) inventories the native flora of California and ranks species according to rarity; plants ranked as 1A, 1B, 2A, 2B, and 3 are generally considered special-status species under CEQA.[1]

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380(d) provides that a species not listed on the federal or state list of protected species may be considered rare if it can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants and animals. Section 15380(d) allows a public agency to undertake a review to determine if a significant effect on species that have not yet been listed by either the USFWS or CDFW (*i.e.*, candidate species) would occur.

California Native Plant Protection Act

The California Native Plant Protection Act of 1977 (California Fish and Game Code Sections 1900-1913) empowers the Fish and Game Commission to list native plant species, subspecies, or varieties as endangered or rare following a public hearing. To the extent that the location of such plants is known, CDFW must notify property owners that a listed plant is known to occur on their property. Where a property owner has been so notified by CDFW, the owner must notify CDFW at least 10 days in advance of any change in land use (other than changing from one agricultural use to another), in order that CDFW may salvage listed plants that would otherwise be destroyed. Currently, 64 taxa of native plants have been listed as rare under the act.

Nesting Birds

California Fish and Game Code Subsections 3503 and 3800 prohibit the possession, take, or needless destruction of birds, their nests, and eggs, and the salvage of dead nongame birds. California Fish and Game Code Subsection 3503.5 protects all birds in the orders of Falconiformes and Strigiformes (birds of prey). Fish and Game Code Subsection 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act. The Attorney General of California has released an opinion that the Fish and Game Code prohibits incidental take.

[1] The California Rare Plant Rank system can be found online at < http://www.cnps.org/cnps/rareplants/ranking.php>

Porter-Cologne Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act, Water Code Section 13000 *et seq*.) is California's statutory authority for the protection of water quality in conjunction with the federal CWA. The Porter-Cologne Act requires the State Water Resources Control Board (SWRCB) and RWQCBs under the CWA to adopt and periodically update water quality control plans, or basin plans. Basin plans are plans in which beneficial uses, water quality objectives, and implementation programs are established for each of the nine regions in California. The Porter-Cologne Act also requires dischargers of pollutants or dredged or fill material to notify the RWQCBs of such activities by filing Reports of Waste Discharge and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements, National Pollution Discharge Elimination System (NPDES) permits, Section 401 water quality certifications, or other approvals. The RWQCB will assert jurisdiction over any waters of the state, including wetlands, regardless of whether or not the feature qualifies as waters of the U.S.

California Fish and Game Code Section 1602 – Lake and Streambed Alteration Program

Diversions or obstructions of the natural flow of, or substantial changes or use of material from the bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW, pursuant to Section 1602 of the California Fish and Game Code. The CDFW requires notification prior to commencement of any such activities, and a Streambed Alteration Agreement (SAA) pursuant to Fish and Game Code Sections 1601-1603, if the activity may substantially adversely affect an existing fish or wildlife resource. A lake under CDFW jurisdiction is defined as "a permanent natural body of water of any size or an artificially impounded body of water of at least one acre, isolated from the sea, and having an area of open water of sufficient depth and permanency to prevent complete coverage by rooted aquatic plants" (CCR Vol. 18 Title 14, Section 1562.1). Streambeds within CDFW jurisdiction are based on the definition of a stream as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supporting fish or other aquatic life" (CCR Vol. 18 Title 14, Section 1.72).

Attachment C

Database Query Results

CNPS California Native Plant Society

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

7 matches found. *Click on scientific name for details*

Search Criteria

Found in Quad 4012327

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Astragalus agnicidus	Humboldt County milk-vetch	Fabaceae	perennial herb	Apr-Sep	1B.1	S2	G2
Erythronium revolutum	coast fawn lily	Liliaceae	perennial bulbiferous herb	Mar-Jul(Aug)	2B.2	S3	G4G5
Kopsiopsis hookeri	small groundcone	Orobanchaceae	perennial rhizomatous herb (parasitic)	Apr-Aug	2B.3	S1S2	G4?
Lilium rubescens	redwood lily	Liliaceae	perennial bulbiferous herb	Apr-Aug(Sep)	4.2	S3	G3
Listera cordata	heart-leaved twayblade	Orchidaceae	perennial herb	Feb-Jul	4.2	S4	G5
Montia howellii	Howell's montia	Montiaceae	annual herb	(Jan-Feb)Mar-May	2B.2	S2	G3G4
Piperia candida	white-flowered rein orchid	Orchidaceae	perennial herb	(Mar)May-Sep	1B.2	S3	G3

Suggested Citation

California Native Plant Society, Rare Plant Program. 2021. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 24 February 2021].

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Contributors
The Calflora Database
The California Lichen Society
California Natural Diversity Database
The Jepson Flora Project
The Consortium of California Herbaria
CalPhotos

Questions and Comments
rareplants@cnps.org

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Myers Flat (4012337) OR Miranda (4012327) OR Blocksburg (4012336) OR Fort Seward (4012326))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Astragalus agnicidus Humboldt County milk-vetch	PDFAB0F080	None	Endangered	G2	S2	1B.1
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	Candidate Endangered	G2G3	S1	
Empidonax traillii brewsteri little willow flycatcher	ABPAE33041	None	Endangered	G5T3T4	S1S2	
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Erethizon dorsatum North American porcupine	AMAFJ01010	None	None	G5	S3	
Erythronium oregonum giant fawn lily	PMLIL0U0C0	None	None	G4G5	S2	2B.2
Erythronium revolutum coast fawn lily	PMLIL0U0F0	None	None	G4G5	S3	2B.2
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Gilia capitata ssp. pacifica Pacific gilia	PDPLM040B6	None	None	G5T3	S2	1B.2
Howellia aquatilis water howellia	PDCAM0A010	Threatened	None	G3	S2	2B.2
Kopsiopsis hookeri small groundcone	PDORO01010	None	None	G4?	S1S2	2B.3
Montia howellii Howell's montia	PDPOR05070	None	None	G3G4	S2	2B.2
Navarretia leucocephala ssp. bakeri Baker's navarretia	PDPLM0C0E1	None	None	G4T2	S2	1B.1
Noyo intersessa Ten Mile shoulderband	IMGASC5070	None	None	G2	S2	
Packera bolanderi var. bolanderi seacoast ragwort	PDAST8H0H1	None	None	G4T4	S2S3	2B.2
Pandion haliaetus osprey	ABNKC01010	None	None	G5	S4	WL

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Pekania pennanti Fisher	AMAJF01020	None	None	G5	S2S3	SSC
Piperia candida white-flowered rein orchid	PMORC1X050	None	None	G3	S3	1B.2
Rana aurora northern red-legged frog	AAABH01021	None	None	G4	S3	SSC
Rana boylii foothill yellow-legged frog	AAABH01050	None	Endangered	G3	S3	SSC
Rhyacotriton variegatus southern torrent salamander	AAAAJ01020	None	None	G3G4	S2S3	SSC
Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
Sidalcea malviflora ssp. patula Siskiyou checkerbloom	PDMAL110F9	None	None	G5T2	S2	1B.2
Tracyina rostrata beaked tracyina	PDAST9D010	None	None	G2	S2	1B.2
Usnea longissima Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2

Record Count: 28

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Humboldt County, California

Local office

Arcata Fish And Wildlife Office

(707) 822-7201
(707) 822-8411

1655 Heindon Road
Arcata, CA 95521-4573

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

Marbled Murrelet Brachyramphus marmoratus — Threatened
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/4467

Northern Spotted Owl Strix occidentalis caurina — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/1123

Western Snowy Plover Charadrius nivosus nivosus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/8035

Yellow-billed Cuckoo Coccyzus americanus — Threatened
There is **proposed** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/3911

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Marbled Murrelet Brachyramphus marmoratus https://ecos.fws.gov/ecp/species/4467#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Great Blue Heron Ardea herodias fannini This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Aug 15

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Rufous Hummingbird selasphorus rufus — Breeds Apr 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Western Screech-owl Megascops kennicottii kennicottii — Breeds Mar 1 to Jun 30
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Western Screech-owl
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

- R3USA
- R4SBA

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Attachment D

Potential for Regionally Occurring Special Status Species

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
Plants			
Astragalus agnicidus Humboldt County milk-vetch	--/SE/1B.1	A perennial herb found in openings, disturbed areas, sometimes roadsides in broadleafed upland forest and North Coast coniferous forest from 120 – 800 meters elevation. Blooms March - June (July). Known from only two sites near Miranda, CA. Microsite habitat characteristics include disturbed openings in partially timbered forest lands, also along ridgelines and on southern aspects (CNPS 2020).	**Will not occur.** While there is North Coast coniferous forest on the project site, there are no suitable open areas for this species and the project site is well outside of this species known range. This species is only known from two locations. The nearest extant occurrence is 4.2 miles west of the project site; the second site is located 12.4 miles north of the project site (CNDDB 2020.
Erythronium oregonum giant fawn lily	--/--/2B.2	A perennial rhizomatous herb found in serpentinite, rocky, openings in cismontane woodlands, meadows and seeps from 100 - 1150 meters elevation. Blooms from May – July (CNPS 2020).	**Will not occur.** There are no suitable woodland, meadow or seep habitats on the project site.
Erythronium revolutum coast fawn lily	--/--/2B.2	A perennial bulbiferous herb found on mesic soils and streambanks in bogs and fens, broadleafed upland forest, and North Coast coniferous forest from 0 - 1600 meters elevation. Blooms March – July (August). Associated species include Douglas fir, tanoak, and Pacific madrone (CNPS 2020).	**May occur.** Suitable habitat for this species is present in north coast coniferous forest habitat in the project site, primarily around the spring site. The nearest extant occurrence is 2 miles north along Fish Creek (CNDDB 2020).
Gilia capitata ssp. *pacifica* Pacific gilia	--/--/1B.2	An annual herb found in coastal bluff scrub, chaparral openings, coastal prairies, and valley and foothill grassland from 5 – 1665 meters elevation. Blooms April – August (CNPS 2020).	**Will not occur.** There are no suitable scrub, chaparral, prairie or grassland habitats on the project site.

