ADDENDUM NO. 3
CITY OF FOLSOM
Water Treatment Plant Backwash and Recycled Water Capacity Project

ISSUED BY
THE CITY OF FOLSOM
ENVIRONMENTAL AND WATER RESOURCES DEPARTMENT

This addendum shall be considered part of the Project Manual for the City of Folsom Water Treatment Plant Backwash and Recycled Water Capacity Project.

General Comments:

1. Revise Specification Section 43 25 13 PUMPING EQUIPMENT – SUBMERSIBLE PUMPS to replace Article 2.4. K.5 with the following:

   - "5. Furnish guiding rail assembly and the discharge flange assembly with either an epoxy coated cast-iron or duplex stainless steel components."

2. Revise Specification Section 43 25 13 PUMPING EQUIPMENT – SUBMERSIBLE PUMPS to replace Article 2.4. K.7 with the following:

   - "7. Provide pump unit connecting to discharge connection with a simple downward motion without rotation. The entire weight of the pumping unit shall wedge tightly against the discharge elbow flange forming a seal."

The following questions have been submitted to the City following the Non-Mandatory Pre-Bid Meeting:

Question 1: Will a project sign be required for the project?

Response: No, a project sign will not be required as part of this project.

Question 2: Will SWPPP be required for this project?

Response: Included as Appendix A of the Project Manual are the SWPPP requirements for less than an acre.

Question 3: Will any permits be required by the City of Folsom, or any other agencies, not referenced within the spec. section?

Response: No other permits for this project are anticipated.

Question 4: ***Based on the small amount of concrete being replaced, will 'contractor' testing be required?***

Response: Special inspections will be provided by the City's construction management representative.

Question 5: ***Please confirm owner will be providing soil compaction testing for the project.***

Response: Special inspections will be provided by the City's construction management representative. If additional inspections are required due to compaction testing, welding inspections, etc. not passing then additional inspections and/or testing will be paid for by the contractor.

Question 6: ***Drawing G04; Temporary bypass piping referenced in Phase I (VII) and Phase 2 (II) will be connecting to the existing 12" RBW line. Please confirm.***

Response: Temporary bypass piping referenced on the plans will connect to the existing 12" RBW line as shown on the project drawings.

Question 7: ***Section 1 on D01 calls out the 12" RBW line as DIP, Section 1 on SP01 calls the pipe out as "PVC", what is the correct pipe type?***

Response: The new RBW piping is specified to be ductile iron pipe (DIP), while the old/existing 12" RBW piping is shown on the records drawings to be PVC.

Question 8: ***Does the City have a soils report available for the trenched and excavated areas of work?***

Response: Previous Water Treatment Plan geotechnical reports have been included as part of Addendum No.3 in Attachment 1.

Question 9: ***Drawing G04; Phase I (Item V), once the decant pumps draw down the maximum amount of water they can pump, how much water will be remaining in the basin (depth of water), for minor dewatering?***

Response: Based on the best available information, it is assumed there will be approximately three (3) feet of water depth remaining in the basin and decant pump station.

Question 10: ***Drawing G 04; Phase I (item V-A), how much 'sludge' should the Contractor expect (in volume) to be removed from each basin? Please identify by a drawing, showing the location of the sludge drying bed where the sludge will be disposed of.***

Response: There is approximately 22 inches of sludge at the northern end of the basin near the pump station and 10 inches of sludge at the southern end of the basin near the proposed 36" pipeline work. The intent for sludge removal is to relocate the sludge from the area of

proposed work (dry side) to the portion of the basin that is dammed off and will not have any work performed (wet side).

Question 11: ***Does the city of Folsom have an elevation or depth of sludge in the reclamation backwash basins that the contractor will need to remove?***

Response: There is approximately 22 inches of sludge at the northern end of the basin near the pump station and 10 inches of sludge at the southern end of the basin near the proposed 36" pipeline work.

Question 12: ***Will the City of Folsom be setting aside an onsite staging area for the performance of this work?***

Response: Updated 100% Drawings show location of allowable staging area at the Water Treatment Plant. Updated drawings have been included as part of Addendum No.3 in Attachment 2.