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
Howellia aquatilis water howellia	FT/--/2B.2	An annual aquatic herb found in freshwater marshes and swamps from 1085 - 1290 meters elevation. Blooms June (CNPS 2020).	**Will not occur.** There are no suitable aquatic habitats on the project site.
Kopsiopsis hookeri small groundcone	--/--/2B.3	A parasitic perennial rhizomatous herb found in North Coast coniferous forest from 90 – 885 meters elevation. Blooms April – August. Microsite habitat characteristics include shrubby places in open woods, generally found on salal (*Gaultheria shallon*) (CNPS 2020).	**Will not occur.** Although there is North Coast coniferous forest on the project site, the primary host plant, salal, was not observed on the site. The nearest extant occurrence is 4.6 miles northwest within a timber harvest unit (CNDDB 2020).
Montia howellii Howell's montia	--/--/2B.2	An annual herb found on vernally mesic soils in vernal pools, north coast coniferous forest, meadows and seeps from 0 – 835 meters elevation. Blooms (January-February) March-May. Microsite habitat characteristics include vernally wet areas with compacted soils (CNPS 2020).	**Will not occur.** Suitable vernally wet habitat with compacted soils is not present in the project site. The only reported occurrence of this species on the Miranda USGS quad is from 1921.
Navarretia leucocephala ssp. *bakeri* Baker's navarretia	--/--/1B.1	A perennial herb found on mesic soils in cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland and vernal pools from 5 – 1740 meters elevation. Blooms April-July (CNPS 2020).	**Will not occur.** There are no suitable habitats on the project site.
Packera bolanderi var. *bolanderi* seacoast ragwort	--/--/2B.2	A perennial rhizomatous herb often found in roadsides in coastal scrub and North Coast coniferous forest from 30 - 650 meters elevation. Blooms (January - April) May-July (August) (CNPS 2020).	**Will not occur.** Habitats in the project site are disturbed and the project site is outside of this species known range. The closest reported occurrences include a cluster of seven occurrences approximately 9 miles north of the

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
			project site in roadcuts in the vicinity of the Eel River near McCann (CNDDB 2020).
Piperia candida white-flowered rein orchid	--/--/1B.2	A perennial herb often found in serpentinite soils in broadleafed upland forests, lower montane coniferous forests, and North Coast coniferous forests from 30 – 1310 meters elevation. Blooms (March)May-September (CNPS 2020).	**May occur.** Suitable habitat for this species is present in north coast coniferous forest habitat in the project site, primarily around the spring site. Several occurrences on the Miranda quad including approximately 4,000 ft west of the site.
Sidalcea malviflora ssp. *patula* Siskiyou checkerbloom	--/--/1B.2	A perennial rhizomatous herb often found on roadcuts in coastal bluff scrub, coastal prairie, and North Coast coniferous forest from 15 – 880 meters elevation. Blooms (April) May-August. Microsite habitat characteristics includes roadcuts within open coastal forests (CNPS 2020).	**Will not occur.** Habitats in the project site are disturbed, lack openings for this species, and the project site is outside of this species known range. The nearest extant occurrence is 6.8 miles north of the project site in roadcuts in the vicinity of the Eel River near McCann (CNDDB 2020).
Tracyina rostrata beaked tracyina	--/--/1B.2	An annual herb found in chaparral, cismontane woodland and valley and foothill grassland from 90 – 790 meters elevation. Blooms May - June (CNPS 2020).	**Will not occur.** There are no suitable chaparral, woodland or grassland habitat on the project site.

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
Animals			
Invertebrates			
Bombus occidentalis western bumble bee	--/SCE/--	Bumble bees are primitively eusocial insects that live in underground colonies made up of one queen, female workers, and reproductive members of the colony. New colonies are initiated by solitary queens, generally in the early spring, which typically occupy abandoned rodent burrows (Thorp et al. 1983). This species is a generalist forager and have been reported visiting a wide variety of flowering plants. A short-tongued bumble bee; select food plants include *Melilotus* spp., *Cirsium* spp., *Trifolium* spp., *Centaurea* spp., *Eriogonum* spp., and *Chrysothamnus* spp. (Koch et al. 2012). This species has a short tongue and typically prefers open flowers with short corollas but is known to chew through the base of flowers with long corollas. The flight period for queens in California is from early February to late November, peaking in late June and late September. New queens hibernate over the winter and initiate a new colony the following spring (Thorp et al. 1983). Rare throughout its range and in decline west of the Sierra Nevada crest.	**Will not occur.** There are no openings or herbaceous dominated areas with suitable food plants in the project site. The last reported occurrence of this species on the Miranda quad is from 1976.
Reptiles			

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
Emys marmorata western pond turtle	--/--/SSC	Turtle that inhabits slow-moving water with dense submerged vegetation, abundant basking sites, gently sloping banks, and dry clay or silt soils in nearby uplands. Turtles will lay eggs up to 0.25-mile from water, but typically go no more than 600 feet (Jennings and Hayes 1994).	**Will not occur.** There is no suitable aquatic habitat on the project site. Soil types on the site primarily consist of gravelly loams which is unsuitable for the species. The nearest extant occurrence is 5.4 miles north of the project site along Elk Creek (CNDDB 2020).
Amphibians			
Rana aurora northern red-legged frog	--/--/SSC	The northern red-legged frog is found in still waters of ponds, marshes or pools in streams. The species prefers thickly vegetated shorelines. In terrestrial environments adults can be found in woody debris and mid-level canopy trees. The species is generally found near permanent water but can be found far from water in damp woods and meadows outside of the breeding season (Hayes and Hayes 2003).	**Not expected.** There is no suitable aquatic habitat on the project site and there are no reported occurrences of this species on the Miranda quad in spite numerous surveys for foothill yellow legged frog in the S. Fork Eel River and other major streams in the area. The nearest documented extant occurrence is 6.6 miles north of the project site in a drainage ditch near Fruitridge (CNDDB 2020).
Rana boylii foothill yellow-legged frog	--/SE/SSC	The foothill yellow-legged frog occurs along the coast ranges from Oregon to Los Angeles and along the western side of the Sierra Nevada. This species uses perennial rocky streams in a wide variety of habitats up to 6,400 feet above msl. This species rarely ventures far from water, is usually found basking in the water, or under surface debris or underground within 165 feet of water.	**Will not occur**. There is no suitable stream habitat in or adjacent to the site.

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
		Eggs are laid in clusters attached to gravel or rocks along stream margins in flowing water. Tadpoles typically require up to four months to complete aquatic development. Breeding typically follows winter rainfall and snowmelt, which varies based upon location (Jennings and Hayes 1994).	
Rhyacotriton variegatus southern torrent salamander	--/--/SSC	Found in shallow, clear, cold, well-shaded streams and riparian areas with rocky bottoms in mature or old-growth forests (Stebbind *et al.* 2012).	**Will not occur.** The project site does not contain suitable aquatic or old growth habitat.
Birds			
Accipiter cooperii Cooper's hawk	--/--/WL	Cooper's hawk inhabits open woodlands or forest edges, where it can hunt birds in flight. Nests sites are mainly in riparian stands of deciduous trees, such as are found in canyon bottoms and flood plains, and in live oak trees.	**May occur.** marginal nesting habitat is present with the north coast coniferous forest in the project site and there is a reported occurrence of nesting Cooper's hawk from 2005 approximately 2 miles north of the site.
Aquila chrysaetos golden eagle	--/--/FP	Typically occurs in rolling foothills, mountain areas, deserts and other open habitats up to 3,822 m amsl. Typically nests on cliff ledges or large trees in open areas in canyons. Will occasionally use other tall structures for nesting, such as electrical transmission towers. Prey consists mostly of rodents, carrion, birds, reptiles and occasionally small livestock (Zeiner et al. 1990).	**Will not occur.** The project site does not contain suitable open habitat.

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
Brachyramphus marmoratus marbled murrelet	FT/SE/--	This species is pelagic, except during nesting season where it will use old-growth, multi-layered canopied forests up to 50 miles inland from the coast. When nesting trees are not present, this species will nest on the ground or amongst rocks. In California, nesting typically occurs in coastal redwood forest or Douglas fir forests (Marshall 1989).	**Not expected.** There is no suitable old growth canopied forest habitat in the project site. The project site is located within mapped Critical Habitat but does not provide any of the primary constituent elements of Critical Habitat for this species. The presence of deformities and/or large branches to use as a nesting platform is one of the primary constituent elements (USFWS 2016) for the species. The majority of the trees on the project site are in good to fair condition, with no deformities noted. Therefore, the site is not considered Critical Habitat, even though it is within an area mapped as Critical Habitat. Due to the presence of Critical Habitat in the project site, this species is discussed in the text.
Charadrius alexandrinus nivosus western snowy plover	FT/--/SSC	Federal listing applies only to coastal populations that nest on sand beaches above the high tide line. Interior populations nest on barren to sparsely vegetated flats along the shores of lakes, braided river systems, salt ponds, and agricultural sumps. Adults feed on insects and brine shrimp (Shuford and Garaldi 2008).	**Will not occur.** There is no suitable beach or salt pan habitat in the project site. The project site lacks suitable unvegetated substrates required by this species for nesting.

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
Coccyzus americanus yellow-billed cuckoo	FT/--/SSC	Yellow-billed cuckoos are found in deciduous forests with gaps and clearings. The species primarily feeds on insects, especially tent caterpillars. In the West, this species is rare and restricted to the cottonwood-dominated forests that line larger rivers running through arid country (Hughes 1999).	**Will not occur.** There is no suitable riparian habitat in or adjacent to the site.
Empidonax traillii brewsteri little willow flycatcher	--/SC/--	Little willow flycatchers are primarily associated with dense willow stands along rivers and lakes and to a lesser extent have been observed using even aged young forests (Hunter *et al.* 2005).	**Will not occur.** There is no suitable dense willow habitat in or adjacent to the site.
Falco peregrinus anatum American peregrine falcon	FD/SD/FP	Raptor that breeds on steep cliff faces near wetlands. Nests are minimal and may consist of a scrape and are located high on protected ledges or cliffs, including manmade structures. Forages on the wing by swooping on flying prey (Zeiner *et al.* 1990).	**Will not occur.** The project site does not contain suitable cliff or ledge habitat to support nesting for this species.
Strix occidentalis caurina northern spotted owl	FT/--/SSC	Northern spotted owls generally inhabit older forested habitats with very dense canopy cover containing large overstory trees and large standing and fallen dead trees (Stephen et al. 2004). Suitable habitat for California spotted owl consists of dense, multilayer, mature forest with greater than 70 percent canopy closure preferred for nesting and greater than 50 percent canopy closure preferred for foraging (Verner et al. 1992). Nests are placed in tree cavities,	**Not expected.** There is no suitable old growth forested habitat in or adjacent to the site. Due to the presence of reported nests within approximately 0.25 mile of the site, this species is discussed in the text.

Species Name/ Common Name[1]	Status[2]	Habit, Ecology and Life History	Potential to Occur
		broken-topped trees, and platforms, such as abandoned raptor or squirrel nests. Adults do not build their own nests (Zeiner et al. 1990).	
Mammals			
Pekania pennanti Fisher	FPT/ST/SSC	This species is found in coniferous and mixed conifer and hardwood forests, typically in mature forest cover. Riparian forests and habitat close to open water such as streams are important. Cavities and branches in trees, snags, stumps, rock piles, and downed timber are used as resting sites, and large diameter live, or dead trees are selected for natal and maternal dens (Zeiner et al. 1990). Fisher is currently found in the northern Cascade and southern Sierra Nevada mountain ranges (north of Shasta County and south of Mariposa County).	**Not expected.** There is no suitable habitat for fisher in the project site. In addition, the overall level of urban development in areas adjacent to the project site provide a deterrent to use of the project area by this species. The nearest extant occurrence is 3 miles north of the project site in the Humboldt Redwoods State Park (CNDDB 2020).

[1]Sensitive species reported in CNDDB or in USFWS lists for the project site and vicinity.
[2]Status is as follows: Federal (ESA) listing/State (CESA) listing/other CDFW status or CRPR. F = Federal; S = State of California; E = Endangered; T = Threatened; C = Candidate; FP=Fully Protected; SSC=Species of Special Concern; WL=Watch List.
CRPR = California Rare Plant Rank: 1B – rare, threatened, or endangered in California and elsewhere; 2B – rare, threatened, or endangered in California but more common elsewhere. Extension codes: .1 – seriously endangered; .2 – moderately endangered.

[3]Status in the Project site is assessed as follows. **Will Not Occur**: Species is either sessile (*i.e.* plants) or so limited to a particular habitat that it cannot disperse on its own and/or habitat suitable for its establishment and survival Will not occur on the project site; **Not Expected**: Species moves freely and might disperse through or across the project site, but suitable habitat for residence or breeding does not occur on the project site, potential for an individual of the species to disperse through or forage in the site cannot be excluded with 100% certainty; **Presumed Absent:** Habitat suitable for residence and breeding occurs on the project site; however, focused surveys conducted for the current project were negative; **May Occur**: Species was not observed on the site and breeding habitat is not present but the species has the potential to utilize the site for dispersal, **High**: Habitat suitable for residence and breeding occurs on the project site and

the species has been recorded recently on or near the project site, but was not observed during surveys for the current project; **Present**: The species was observed during biological surveys for the current project and is assumed to occupy the project site or utilize the project site during some portion of its life cycle.

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Attachment E

Species Observed on the Property

Table E-1. Plant Species Observed on the Property

Family	Species Name	Common Name	Status[1]
Native			
Anacardiaceae	*Toxicodendron diversilobum*	poison-oak	--
Araliaceae	*Aralia californica*	elk clover	--
Asteraceae	*Baccharis pilularis*	coyote brush	--
Athyriaceae	*Athyrium filix-femina*	lady fern	--
Betulaceae	*Alnus rubra*	red alder	--
	Corylus cornuta	California hazelnut	--
Blechnaceae	*Woodwardia fimbriata*	giant chain fern	--
Caprifoliaceae	*Lonicera hispidula* var. *vacillans*	hairy honeysuckle	--
Cupressaceae	*Sequoia sempervirens*	coast redwood	--
	Thuja plicata	western red cedar	--
Cyperaceae	*Carex obnupta*	slough sedge	--
Dryopteridaceae	*Polystichum munitum*	western swordfern	--
Equisetaceae	*Equisetum telmateia* ssp. *braunii*	giant horsetail	--
Ericaceae	*Arbutus menziesii*	Pacific madrone	--
	Arctostaphylos columbiana	hairy manzanita	--
	Vaccinium ovatum	California huckleberry	--
Fagaceae	*Notholithocarpus densiflorus*	tanoak	--
	Quercus chrysolepis	canyon live oak	--
	Quercus kelloggii	black oak	--
Juncaceae	*Juncus effusus*	soft rush	--
Lauraceae	*Umbellularia californica*	California bay	--
Myrsinaceae	*Trientalis latifolia*	Pacific starflower	--
Pinaceae	*Pseudotsuga menziesii*	Douglas fir	--
Rhamnaceae	*Ceanothus integerrimus*	deer brush	--
Rosaceae	*Heteromeles arbutifolia*	toyon	--
Sapindaceae	*Acer macrophyllum*	big leaf maple	--
Non-native			
Fabaceae	*Cytisus scoparius*	Scotch broom	High
Poaceae	*Anthoxanthum odoratum*	sweet vernal grass	Limited
	Avena fatua	wild oats	Moderate
	Cynosurus echinatus	dogstail grass	Moderate
	Festuca perennis	Italian ryegrass	Moderate
Rosaceae	*Rosa rubiginosa*	sweetbriar rose	--
	Rubus armeniacus	Himalayan blackberry	High

[1]Status of native species is federal listing/state listing/California Rare Plant Rank; Status for non-native species is California Invasive Species Council invasiveness rating.

Table E-2. Wildlife Species Observed on the Property

Order/Family	Species Name	Common Name	Status[1]
Birds			
Cathartiformes			
Cathartidae	*Cathartes aura*	turkey vulture	--
Columbiformes			
Columbidae	*Zenaida macroura*	mourning dove	--
Odontophoridae	*Callipepla californica*	California quail	--
Passeriformes			
Aegithalidae	*Psaltriparus minimus*	bushtit	--
Corvidae	*Aphelocoma californica*	California scrub jay	--
	Corvus brachyrhynchos	American crow	--
Mimidae	*Mimus polyglottos*	northern mockingbird	--
Passerelidae	*Junco hyemalis*	dark-eyed junco	--
	Melozone crissalis	California towhee	--
	Zonotrichia leucophrys	white-crowned sparrow	--
Tyrannidae	*Sayornis nigricans*	black phoebe	--
Piciformes			
Picidae	*Colaptes auratus*	northern flicker	--
	Dryobates pubescens	downy woodpecker	--
Mammals			
Carnivora			
Canidae	*Canis latrans*	coyote (scat)	--
Procyonidae	*Procyon lotor*	raccoon (scat)	--
Lagomorpha			
Leporidae	*Lepus californicus*	black-footed jackrabbit	--

[1]Status for animal species is ESA/CESA listing or other sensitivity.

Attachment F

Site Photographs

Photo 1: View of the existing spring source collection system and associated pipe gallery. Photo taken November 11, 2020.

Photo 2: View of the existing spring source collection system and associated pipe gallery. Photo taken November 11, 2020.

Photo 3: View of the overflow tank as part of the spring source collection system. Photo taken November 11, 2020.

Photo 4: View of the existing spring source collection system, associated pipe gallery, and surrounding forest. Photo taken November 11, 2020.

Photo 5: View of the heavily rutted dirt road used to access the spring site. Photo taken November 11, 2020.

Photo 6: View of the heavily rutted dirt road used to access the spring site. Photo taken November 11, 2020.

Photo 7: View of two 3,000 gallon water storage tanks and associated infrastructure at the WTP. Photo taken November 11, 2020.

Photo 8: View of a 3,000 gallon water storage tank and associated water treatment building at the WTP. Photo taken November 11, 2020.

Photo 9: View of the 140,000-gallon water storage tank and associated infrastructure. It is proposed that a booster pump station be installed in the foreground. Photo taken November 11, 2020.

Photo 10: View of the proposed location of an additional water storage tank on a graded, gravel pad covered in a geotextile tarp. Photo taken November 11, 2020.

Photo 11: View of additional water storage tanks. Photo taken November 11, 2020.

Photo 12: View of the well serving as a secondary water source for the Phillipsville CSD. Photo taken November 11, 2020.

Photo 13: Water is transported to Phillipsville CSD residents via existing HDPE pipes installed above ground. Photo taken November 11, 2020.

Appendix D

Cultural Resources Assessment Report (HELIX Environmental Planning 2021b)

HELIX Environmental Planning, Inc.
11 Natoma Street, Suite 155
Folsom, CA 95630
www.**helixepi**.com

February 22, 2021 Project # WWE-06

Sheila Magladry, P.E.
Water Works Engineers, LLC.
760 Cypress Avenue, Suite 201
Redding, CA 96001

Subject: **Cultural Resource Assessment Letter Report for the Phillipsville Community Services District Water System Improvements Project, Humboldt County, California**

Dear Ms. Magladry,

HELIX Environmental Planning, Inc. (HELIX) has prepared this cultural resources assessment letter report for the proposed Phillipsville Community Services District (CSD) Water System Improvements Project (project) in the community of Phillipsville in Humboldt County, California. The project is subject to the requirements of both the California Environmental Quality Act (CEQA) and Section 106 of the National Historic Preservation Act of 1966 (Section 106), with the California State Water Resources Control Board (SWRCB) acting as lead agency under both environmental policies. The relevant regulatory frameworks are presented in **Attachment A**.

This assessment is intended to evaluate the potential for the proposed project to significantly impact historic properties (i.e., prehistoric or historic-era archaeological or architectural resources that meet the criteria for listing in the National Register of Historic Places [NRHP]) and/or historical resources (i.e., prehistoric or historic-era archaeological or architectural resources that meet the criteria for listing in the California Register of Historical Resources [CRHR]). The conclusions and recommendations presented here are based on data from an archival records search, Native American outreach, and an intensive pedestrian survey of the project area.

PROJECT LOCATION AND DESCRIPTION

The proposed project is located in the community of Phillipsville, California, in the southern portion of Humboldt County, approximately 8 miles north of Garberville. The approximately 5.4-acre project area lies within a portion of Sections 12 and 13, Township 3 South, Range 4 East (**Figure 1**; all figures are presented in **Attachment B**). The project area is accessed by state highways 101 and 254 and is adjacent to the South Fork of the Eel River. The community of Phillipsville is bound to the north and south by Humboldt Redwoods State Park.

The project applicant is proposing to improve some of the current water distribution infrastructure that supplies customers served by the Phillipsville CSD. The project would remedy existing water quality issues from a spring source that serves some customers of the district and provide for necessary system

redundancy in case of emergency. The project would also include the installation of new storage tanks and distribution infrastructure to reduce inefficiencies and potentially unsafe conditions due to potential leaks, landslides, and/or contamination of water from the spring source. Most residents in the district are served by an existing well, and the project would include digging a second well to ensure redundancy and a consistent water supply. Further, the project would include a booster pump that would allow residents served by the spring to also have access to a secondary water source (i.e., the well). The connection of the booster pump and well source to the remaining residents currently served by the spring would also enable the construction of fire hydrants to protect homes, wildlands, and infrastructure on the higher terrain of the district, which is also part of the proposed project. A water supply suitable for fire suppression does not currently exist in the higher-elevation portions of the district.

Specific project improvements will include, but may not be limited to:

- Physical improvements to the existing groundwater spring, including regrading/recontouring of the surrounding surface and pipe gallery. The effluent end of the spring would be sealed with a bentonite cut-in wall placed around the collection pipeline, a spring liner would be installed to protect the spring source from influence from surface water, and the hillside around the spring would be re-graded to direct surface water runoff away from the spring.
- Approximately 1-mile of surface roadway improvement to the unnamed spring access road, including grading and felled tree clearance.
- System improvements to the existing water treatment plant building, footprint, and piping. Improvements would include installing a buried, large diameter contact pipeline between the spring water treatment plant (WTP) and the upper zone storage tanks; constructing a concrete pad to support a trailer-mounted generator; and installing security fencing around the building.
- Installation of water storage facilities to increase system redundancy and to provide for necessary fire flows. Improvements would include geotechnical engineering improvements to stabilize slopes; demolition of three existing storage tanks; installation of two new storage tanks and appurtenances; and institutional controls.
- Gravel road surfacing and gravel pathways would be installed at the tank site for access to the spring WTP and walking access around the tanks.
- The existing site plumbing would be demolished to prepare for the contact pipeline installation and new yard piping for the new tanks. Work may include felling of mature, native trees and minor trenching/grading.
- Installation of a booster pump station inside a concrete masonry unit (CMU) block building.
- The pump station and an existing 140,000-gallon steel water storage tank would be enclosed with site fencing, and parking and exterior building lights would be installed.
- Installation of a new 8-inch fire suppression service pipeline that would run approximately one mile from the booster pump station to the upper zone tank site. The pipeline would run down the center of an existing dirt road. A trench would be excavated to accommodate the pipeline and a fiber optic cable.
- Restoration of the gravel road would be restored to pre-construction conditions following the pipeline installation and other system improvements.
- Development of a new well approximately 60 feet from the existing well.

- Improvements to the existing well and well house, including construction of a secondary containment shed on a concrete pad. The well site would be enclosed with fencing and exterior building lights would be installed.

Area of Potential Effects

The Area of Potential Effects (APE) is defined as the geographic area or areas within which a project may directly or indirectly cause alterations in the character or use of significant archaeological or architectural resources. The APE is influenced by the scale and nature of the project as well as by the types of cultural resources in the vicinity. For the purposes of this analysis, the project's primary APE is understood to be the area that would be subjected to ground disturbance during construction and implementation of the proposed project (**Figure 3**).

The APE for the proposed project measures approximately 5.4 acres and corresponds to the project area described above. The APE's vertical dimension is established by the trenching for the 8-inch fire suppression service pipeline, which would run down the center of an existing dirt road and is estimated to extend approximately 2 to 3 feet below the current ground service. Because the project would largely replace existing infrastructure or add new subsurface infrastructure, visual impacts are expected to be negligible and a separate APE to address secondary impacts was considered unnecessary.