Question 13: ***On Drawing Sheet G04, Sequencing Notes, Phase 1, Item V. A., states the sludge in the bottom of the basins shall be pumped out to onsite sludge drying bed in order to completely clean the area surrounding the Decant PS to facilitate work.***

a. Can you clarify the exact area, depth, and volume of sludge to be removed?

b. The sludge underneath the cofferdam footprint will need to be removed prior to installing the cofferdam in order to get a good seal. This will be a lot of work to accomplish in a 24-hour shutdown. Can we do the cofferdam in one basin in one 24-hr shutdown, then the other basin in a separate 24-hr shutdown?

c. Can you clarify exactly where the drying bed is where the sludge will be placed?

d. Please confirm the City will drain the basins prior to sludge removal and cofferdam installations.

Response:

a. There is approximately 22 inches of sludge at the northern end of the basin near the pump station and 10 inches of sludge at the southern end of the basin near the proposed 36" pipeline work. Exact area and volume of sludge to be removed is dependent on contractor methods for cofferdam or other alternative methods of damming the work areas.
b. If more than one, 24 hour shut down is requested/required by the contractor, the timing must be coordinated with the Water Treatment Plant staff to allow for normal plant operations.
c. The intent for sludge removal is to relocate the sludge from the area of proposed work (dry side) to the portion of the basin that is dammed off and will not have any work performed (wet side).
d. The City will drain the basin to the lowest existing pumping level. Residual water that needs to be removed to allow for sludge removal or dam installation, etc. is the Contractor's responsibility.

Question 14: ***Phase III, Item III., can the removal of the 2 cofferdams be accomplished in 2 separate 24-hr shutdowns? One shutdown for each cofferdam removal.***

Response: Yes, two shutdowns to allow for construction are possible as long as there is seven (7) days minimum between shutdowns.

Question 15: ***Can the City please clarify the sequence of work in the plans?***

Response: Updated 100% Drawings have been included as part of Addendum No.3 in Attachment 2.

Question 16: ***Drawing Sheet C01, Note near middle of page states, "FIELD WELD 150# FLANGE ON EXISTING PIPE" and Detail 1, these do not appear to apply since this is within the new section of pipe. Please clarify.***

Response: On sheet C01, grid C-4, modify callout "FIELD WELD 150# FLANGE ON EXISTING PIPE" to "FLANGED CONNECTION TO ACCOMMODATE DISMANTLING JOINT, TYP OF 2" and delete detail 1 symbology. The flange in question, which is also shown in detail 3 for the dismantling joint, may be factory installed.

Question 17: ***In regard to this project per Plans page G04, under General Notes, section ii, part D requires the use of NSF-61 certified pumps for the temporary bypass. Only permanently installed pump options exist with the NSF-61 certification capable of handling the projects flow requirements. Temporary bypass pumps that meet this specification are very limited. Can the specification be revised to include additional pump options?***

Response: Only NSF-61 pumps that are for use in clean-water applications are allowed for work within the Water Treatment Plant and as part of this project.

Question 18: ***Tesco Controls is specified in 406113 -1.1A3, 406113-1.2B1, 406113-1.4B1, 406113-2.2A and 406113-3.1A for the Integration work on the project. Can Telstar be added as an alternative Integrator to Tesco?***

Response: Any licensed and qualified contractor is allowed to perform electrical work for the project. However, due existing infrastructure and SCADA controls, Tesco is required to perform the system integration as specified.

The changes detailed in this Addendum No.3, issued by the City of Folsom Environmental and Water Resources Department.