ARCHIVAL RECORDS SEARCH

On December 11, 2020, an archival records search in support of the proposed project was conducted at the Northwest Information Center (NWIC) of the California Historical Resources Information System, located at Sonoma State University. The records searches addressed all portions of the APE and a 0.5-mile radius around the APE (hereafter referred to as the study area). Sources of information included previous survey and cultural resources files; the National Register of Historic Places (NRHP); the CRHR; the Office of Historic Preservation (OHP) Archaeological Determinations of Eligibility; the OHP Directory of Properties in the Historic Property Data File; historical topographic maps; and historical aerial photographs.

The records search identified 16 studies that have previously been conducted within the study area (**Table 1**).

Table 1
PREVIOUS STUDIES CONDUCTED WITHIN THE STUDY AREA

Report	Year	Author(s)	Title	Affiliation
S-000848	1976	Fredrickson, D. A.	A Summary of Knowledge of the Central and Northern California Coastal Zone and Offshore Areas, Vol. III, Socioeconomic Conditions, Chapter 7: Historical & Archaeological Resources	The Anthropology Laboratory, Sonoma State College; Winzler & Kelly Consulting Engineers
S-002458	1981	Ramiller, N., S.Ramiller, R. Werner, and S. Stewart	Overview of Prehistoric Archaeology for the Northwest Region, California Archaeological Sites Survey: Del Norte, Humboldt, Mendocino, Lake, Sonoma, Napa, Marin, Contra Costa, Alameda	Northwest Regional Office, California Archaeological Sites Survey, Anthropological Studies Center, Sonoma State University
S-007888	1973	Fredrickson, D. A.	Early Cultures of the North Coast Ranges, California.	University of California, Davis

Report	Year	Author(s)	Title	Affiliation
S-008226	1986	Parkman, E. B.	Status of Archeological Resources in the Northern Region, California Department of Parks and Recreation	California Department of Parks & Recreation
S-011185	1988	Gmoser, G. J.	Boundary Development in Northwestern California, an Ecological Approach to Culture History	Sonoma State University
S-017442	1995	Sandelin, L.	Phase I Archaeological Study, Beebe, APN 214-051-01 & 214-041-01, Proposed Lot Line Adjustment, Humboldt County, California	Sandelin Archaeology and Forestry
S-020395	1998	Gillette, D. L.	PCNs of the Coast Ranges of California: Religious Expression or the Result of Quarrying?	California State University, Hayward
S-030204	2003	Gillette, D. L.	The Distribution and Antiquity of the California Pecked Curvilinear Nucleated (PCN) Rock Art Tradition.	University of California, Berkeley
S-038865	2011	Leach-Palm, L., P. Brady, P. Mikkelsen, L. Seil, D. Rice, B. Larson, J. Freeman, and J. Costello	Cultural Resources Inventory of Caltrans District 1 Rural Conventional Highways in Del Norte, Humboldt, Mendocino and Lake Counties, Contract No. 01A1056, Expenditure Authorization No. 01-453608	Far Western Anthropological Research Group; JRP Historical Consulting, LLC; Foothill Resources Ltd.
S-042152	2001	Collins, M. D.	Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California Kahn; Phillipsville THP 1-01-49 HUM	James Able Forestry Consultants
S-043461	2008	Cohoon, B. C.	An Archaeological Survey Report for the Kahn Phillipsville 2008 Timber Harvesting Plan, Humboldt County, California	Ben Cohoon Logging and Forestry
S-044429	2012	Haney, J., and E. Dwyer	Archaeological Survey Report for a Proposed Bridge Upgrade/Replacement Project along State Route 254, Humboldt County, California	Caltrans District 3
S-044964	2008	Leach-Palm, L., W. R. Hildebrandt, and J. Meyer	Phase I Archaeological Survey of 262 Locations Planned for Metal Beam Guardrail Construction along State Route 101, Humboldt County, 01-HUM-101, PM 0.20-126.00 (KP 032-202.77), EA 01-464000	Far Western Anthropological Research Group, Inc.
S-045088	2007	Lasbury, T.	Final Mitigated Negative Declaration for the Phillipsville Community Services District	Phillipsville Community Services District
S-046715	2014	Cardiff, D., S. Thomas, and D. York	Historic Property Survey Report for Metal Beam Guardrail Repair and Replacement Project, Humboldt County, Var, Var 2014, E-FIS Project Number, 0112000274	Caltrans District 1
S-046715	2014	Cardiff, D., S. Thomas, and D. York	Archaeological Survey Report for the HUM-VAR-MBGR Repair and Replacement Project 2014 01-HUM-VAR, Humboldt County, California, EA 01-46392	Caltrans District 1

One study directly investigated the majority of the current APE. Report S-045088, the Final Mitigated Negative Declaration for the Phillipsville Community Services District, was completed in 2007 and addressed the entire alignment that contains the existing 3-inch pipeline and transmission line, as well as portions of Phillipsville. The study did not find any cultural resources within the current APE.

The other studies found during the records search are generally regional-scale academic and research studies or focused on areas to the west of the current APE. Report S-038865, completed in 2011, was a Cultural Resources Inventory of Caltrans District 1 Rural Conventional Highways in Del Norte, Humboldt, Mendocino and Lake Counties. That inventory resulted in the documentation of the only cultural resource that has previously been recorded within the study area (**Table 2**).

Table 2
PREVIOUSLY DOCUMENTED RESOURCES WITHIN THE STUDY AREA

Primary	Trinomial	Description	Year	Author(s)	Affiliation
P-12-003233	N/A.	Historic Highway	2011	Andrew Hope	Caltrans

Resource P-12-003233 represents State Route 254 in Humboldt County, also known as Avenue of the Giants. The resource is a two-lane highway approximately 32 miles in length. Its 2011 documentation recommends that the resource is not eligible for listing in the NRHP or the CRHR. P-12-003233 intersects the western portion of the current study area but comes no closer than 600 feet to the APE.

Additional Historical Information

The 1922 Atlas of Humboldt County, California (Belcher Abstract & Title Co. 1922) indicates that the parcel containing the APE was owned at the time by John H. Mercer. Reviews of additional sources of information, including the California Inventory of Historic Resources, the Built Environment Resources Directory, Archaeological Determinations of Eligibility, and GLO Plat Maps, failed to yield any additional information about the history of the project area.

NATIVE AMERICAN OUTREACH

On December 21, 2020, HELIX requested that the Native American Heritage Commission (NAHC) conduct a search of their Sacred Lands File for the presence of Native American sacred sites or human remains in the vicinity of the proposed project area. A written response received from the NAHC on December 22, 2020, stated that the Sacred Lands File failed to indicate the presence of Native American cultural resources in the vicinity of the APE.

On December 28, 2020, HELIX sent letters to three Native American contacts that were recommended by the NAHC as potential sources of information related to cultural resources in the vicinity of the project area:

- Edward Bowie, Cultural Liaison, Bear River Band of Rohnerville Rancheria
- Erika Cooper, Tribal Historic Preservation Officer, Bear River Band of Rohnerville Rancheria
- Josefina Cortez, Chairwoman, Bear River Band of Rohnerville Rancheria

The letters advised the tribes and specific individuals of the proposed project and requested information regarding cultural resources in the immediate area, as well as any feedback or concerns related to the proposed project. As of the date of this report, one response has been received: Ms. Erika Cooper, Tribal Historic Preservation Officer of the Bear River Band of the Rohnerville Rancheria, replied via emial on February 19, 2021. Ms. Cooper did not offer any comments or recommendations related to the proposed project, but requested a point of contact for the project's lead agency, clarification of the project's regulatory framework, and an update on the results of the records search. This requested information was provided to Ms. Cooper via email response on February 22, 2021.

Documentation related to Native American coordination is included as **Attachment C**.

INTENSIVE PEDESTRIAN SURVEY

On November 11, 2020, HELIX Staff Archaeologist, Jentin Joe, conducted a pedestrian survey to characterize any prehistoric or historic-era archaeological resources located within the APE. During the survey the ground surface throughout the APE was examined for the presence of historic-era artifacts (e.g., metal, glass, ceramics), prehistoric artifacts (e.g., flaked stone tools, tool-making debris), and other features that might represent human activity that took place more than 50 years ago. A 20-foot buffer

was also surveyed around all proposed project elements, and a 10-foot buffer was surveyed on either side of the dirt road where the 8-inch fire suppression service pipeline would run. Survey photographs are presented in **Attachment D**.

The topography of the project area can be roughly divided into two zones. The lower zone is a relatively flat plain adjacent to the South Fork Eel River and west of State Route 254. This area has been improved, and contains residences, farm structures, agricultural crops, and trees. Soils in the lower zone consist of nonmarine fluvial terrace deposits that are uplifted remnants of the former Eel River channel and flood plain. The upper zone, located east of State Route 254, exhibits slopes measuring from 18 to 34 degrees. Those slopes are moderately to heavily timbered and have a thick understory of smaller trees, shrubs, and vines that severely limited surface visibility during the survey (**Photograph 1**). Soils in the upper zone are moderately lithified sedimentary deposits overlain by landslide deposits. Access roads and residential structures are present locally across these slopes, and former skid trails and landings can be observed in various locations (Bajada 2020).

Landslides are present throughout the region and within the CSD service area. Recent or active landslide deposits underlie most of the APE, including the spring and proposed tank and pump station locations. Bajada (2020:14) determined that "the landslide underlying the spring and proposed tank site has geomorphology indicative of an earth flow and could be actively creeping on an annual and seasonal basis… the geomorphology of the landslide underlying the proposed pump station appears older, implying that the landslide is dormant."

The existing spring source collection system and associated pipe gallery and overflow tank are built into a hillside at the northeastern end of the APE (**Photograph 2**). The spring is contained within a pond liner and clay fill soil has been used for stabilization due to the high landslide risk in the area. The spring was accessed from the east by a heavily rutted dirt road off of Rock Pit Lane, which features a large gravel staging area at its terminus.

The spring WTP, also near the northeastern end of the APE, consists of a gravel pad with three 3,000-gallon water storage tanks and an associated water treatment building **(Photograph 3**). All proposed alterations to the spring WTP would remain within the current footprint of the WTP. The site is accessed via a steep gravel road off of Spring Canyon Road that represents the alignment of the proposed 8-inch fire suppression service pipeline (**Photograph 4**).

A 140,000-gallon water storage tank and associated infrastructure is located at the southern end of the APE, off of Ascending Lane (**Photograph 5**). The proposed booster pump station would be installed in a CMU block building in front of the water storage tank. An additional water storage tank is proposed to be installed on a site located off of Spring Canyon Road. The potential tank site is located on a graded, gravel pad covered in a geotextile tarp (**Photograph 6**), while the well house and associated infrastructure are located in Phillipsville on the east side of the Avenue of the Giants Highway (**Photograph 7**).

The entirety of the APE was surveyed, but no prehistoric or historic-era artifacts or features were found.

CONCLUSIONS AND RECOMMENDATIONS

The records search determined that one previous study has characterized the current APE. Report S-045088, the Final Mitigated Negative Declaration for the Phillipsville Community Services District, was completed in 2007 and addressed the alignment that contains the existing 3-inch pipeline and transmission line and would contain the proposed 8-inch fire suppression service pipeline. That study did not find any cultural resources within the current APE.

The only resource previously documented within the study area is P-12-003233, which represents State Route 254 (also known as Avenue of the Giants) in Humboldt County. In 2011 the highway was recommended ineligible for listing in both the NRHP and the CRHR. P-12-003233 intersects the western portion of the current study area but comes no closer than 600 feet to the APE.

The results of HELIX's Native American outreach remain inconclusive – a search of the Sacred Lands File by the NAHC did not indicate that sensitive Native American resources are located in the area, although none of the tribes or individuals contacted by HELIX have responded with specific information about the area.

No cultural resources were found during the survey and the majority of the APE is underlain by recent and/or active landslide deposits on steep slopes, suggesting that the likelihood of encountering intact, surficial or shallowly buried archaeological materials during project implementation is low. Given these findings the APE should be considered to have a low sensitivity for cultural resources at the grading and excavation depths planned for the proposed project. Because ground visibility in portions of the APE was poor during the survey, HELIX has provided the recommendations below to minimize the potential for undiscovered historic properties or historical resources, if they exist, to be adversely affected during project implementation.

Inadvertent Discoveries

In the event that cultural resources are exposed during ground-disturbing activities, construction activities should be halted in the immediate vicinity of the discovery. If the site cannot be avoided during the remainder of construction, an archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards should then be retained to evaluate the find's eligibility for inclusion in the NRHP and/or CRHR. If the discovery proves to be significant, additional work, such as data recovery excavation, may be warranted and should be discussed in consultation with the SWRCB.

Treatment of Human Remains

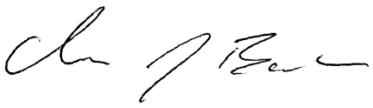
Although there is no evidence to suggest the presence of human remains, their discovery is always a possibility during a project. If such an event did occur, the specific procedures outlined by the NAHC, in accordance with Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the Public Resources Code, will be followed:

1. All excavation activities within 60-feet of the remains will immediately stop, and the area will be protected with flagging or by posting a monitor or construction worker to ensure that no additional disturbance occurs.
2. The project owner or their authorized representative will contact the County Coroner.

3. The coroner will have two working days to examine the remains after being notified in accordance with HSC 7050.5. If the coroner determines that the remains are Native American and are not subject to the coroner's authority, the coroner will notify NAHC of the discovery within 24 hours.
4. NAHC will immediately notify the Most Likely Descendant (MLD), who will have 48 hours after being granted access to the location of the remains to inspect them and make recommendations for treatment of them. Work will be suspended in the area of the find until the senior archaeologist approves the proposed treatment of human remains.
5. If the coroner determines that the human remains are neither subject to the coroner's authority nor of Native American origin, then the senior archaeologist will determine mitigation measures appropriate to the discovery.

Should you have any questions regarding our approach, methodology, results or conclusions, please do not hesitate to contact me.

Sincerely,



Clarus J. Backes, Jr., RPA
Senior Archaeologist
HELIX Environmental Planning, Inc.

Attachments (4):

Attachment A – Regulatory Framework
Attachment B – Figures
Attachment C – Native American Correspondence
Attachment D – Representative Site Photos

REFERENCES

Bajada Geosciences, Inc. 2020. Preliminary (Desktop) Geotechnical Report: Phillipsville Community Services District Water System Improvement Project, Humboldt County, California. Report prepared for the Phillipsville Community Services District.

Belcher Abstract & Title Co. 1922. Atlas of Humboldt County, California compiled from official records and private sources and surveys. On file at the Northwest Information Center, Sonoma State University.

Attachment A

Regulatory Framework

Regulatory Framework

Federal Regulations

National Environmental Policy Act

The National Environmental Policy Act (NEPA) and its supporting federal regulations establish certain requirements that must be adhered to for any action "financed, assisted, conducted or approved by a federal agency." In making a decision on the issuance of federal grant monies or a permit to conduct work on federal lands for components of the proposed action, the federally designated lead agency pursuant to NEPA is required to "determine whether the proposed action may significantly affect the quality of the human environment." NEPA requires the systematic evaluation of potential environmental impacts of a proposed action and alternative actions, the identification of adverse effects, and consultation with any federal agency that has jurisdiction by law or special expertise with respect to any environmental impact involved. With regard to cultural resources, NEPA states, "It is the continuing responsibility of the Federal Government to use all practicable means . . . to preserve important historic, cultural, and natural aspects of our national heritage." (42 USC 4331). The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP, or may cause loss or destruction of significant scientific, cultural, or historical resources, must be considered (40 CFR 1508.27(b)8).

National Historic Preservation Act of 1966 (16 USC 470)

Enacted in 1966, the NHPA declared a national policy of historic preservation and instituted a multifaceted program, administered by the Secretary of the Interior, to encourage the achievement of preservation goals at the federal, state, and local levels. The NHPA authorized the expansion and maintenance of the National Register of Historic Places (NRHP), established the position of SHPO and provided for the designation of State Review Boards, set up a mechanism to certify local governments to carry out the purposes of the NHPA, assisted Native American tribes in preserving their cultural heritage, and created the Advisory Council on Historic Preservation (ACHP).

Section 106

Section 106 of the NHPA states that federal agencies with direct or indirect jurisdiction over federally funded, assisted, or licensed undertakings must take into account the effect of the undertaking on any historic property that is included in or eligible for inclusion in the NRHP, and that the ACHP must be afforded an opportunity to comment on such undertakings through a process outlined in 36 CFR Part 800. The Section 106 process involves the identification of significant historic and archaeological resources ("historic properties") within an APE, the determination of whether the undertaking will cause an adverse effect on historic properties, and the resolution of those adverse effects through execution of a Memorandum of Agreement. In addition to the ACHP, interested members of the public—including individuals, organizations,

and agencies (such as the California Office of Historic Preservation)—are provided with opportunities to participate in the process.

National Register of Historic Places

The NRHP was established by the NHPA of 1966 as "an authoritative guide to be used by federal, state, and local governments, private groups, and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment" (36 CFR 60.2).

The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. A property is eligible for the NRHP if it is significant under one or more of the following criteria:

- Criterion A: It is associated with events that have made a significant contribution to the broad patterns of our history.
- Criterion B: It is associated with the lives of persons who are significant in our past.
- Criterion C: It embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D: It has yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

Cemeteries, birthplaces, graves of historic figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, and properties that are primarily commemorative in nature are not considered eligible for the NRHP unless they satisfy certain conditions. In general, a resource must be at least 50 years old to be considered for the NRHP, unless it satisfies a standard of exceptional importance.

Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) sets provisions for the inadvertent discovery and/or intentional removal of human remains and other cultural items from federal and tribal lands. It clarifies the ownership of human remains and sets forth a process for repatriation of human remains and associated funerary objects and sacred religious objects to the Native American groups claiming to be lineal descendants or culturally affiliated with the remains or objects. It requires any federally funded institution housing Native American remains or artifacts to compile an inventory of all cultural items within the museum or with its agency and to provide a summary to any Native American tribe claiming affiliation.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act of 1978 (AIFRA) was enacted to protect and preserve the traditional religious rights and cultural practices of Native Americans. These rights include, but are not limited to, access of sacred sites, freedom to worship through ceremonial and traditional rights and use, and possession of objects considered sacred. The AIFRA requires that federal agencies evaluate their actions and policies to determine if changes are needed to ensure that Native American religious rights and practices are not disrupted by agency practices. Such evaluations are made in consultation with native traditional religious leaders.

State Regulations

California Environmental Quality Act

Pursuant to CEQA, a historical resource is a resource listed in, or eligible for listing in, the California Register of Historical Resources (CRHR). In addition, resources included in a local register of historic resources, or identified as significant in a local survey conducted in accordance with state guidelines, are also considered historic resources under CEQA, unless a preponderance of the facts demonstrates otherwise. According to CEQA, the fact that a resource is not listed in, or determined eligible for listing in, the CRHR, or is not included in a local register or survey, shall not preclude a Lead Agency, as defined by CEQA, from determining that the resource may be a historic resource as defined in California Public Resources Code (PRC) Section 5024.1.7.

CEQA applies to archaeological resources when (1) the historic or prehistoric archaeological resource satisfies the definition of a historical resource, or (2) the historic or prehistoric archaeological resource satisfies the definition of a "unique archaeological resource." A unique archaeological resource is an archaeological artifact, object, or site that has a high probability of meeting any of the following criteria (PRC § 21083.2(g)):

1. The archaeological resource contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
2. The archaeological resource has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. The archaeological resource is directly associated with a scientifically recognized important prehistoric or historic event or person.

California Register of Historical Resources

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC § 5024.1(a)). Certain properties, including those listed in or formally determined eligible for listing in the National Register of Historic Places (NRHP) and California Historical Landmarks (CHLs) numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical

Interest program, identified as significant in historic resources surveys, or designated by local landmarks programs may be nominated for inclusion in the CRHR.

A resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria (PRC § 5024.1(c)):

> Criterion 1: It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
>
> Criterion 2: It is associated with the lives of persons important in our past.
>
> Criterion 3: It embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values.
>
> Criterion 4: It has yielded, or may be likely to yield, information important in history or prehistory.

Resources nominated to the CRHR must retain enough of their historic character or appearance to be recognizable as historic resources and to convey the reasons for their significance. It is possible that a resource whose integrity does not satisfy NRHP criteria may still be eligible for listing in the CRHR. A resource that has lost its historic character or appearance may still have sufficient integrity for the CRHR if, under Criterion 4, it maintains the potential to yield significant scientific or historical information or specific data. Resources that have achieved significance within the past 50 years also may be eligible for inclusion in the CRHR, provided that enough time has lapsed to obtain a scholarly perspective on the events or individuals associated with the resource.

Native American Heritage Commission

Section 5097.91 of the PRC established the Native American Heritage Commission (NAHC), whose duties include the inventory of places of religious or social significance to Native Americans and the identification of known graves and cemeteries of Native Americans on private lands. Under Section 5097.9 of the PRC, a State policy of noninterference with the free expression or exercise of Native American religion was articulated along with a prohibition of severe or irreparable damage to Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines located on public property. Section 5097.98 of the PRC specifies a protocol to be followed when the NAHC receives notification of a discovery of Native American human remains from a county coroner.

Government Code Sections 6254(r) and 6254.10

These sections of the California Public Records Act were enacted to protect archaeological sites from unauthorized excavation, looting, or vandalism. Section 6254(r) explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission." Section 6254.10

specifically exempts from disclosure requests for "records that relate to archaeological site information and reports, maintained by, or in the possession of the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a Native American tribe and a state or local agency."