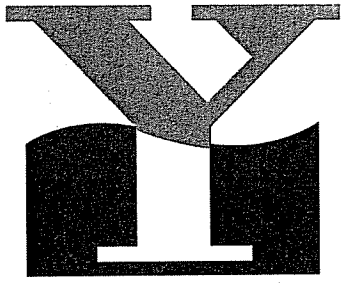
Date: 3/16/2022

Marcus Yasutake, PE
Environmental and Water Resources Director
City of Folsom

ATTACHMENT 1 – PREVIOUS WATER TREATMENT PLANT GEOTECHNICAL REPORTS

GEOTECHNICAL ENGINEERING STUDY
for
FOLSOM WATER TREATMENT PLANT
Phase 4 Upgrade & Expansion
East Natoma Street and Randall Drive
Folsom, California

Project No. 95176.8
April 2003



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YOUNGDAHL CONSULTING GROUP, INC
Building Innovative Solutions

1234 Glenhaven Court, El Dorado Hills, Ca 95762
5750 Arabian Lane, Loomis, Ca 95650
ph 916.933.0633 fx 916.933.6482
www.youngdahl.net

Project No. 95176.8
24 April 2003

Malcolm Pirnie
90 Blue Ravine Road, Suite 190
Sacramento, California 95630

Attention: Mr. Rick Kennedy

Subject: **FOLSOM WATER TREATMENT PLANT - PHASE 4 UPGRADE & EXPANSION**
East Natoma Street and Randall Drive, Folsom, California
GEOTECHNICAL ENGINEERING STUDY

References:

1) *Subcontractor Agreement for Professional Consultant Services, dated 30 January 2003.*
2) *Geotechnical Engineering Study for Folsom Water Treatment Plant - Proposed Clearwell, prepared by Youngdahl Consulting Group, Inc., dated 2 August 2001 (Project No. 95176.7).*
3) *Geotechnical Engineering Study Update, Folsom Water Treatment Plant, Phase 3 Expansion Prepared By: Youngdahl & Associates, Inc., Dated October 1996 (Project No. 95176.3E).*
4) *Geotechnical Engineering Study for Folsom Water Treatment Plant, Phase 2 Expansion Prepared By: Youngdahl & Associates, Inc., Dated July 1995 (Project No. 95176.E).*

Dear Mr. Kennedy:

In accordance with your authorization, Youngdahl Consulting Group, Inc., has performed a geotechnical engineering study for the proposed Phase 4 expansion of the existing Folsom Water Treatment Plant in Folsom, California. The purpose of this study was to explore and evaluate the surface and subsurface soil conditions at the site and to develop geotechnical information and design criteria for the proposed project. Our scope was limited to a subsurface exploration, laboratory testing, and preparation of this report per the referenced Subcontractor Agreement.

Based upon our field study, subsurface exploration program, laboratory testing and engineering analysis, we believe the primary geotechnical issues to be addressed consist of the presence of shallow BEDROCK. Other geotechnical issues may become more apparent during mass grading operations which are not listed above. The descriptions, findings, conclusions and recommendations provided in this report are formulated as a whole and specific conclusions or recommendations should not be derived or used out of context. Please review the limitations and uniformity of conditions section of this report. This report has been prepared for the exclusive use of Malcolm Pirnie and their consultants, for specific application to this project, in accordance with generally accepted geotechnical engineering practice. Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours,
Youngdahl Consulting Group, Inc.

Reviewed by:

Robert F. Black, P.E.
Project Engineer

John C. Youngdahl, P.E.
Principal Engineer

Distribution: (4) to Client

RFB:RCK:JCY

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GEOTECHNICAL ENGINEERING STUDY
for
FOLSOM WATER TREATMENT PLANT
Phase 4 Upgrade and Expansion
East Natoma Street and Randall Drive
Folsom, California

1.0 INTRODUCTION

This report presents the results of our Geotechnical Engineering Study performed for the proposed Phase 4 improvements planned to be constructed at the Folsom Water Treatment Plant in Folsom, California. Refer to Figure A-1 for a vicinity map for the project site.

1.1 Purpose and Scope

The purpose of this study was to explore and evaluate the surface and subsurface conditions at the site and to develop geotechnical information and design criteria for the proposed project. The scope of this study includes the following:

1. A review of geotechnical and geologic data available to us at the time of our study.

2. A field study consisting of a visual site reconnaissance, followed by an exploratory boring program. Geophysical seismic refraction lines were used to characterize the subsurface rock conditions.