Health and Safety Code, Sections 7050 and 7052

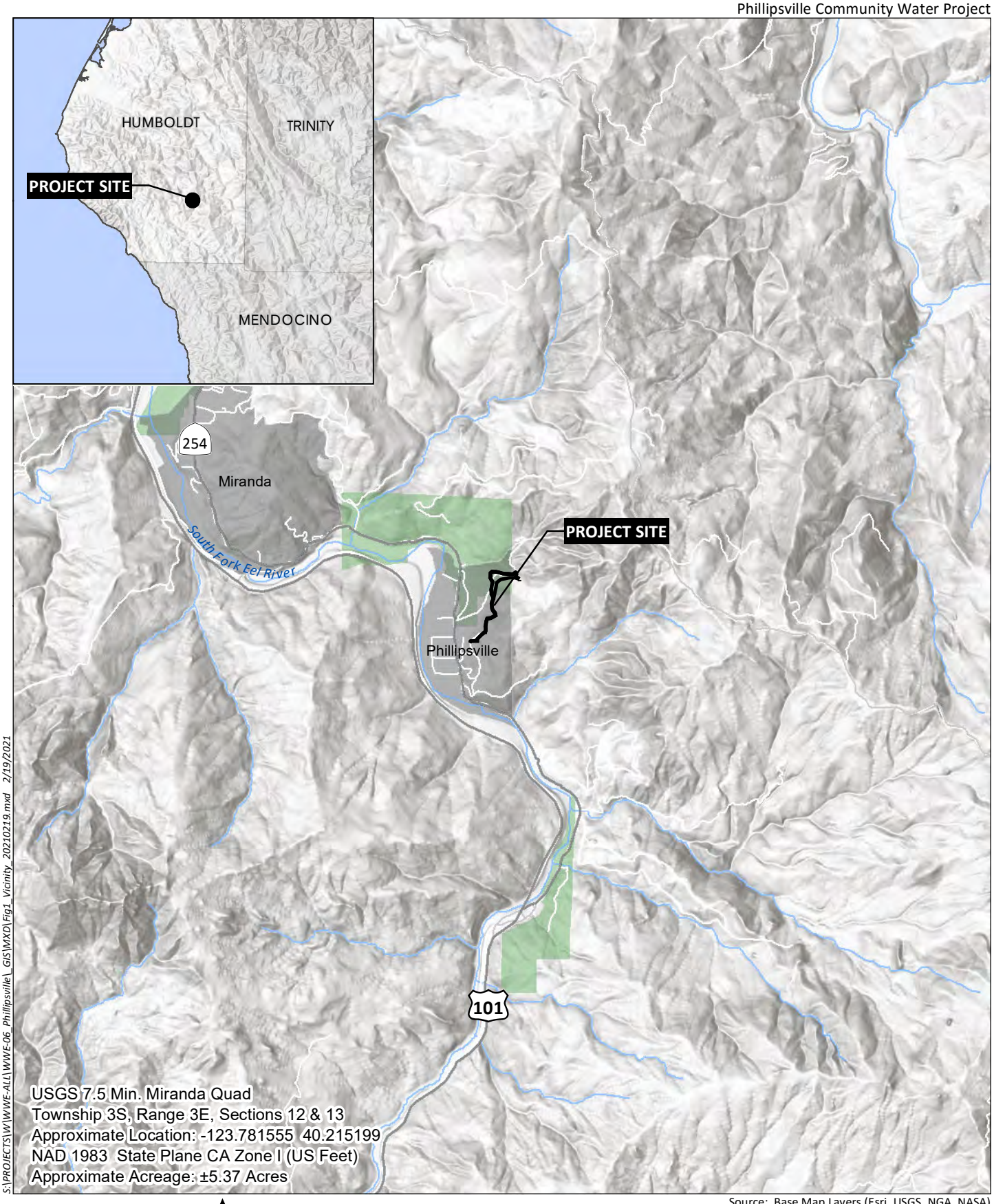
Health and Safety Code, Section 7050.5 declares that, in the event of the discovery of human remains outside of a dedicated cemetery, all ground disturbance must cease and the county coroner must be notified. Section 7052 establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives.

Penal Code, Section 622.5

Section 622.5 of the Penal Code provides misdemeanor penalties for injuring or destroying objects of historic or archaeological interest located on public or private lands, but specifically excludes the landowner.

Attachment B

Figures



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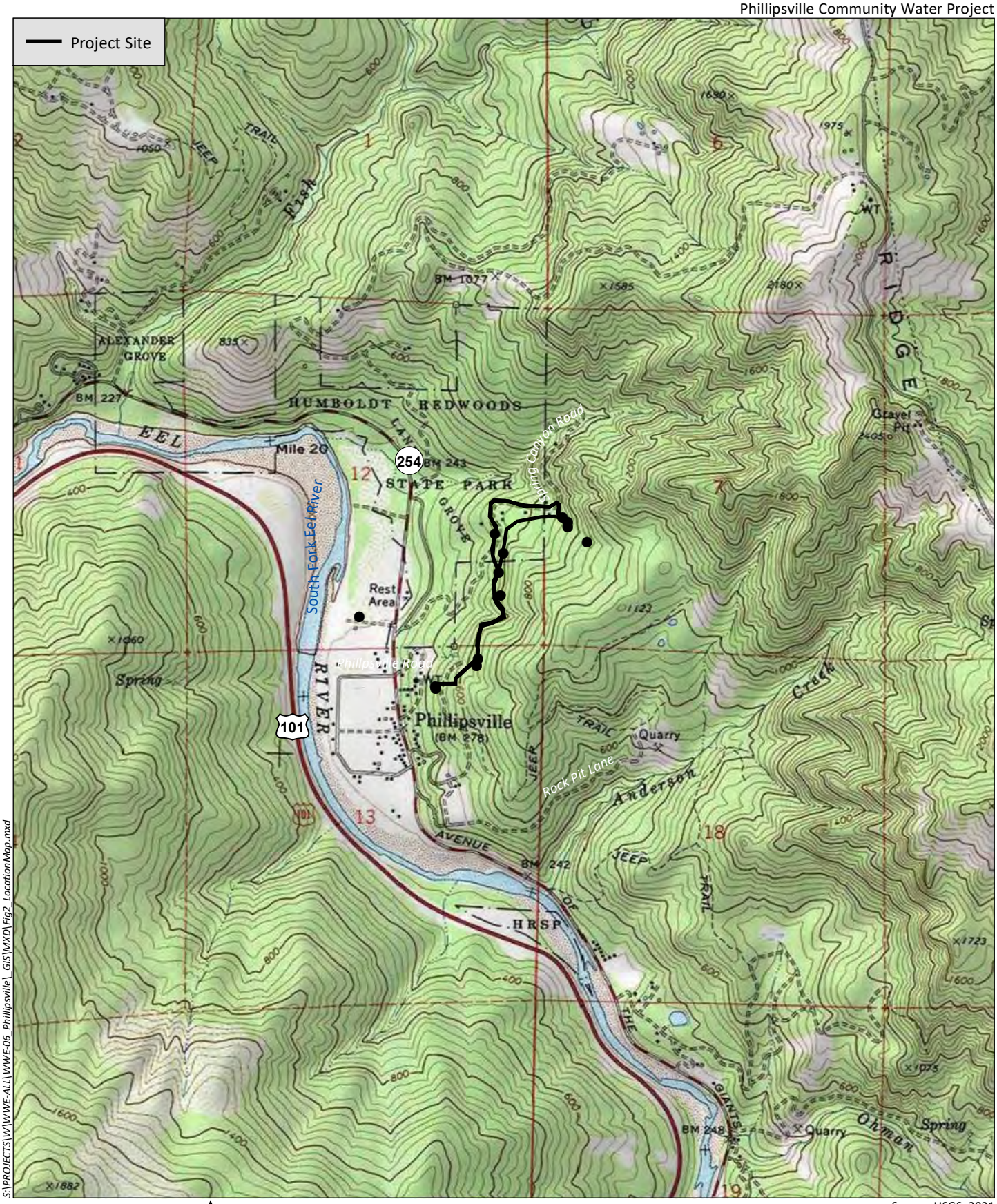
Source: Base Map Layers (Esri, USGS, NGA, NASA)

HELIX Environmental Planning

Vicinity Map

Figure 1



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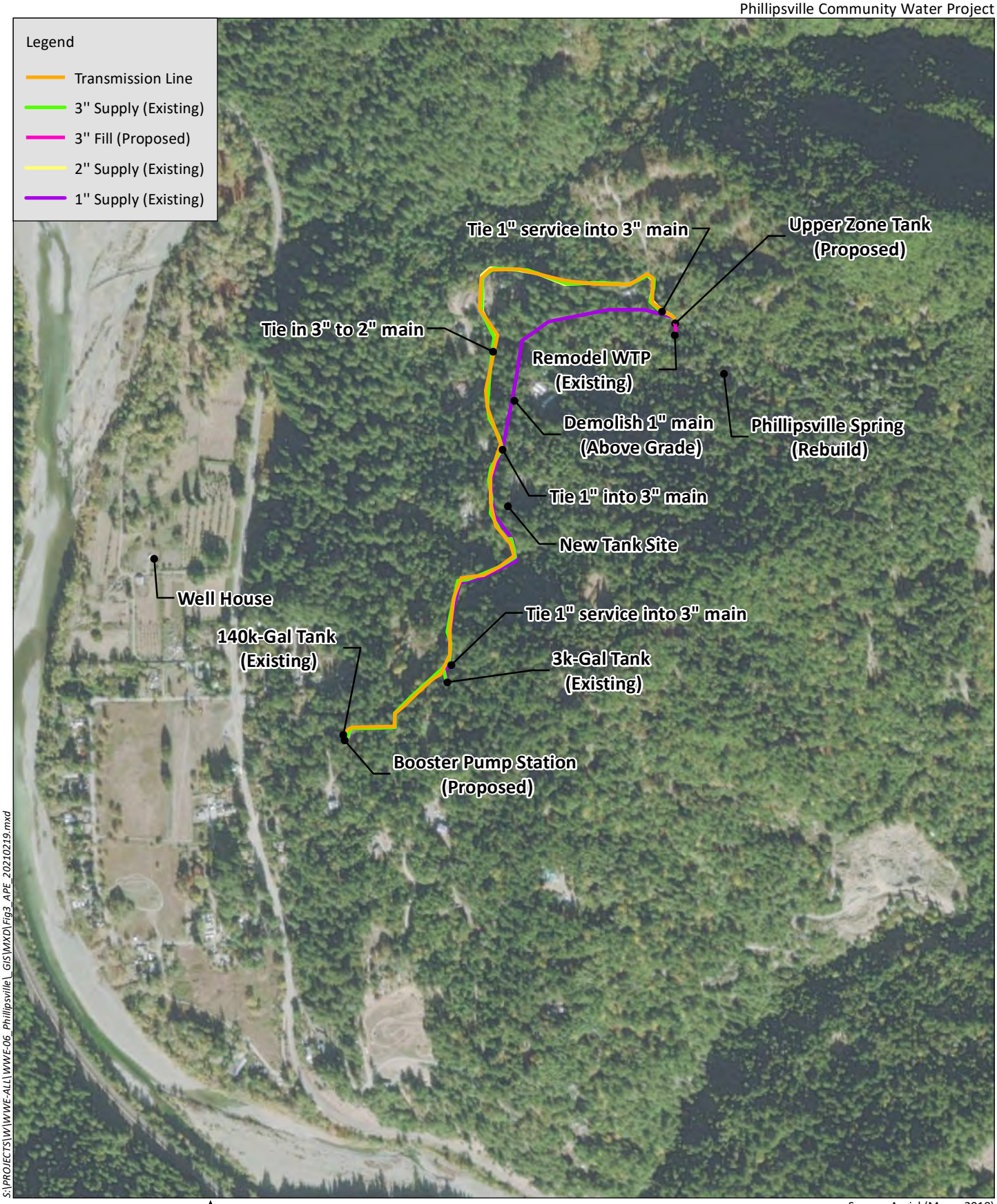
Source: USGS, 2021

HELIX Environmental Planning

Project Location Map

Figure 2



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Area of Potential Effect (APE)

Figure 3

Attachment C

Native American Correspondence

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

January 21, 2021

Clarus Backes

HELIX Environmental Planning

Via Email to:clarusb@helixepi.com

Re: WWE-06 Phillipsville Community Water Project, Humboldt County

Dear Mr. Backes:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez-Lopez
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Humboldt County
1/21/2021

Bear River Band of Rohnerville Rancheria
Erika Cooper, Tribal Historic Preservation Officer
266 Keisner Road
Loleta, CA, 95551
Phone: (707) 733 - 1900
Fax: (707) 733-1723

Mattole
Wiyot

Bear River Band of Rohnerville Rancheria
Josefina Cortez, Chairwoman
266 Keisner Road
Loleta, CA, 95551
Phone: (707) 733 - 1900
Fax: (707) 733-1723

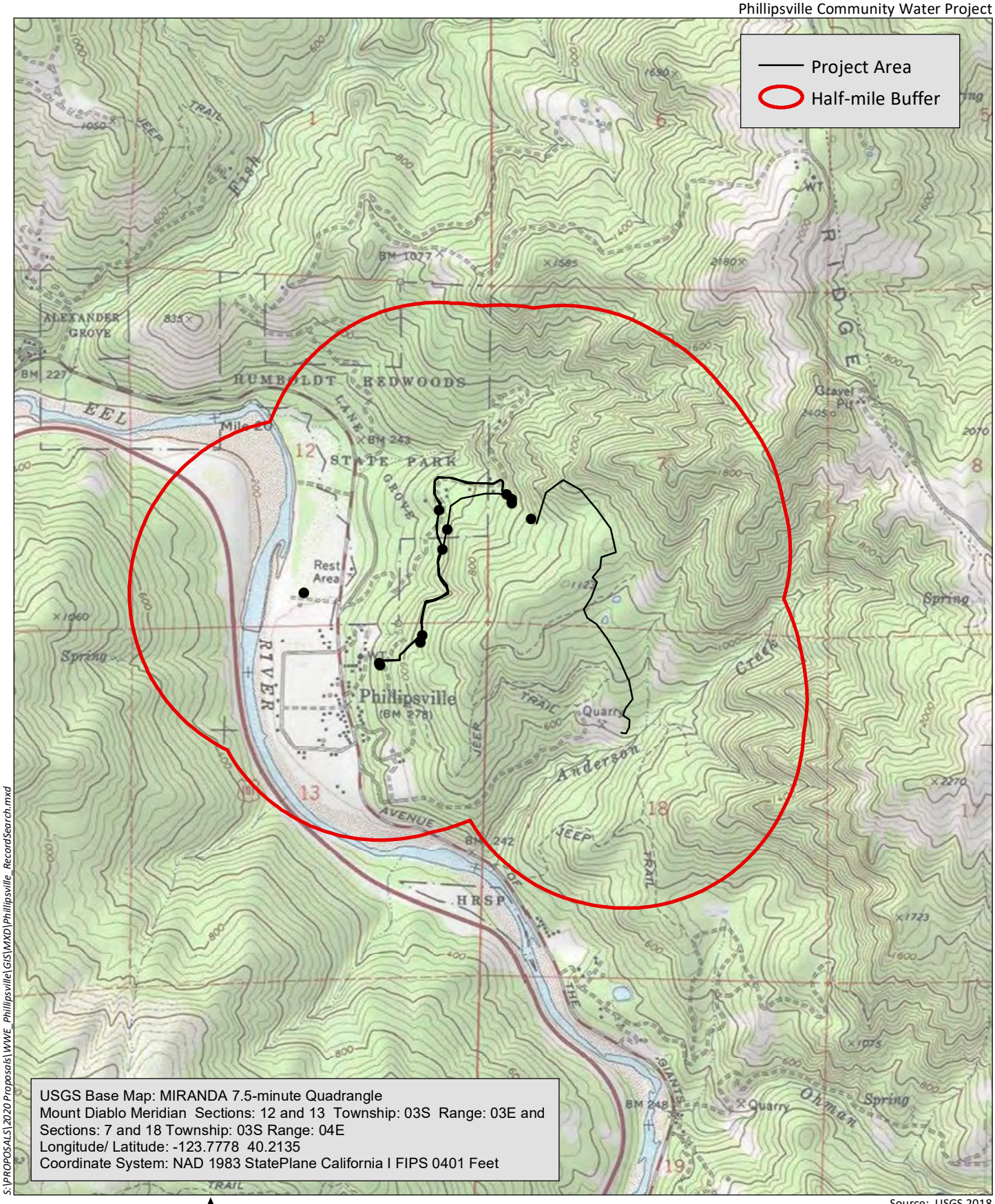
Mattole
Wiyot

Bear River Band of the Rohnerville Rancheria
Edward Bowie, Cultural Liaison
266 Keisner Rd.
Loleta, CA, 95551
Phone: (707) 733 - 1900
Fax: (707) 733-1723

Mattole
Wiyot

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed WWE-06 Phillipsville Community Water Project, Humboldt County.



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Source: USGS 2018

HELIX Environmental Planning

Half-mile Record Search Map

Exhibit A

HELIX Environmental Planning, Inc.
11 Natoma Street
Suite 155
Folsom, CA 9530
916.365.8700 **tel**
619.462.0552 **fax**
www.**helixepi**.com

December 29, 2020

Edward Bowie, Cultural Liaison
Bear River Band of Rohnerville Rancheria
266 Keisner Road
Loleta, CA 95551

Subject: WWE-06, Phillipsville Community Water Project

Dear Mr. Bowie,

HELIX Environmental Planning, Inc. (HELIX) has contracted with Water Works Engineers, LLC to provide a Cultural Resources Assessment in support of the proposed Phillipsville Community Water Project (project) located in Humboldt County, California. A search of the Native American Heritage Commission's (NAHC) Sacred Lands File yielded a negative result for the project, and the NAHC has suggested we contact you for information regarding Native American resources in or near the project area.

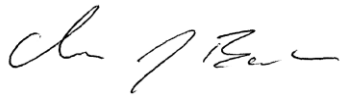
The Phillipsville Community Services District (PCSD) serves approximately 300 residents from two water sources: a spring and a well. A potable water treatment system for the spring was installed in 2012, and while the system is adequate to meet surface water treatment standards, there is inadequate chlorine contact time. This project is needed to assess the current condition of the spring source and evaluate potential improvements to address slope stability, treatment system deficiencies, water storage, chlorine contact time requirements, and adequate water supply during summer months. The proposed project includes an evaluation of the system conditions and an analysis of alternatives to improve drinking water supply and water quality. Specific project improvements may include but are not limited to: Physical improvements to the existing groundwater spring; approximately 1-mile of surface roadway improvement to the unnamed spring access road, including grading and felled tree clearance; system improvements to the existing water treatment plant building, footprint, and piping; installation of water storage facilities to increase system redundancy and to provide for necessary fire flows; and minor modifications to existing distribution piping and trenching for new transmission main. Work may include felling of mature, native trees and minor trenching/grading.

The project would be located in Township 3S, Range 3E, Sections 12 and 13; and Township 3S, Range 4E, Sections 7 and 18, as shown on the Miranda, CA USGS 7.5' topographic quadrangle.

If there are sensitive resources on or near the proposed project location that could be impacted by construction activities please advise us accordingly. If you have any information, questions, or

concerns regarding the proposed project, please feel free to contact me directly at (916) 365-8700 or clarusb@helixepi.com.

Sincerely,



Clarus J. Backes Jr., M.A., RPA
Cultural Resources Group Manager
HELIX Environmental Planning, Inc.

HELIX Environmental Planning, Inc.
11 Natoma Street
Suite 155
Folsom, CA 9530
916.365.8700 **tel**
619.462.0552 **fax**
www.**helixepi**.com

December 29, 2020

Erika Cooper, Tribal Historic Preservation Officer
Bear River Band of Rohnerville Rancheria
266 Keisner Road
Loleta, CA 95551

Subject: WWE-06, Phillipsville Community Water Project

Dear Ms. Cooper,

HELIX Environmental Planning, Inc. (HELIX) has contracted with Water Works Engineers, LLC to provide a Cultural Resources Assessment in support of the proposed Phillipsville Community Water Project (project) located in Humboldt County, California. A search of the Native American Heritage Commission's (NAHC) Sacred Lands File yielded a negative result for the project, and the NAHC has suggested we contact you for information regarding Native American resources in or near the project area.

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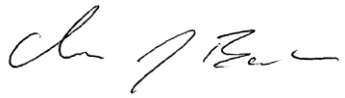

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December 29, 2020

Josefina Cortez, Chairwoman
Bear River Band of Rohnerville Rancheria
266 Keisner Road
Loleta, CA 95551

Subject: WWE-06, Phillipsville Community Water Project

Dear Chairwoman Cortez,

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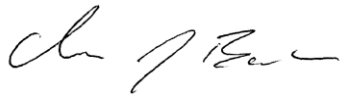

Clarus J. Backes Jr., M.A., RPA
Cultural Resources Group Manager
HELIX Environmental Planning, Inc.

From: Erika Cooper
To: Clarus Backes
Subject: WWE-06 Phillipsville Community Water Project
Date: Friday, February 19, 2021 8:31:53 AM

Hello Clarus,

Thank you for reaching out regarding the subject project, for which I understand Helix will be conducting a cultural resources study. To begin, please provide both a point of contact for the lead agency for the project and clarification on the regulatory framework of the project. An update on the results of your records search would be useful as well, as there are likely recent nearby surveys that have not been filed with the information center yet.

Erika Cooper
Tribal Historic Preservation Officer

Bear River Band of the Rohnerville Rancheria
266 Keisner Road | Loleta, CA 95551
O: 707-733-1900 x233 | M: 707-502-5233

From: Clarus Backes
To: "Erika Cooper"
Subject: RE: WWE-06 Phillipsville Community Water Project
Date: Monday, February 22, 2021 10:06:00 AM

Ms. Cooper,

Thank you for responding to our request for comments about the Phillipsville Community Water Project. The project will be subject to the requirements of both Section 106 and CEQA, with the State Water Resources Control Board acting as lead agency. Here is the information for our point of contact:

Andrew Stoltenberg
Water Resource Control Engineer
Work Phone: 916-341-5686
Cell Phone: 916-578-4424
Small DAC Coastal Unit
Division of Financial Assistance
Andrew.Stoltenberg@waterboards.ca.gov

Regarding the records search, HELIX requested data for the APE with a 0.5-mile buffer. Only one resource has been recorded in the records search area: P-12-003233 represents State Route 254 (Avenue of the Giants) in Humboldt County. The resource is a two-lane highway approximately 32 miles in length. Its 2011 documentation recommends that the resource is not eligible for listing in the NRHP or the CRHR. P-12-003233 intersects the western portion of the current study area, but comes no closer than 600 feet to the APE.

We also determined that 16 studies have previously been conducted within the records search study area. Only one survey directly investigated portions of the current APE: Report S-045088, the *Final Mitigated Negative Declaration for the Phillipsville Community Services District*, was completed in 2007 by T. Lasbury for the Phillipsville Community Services District and addressed the majority of the current APE as well as portions of Phillipsville. The study did not find any cultural resources within the APE. We would welcome any information you can give regarding other studies that have intersected the APE but may not have shown up in our records search.