3. A laboratory testing program performed on representative samples collected during our field study.

4. Engineering analysis of the data and information obtained from our field study, laboratory testing, and literature review. Development of recommendations for site preparation and grading, and geotechnical design criteria for foundations, retaining structures, and underground facilities.

5. Preparation of this report summarizing our findings, conclusions, and recommendations regarding the geotechnical aspects for the project.

2.0 PROJECT DESCRIPTION

Based on a review of the project plans provided by the client, proposed construction is expected to include new Actiflo basins, new filtration basins, and a new chlorine contact tank, as well as new underground utilities. All of the structures will be of reinforced, cast-in-place concrete construction on reinforced mat foundations two feet thick. All of the structures will require excavation below the existing grade to varying depths. The maximum excavation depth of approximately 30 feet will be required at the proposed Actiflo facility, and 25 feet for the chlorine contact tank and filters.

3.0 SITE DESCRIPTION

3.1 Background

Review of our records indicate that the Actiflo facility and filtration basin locations are within native and/or minimally disturbed areas of the site. The proposed chlorine contact tank location is within an area which has been filled in during previous development of the site. The fill is anticipated to be highly variable in composition and compaction. If studies or plans exist that pertain to the site which are not cited as a reference in this report, we should be afforded the opportunity to review and modify our conclusions and recommendations as necessary.

3.2 Surface Observations

The project sites are located within the existing Folsom Water Treatment Plant located on East Natoma Street and Randall Road in Folsom, California. The proposed Actiflo basin is to be located on the northeast side of the existing sedimentation basin; the proposed new filters are to be located on the northeast side of the existing conventional filter area; and the proposed chlorine contact tank is to be located southeast of the existing ABW filters.

Topography varies from relatively flat within the proposed chlorine contact tank and filter areas, to mildly sloping within the Actiflo basin area. Site vegetation consists of a minor growth of grasses.

The aforementioned site description was based on our site visit, as well as a review of the site plan provided by the client, which forms the basis for our site plan, Figure A-2, Appendix A.

3.3 Subsurface Exploration

Our field study included a site reconnaissance by a Youngdahl Consulting Group, Inc., representative followed by a subsurface exploration program conducted on 17 March 2003, which included the advancing of 3 exploratory borings under his direction at the approximate locations shown on Figure A-2, Appendix A. Our exploratory borings were advanced with a solid flight auger, using a truck-mounted drill rig operated by an independent drilling firm working under subcontract to Youngdahl Consulting Group, Inc. An engineer from our firm logged the subsurface conditions and collected representative samples. All samples were stored in watertight containers and later transported to our laboratory for further visual examination and testing. After each boring was completed, the borehole was backfilled with soil cuttings. Refer to Appendix B for a more detailed description of the subsurface exploration procedure.

3.4 Subsurface Conditions

The borings encountered relatively similar subsurface conditions; Borings B-1 and B-2 encountered surface soils consisting of brown sandy CLAY and clayey GRAVEL/SAND (completely weathered bedrock) in a moist and medium stiff/dense condition to a depth of 3 feet. Boring B-3 encountered FILL material consisting of brown silty GRAVEL with sand and rock fragments in a moist and medium dense condition to a depth of 8 feet, underlain by native brown SILT in a moist and medium dense condition to a depth of 10 ½ feet.

Underlying the surface fills and native soils to the maximum depth explored in each boring, gray completely to highly weathered metavolcanic BEDROCK was encountered. The bedrock graded moderately weathered at the bottom of each boring; practical refusal was encountered in Borings B-1 and B-2 at a depth of 12 feet and 10 feet, respectively.

A more detailed description of the subsurface conditions encountered is presented graphically on the "Exploratory Boring Logs", Figures A-3 through A-5, presented in Appendix A. These logs show a graphic interpretation of the subsurface profile, the location and depths at which samples were collected and selected laboratory test results.

Free groundwater was not encountered in the borings completed for this project; however, Borings B-1 and B-2 were not carried to design depth of the proposed improvements due to equipment refusal. A review of our previous work done in the vicinity of the two borings above indicates that free groundwater was generally not encountered during our subsurface exploration or during construction of the existing improvements. Therefore, we do not anticipate that groundwater would be encountered in the above areas. Elsewhere on site, groundwater levels could fluctuate depending on rainfall amounts, on and offsite construction activities, and other factors.