Best regards,
Clarus Backes

Clarus Backes, RPA
Cultural Resources Group Manager

HELIX Environmental Planning, Inc.
11 Natoma Street
Suite 155
Folsom, CA 95630
916.365.8700 **tel**
323.974.9165 **cell**

From: Robert Edgerton
To: erikacooper@brb-nsn.gov
Cc: Sheila Magladry
Subject: WWE-06 Phillipsville Community Services District Water Project
Date: Thursday, March 18, 2021 11:20:00 AM

Dear Ms. Cooper –

On behalf of the Phillipsville Community Services District (PCSD) we previously contacted you regarding proposed improvements to an existing water system owned/operated by PCSD in the community of Phillipsville. You responded to our information request on February 19, 2021 seeking the name of the Lead Agency point of contact and clarification on the regulatory framework. On February 22, 2021 we responded (please see email chain below). Please note that as of the date of this email the PCSD has been identified as the new Lead Agency for the proposed project with the State Water Resources Control Board identified as a CEQA Responsible Agency. For your information, the new Lead Agency contact information is as follows:

Ms. Bonnie Mulanney
General Manager
Phillipsville Community Services District
PO Box 24
Phillipsville, CA 95559
Office@phillipsvillecsd.org
707-932-0800

Clarifying information regarding the proposed project's regulatory framework was provided on February 21, 2021 as outlined below. We again respectfully invite the Bear River Band of the Rohnerville Rancheria to provide any information you wish to share regarding other cultural resource studies and/or tribal cultural resources that should be brought to the attention of the Lead Agency. Thank you very much in advance for your consideration and reply. Sincerely,

Robert Edgerton, AICP CEP
Principal Planner

HELIX Environmental Planning, Inc.
11 Natoma Street, Suite 155
Folsom, CA 95630
916.365.8700 **tel**
916.709.2302 **cell**
RobertE@helixepi.com
helixepi.com | LinkedIn | Facebook | Twitter

From: Erika Cooper
To: Robert Edgerton
Cc: Sheila Magladry
Subject: Re: WWE-06 Phillipsville Community Services District Water Project
Date: Thursday, March 18, 2021 3:33:30 PM

Thank you for the updated contact information.

Has the field survey been completed yet? If so, please send a copy of the report.

Erika Cooper
Tribal Historic Preservation Officer

Bear River Band of the Rohnerville Rancheria
266 Keisner Road | Loleta, CA 95551
O: 707-733-1900 x233 | M: 707-502-5233

From: Robert Edgerton
To: Erika Cooper
Cc: Sheila Magladry
Subject: RE: WWE-06 Phillipsville Community Services District Water Project
Date: Thursday, March 18, 2021 3:47:00 PM
Attachments: WWE-06 CRAR_22FEB21_red.pdf

Hi, Ms. Cooper –

The Cultural Resources Assessment Report for the proposed project is attached for your reference. Thank you, Robert

Attachment D

Representative Site Photos

Photograph 1. Typical vegetation within the APE, looking west. Photo taken November 11, 2020.

Photograph 2. Spring overview, looking west. Photo taken November 11, 2020.

Photograph 3. Spring water treatment plant, looking south. Photo taken November 11, 2020.

Photograph 4. Gravel road from Spring Canyon Road to the spring, looking southeast. Photo taken November 11, 2020.

Photograph 5. 140,000 gallon water storage tank, looking north. Photo taken November 11, 2020.

Photograph 6. Proposed water storage tank location, looking north. Photo taken November 11, 2020.

Photograph 7. Well house and associated infrastructure, looking north-northwest. Photo taken November 11, 2020.

Appendix E

Mitigation Monitoring and Reporting Program

MITIGATION MONITORING AND REPORTING PROGRAM
PHILLIPSVILLE COMMUNITY SERVICES DISTRICT WATER SYSTEM IMPROVEMENTS

Purpose of Mitigation Monitoring and Reporting Program: The California Environmental Quality Act (CEQA), Public Resources Code Section 21081.6, requires that a Mitigation Monitoring and Reporting Program (MMRP) be established upon completing findings. CEQA stipulates that "the public agency shall adopt a reporting or monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation."

This MMRP has been prepared in compliance with Section 21081.6 of CEQA to ensure that all required mitigation measures are implemented and completed according to schedule and maintained in a satisfactory manner during the construction and operation of the project, as required. A table (attached) has been prepared to assist the responsible parties in implementing the MMRP. The table identifies individual mitigation measures, monitoring/mitigation timing, the responsible person/agency for implementing the measure, and space to confirm implementation of the mitigation measures. The numbering of mitigation measures follows the numbering sequence found in the Initial Study and Mitigated Negative Declaration.

The Phillipsville Community Services District is the Lead Agency for the project under CEQA and shall administer and implement the MMRP. The PCSD is responsible for review of all monitoring reports, enforcement actions, and document disposition. The PCSD shall rely on information provided by the project site observers/monitors (e.g., construction manager, project manager, biologist, archaeologist, etc.) as accurate and up-to-date and shall provide personnel to field check mitigation measure status, as required.

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MITIGATION MONITORING AND REPORTING PROGRAM FOR THE PHILLIPSVILLE COMMUNITY SERVICES DISTRICT WATER SYSTEM IMPROVEMENTS

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
BIOLOGICAL RESOURCES				
Mitigation Measure BIO-01: Special Status Plants. Prior to any construction-related ground disturbance occurring in areas of suitable habitat for special status plants, focused surveys shall be completed to determine the presence or absence of these species on the project site. The surveys shall be floristic in nature and shall be seasonally timed to coincide with the blooming period of these species (May to September; white-flowered rein orchid) and (March to July; coast fawn lily). If special status species are not found during the focused surveys, then no further action is required. • If special status plants are documented on the site, a report shall be submitted to CNDDB to document the status of the species on the site. If the project is designed to avoid impacts to special status plant individuals and habitat, no further mitigation for these species would be necessary. • If special status plants are documented on the site and project impacts to these species are anticipated, consultation with CDFW shall be conducted to develop a mitigation strategy. The proponent shall notify CDFW, providing a complete description of the location, size, and condition of the occurrence, and the extent of proposed direct and indirect impacts to it. The project proponent shall comply with any mitigation requirements imposed by CDFW. Mitigation requirements could include but are not limited to, development of a plan to relocate the special-status plants (seed) to a suitable location outside of the impact area and monitoring the relocated population to demonstrate transplant success or preservation of this species or its habitat at an on or offsite location.	Pre-construction special status plant surveys shall be conducted during the bloom season for each plant.	Phillipsville Community Services District; potential coordination with California Department of Fish and Wildlife.		
Mitigation Measure BIO-02: Migratory Birds and Raptors. If project activities such as vegetation removal activities commence during the avian breeding season (February 1 – August 31), a qualified biologist shall conduct a pre-construction nesting bird survey no more than 7 days prior to initiation of project activities. The survey area shall include suitable raptor nesting habitat within 500 feet of the project boundary (inaccessible areas outside of the project site can be surveyed	Pre-construction migratory bird and raptor surveys shall be conducted between February 1 and August 31. No survey is	Phillipsville Community Services District; potential coordination with US Fish and		

from the site or from public roads using binoculars or spotting scopes). Pre-construction surveys are not required in areas where project activities have been continuous since prior to February 1, as determined by a qualified biologist. Areas that have been inactive for more than 14 days during the avian breeding season must be re-surveyed prior to resumption of project activities. If no active nests are identified, no further mitigation is required. If active nests are identified, the following measure shall be implemented: • A suitable buffer (e.g., northern spotted owl and marbled murrelet – coordinate with USFWS and CDFW; 300 feet for common raptors; 100 feet for non-raptors) shall be established by a qualified biologist around active nests and no construction / decommissioning activities within the buffer shall be allowed until a qualified biologist has determined that the nest is no longer active (i.e., the nestlings have fledged and are no longer reliant on the nest, or the nest has failed). Encroachment into the buffer may occur at the discretion of a qualified biologist. Any encroachment into the buffer shall be monitored by a qualified biologist to determine whether nesting birds are being impacted.	warranted for construction activities between September 1 and January 31.	Wildlife Service and/or California Department of Fish and Wildlife.		
CULTURAL RESOURCES				
Mitigation Measure CUL-01: **Inadvertent discoveries of cultural resources**. In the event that cultural resources are exposed during ground-disturbing activities, construction activities should be halted in the immediate vicinity of the discovery. If the site cannot be avoided during the remainder of construction, an archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards should then be retained to evaluate the find's eligibility for inclusion in the NRHP and/or CRHR. If the discovery proves to be significant, additional work, such as data recovery excavation, may be warranted and should be discussed in consultation with the Lead Agency.	Prior to and during construction – this mitigation measure shall be included in all construction documents for implementation during demolition or construction.	Phillipsville Community Services District; Archaeologist or Qualified Cultural Resource Monitor; Construction Contractor		
Mitigation Measure CUL-02: Inadvertent discoveries of human remains. Although there is no evidence to suggest the presence of human remains, the discovery of human remains is always a possibility during a project. If such an event did occur, the specific procedures outlined by the NAHC, in accordance with Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the Public Resources Code, will be followed: 1. All excavation activities within 60-feet of the remains will immediately stop, and the area will be protected with flagging or by posting a monitor or construction worker to	Prior to and during demolition and construction – this mitigation measure shall be included in all construction documents for implementation during demolition or	Phillipsville Community Services District; Archaeologist or Qualified Cultural Resource Monitor;		

ensure that no additional disturbance occurs. 2. The project owner or their authorized representative will contact the County Coroner. 3. The coroner will have two working days to examine the remains after being notified in accordance with HSC 7050.5. If the coroner determines that the remains are Native American and are not subject to the coroner's authority, the coroner will notify NAHC of the discovery within 24 hours. 4. NAHC will immediately notify the Most Likely Descendant (MLD), who will have 48 hours after being granted access to the location of the remains to inspect them and make recommendations for treatment of them. Work will be suspended in the area of the find until the senior archaeologist approves the proposed treatment of human remains. 5. If the coroner determines that the human remains are neither subject to the coroner's authority nor of Native American origin, then the senior archaeologist will determine mitigation measures appropriate to the discovery.	construction.	Construction Contractor		
NOISE				
Mitigation Measure NOI-01: Construction related noise. The following shall be implemented during construction activities: • The operation of tools or equipment used in construction, drilling, repair, alteration or demolition shall only occur between the hours of 8 a.m. and 5 p.m. Monday through Friday, and between 9 a.m. and 5 p.m. on Saturdays. • No heavy equipment related to construction activities shall be allowed on Sundays or holidays. • All stationary and construction equipment shall be maintained in good working order and fitted with factory approved muffler systems.	Contractor shall be required to adhere to mitigation measure.	Phillipsville Community Services District.		
TRIBAL CULTURAL RESOURCES				
Mitigation Measure TCR-01: Unanticipated discovery of TCRs. If potentially significant TCRs are discovered during ground disturbing construction activities, all work shall cease within 50-feet of the find. A Native American Representative from traditionally and culturally affiliated Native American Tribes that requested consultation on the project shall be contacted and invited to assess the significance of the find and make recommendations for further evaluation and treatment, as necessary. If deemed necessary by the Lead Agency, a qualified cultural resources specialist meeting the Secretary of Interior's Standards and Qualifications for	Prior to and during demolition and construction – this mitigation measure shall be included in all construction documents for implementation during demolition or	Phillipsville Community Services District; Native American Representative/ Monitor or Qualified		

Archaeology, may also assess the significance of the find in joint consultation with Native American Representatives to ensure that tribal values are considered. Work at the discovery location cannot resume until the Lead Agency, in consultation as appropriate and in good faith, determines that the discovery is either not a TCR, or has been subjected to culturally appropriate treatment, if avoidance and preservation cannot be accommodated.	construction.	Cultural Resource Monitor; Construction Contractor		