Groundwater was encountered at an approximate elevation of 358 feet during our previous work in the vicinity of the chlorine contact tank (see reference 2). However, at this depth it is not anticipated to affect the proposed tank. Perched groundwater and/or seepage could be encountered anywhere on site near the soil/bedrock contact after particularly wet winters, or due to other water sources such as on and off site landscaping, surface water runoff, etc.

3.5 Geologic Conditions

The geologic portion of this report included a review of geologic data pertinent to the site, and an interpretation of our observations and the Logs of Exploratory Borings drilled during the field study. The site is located at the foot of the Sierra Foothills region of the Sierra Nevada Mountain Range. According to the 1:48,000 scale Generalized Geology of the Folsom 15 minute quadrangle, the project site is underlain by metavolcanic rock of the Copper Hill Volcanics formation of Mesozoic Age (R.C. Loyd, 1984).

According to the Fault Activity Map of California and Adjacent Areas (Jennings, 1994) and the "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada" (USGS/ICBO, 1998), no active faults or Earthquake Fault Zones (Special Studies Zones) are located on the project site. No evidence of recent or active faulting was observed during our field study. Major structural features in the area are related to the Bear Mountains Fault Zone, the Foothill-Melones Fault Zone, and Mormon Island Shear Zone. The Mormon Island Shear Zone straddles the El Dorado County-Sacramento County line about 2 ½ miles east of the site. The Bear Mountain Fault Zone has two traces in the Sierra Foothills. The west branch of this fault zone is mapped approximately 3 ½ miles east of the site in El Dorado Hills. The east branch is mapped approximately 12 miles east in Shingle Springs. The Melones Fault Zone is located about 20 miles east of the site in Placerville. The Bear Mountain and Melones Faults are considered only potentially active, with the last movement on either fault estimated to have occurred more than two million years ago. The nearest mapped active fault to the site is the Dunnigan Hills fault located about 38 miles to the west-northwest. Strong earthquakes generated along any of the faults within the region may affect the site depending on the characteristics of the earthquake and the location of the epicenter. In general, the effects will be confined to those phenomena associated with shaking and/or ground acceleration. These effects can be minimized by appropriate design and construction procedures.

Seismicity: Deterministic attenuation relationships developed by Boore, Joyner, and Fumal (1994, 1997) yield a predicted peak horizontal ground acceleration (PHGA) for the site from the Mormon Island Shear Zone of 0.3g. The California Seismic Hazard Map, based upon maximum credible earthquakes, produced by Caltrans (Maulchin, 1996) also predicts of PHGA of roughly 0.3g. The predicted peak vertical ground acceleration for the site is estimated to be two-thirds of the above value, or 0.2g. According to the Seismic Shaking Hazard Map of California (Petersen, M.D. and others, 1999), the site can probabilistically be expected to experience a peak horizontal ground acceleration of 0.2g (10 percent probability of exceedence in 50 years).

Based on the proposed foundation elevations, we expect weathered bedrock materials. As such, seismically induced settlement is expected to be negligible. Engineered fills placed and compacted according the recommendations outlined in Section 5.3 of this report are also anticipated to perform adequately.

3.6 Laboratory Testing

The laboratory testing of collected samples was directed towards determining the physical and engineering properties of the soil underlying the site. A description of the tests performed and their results are presented in Appendix B.

3.7 Seismic Refraction Survey

Seismic lines (see attached Seismic Rippability Investigation prepared by Gasch & Associates, Inc.: Appendix C) performed at the project site give an indication of the amount of effort that may be required for excavation during construction. Seismic lines were conducted along the proposed location of the Actiflo basin during this study, as well as near the proposed chlorine contact tank during our previous work on site (Reference 2). A standard impact hammer/plate with trip sensor was employed to generate seismic signals along the roadway.

The study compiled in the attached report was conducted with state-of-the-technology geophysical equipment operated by an experienced geophysical team, familiar with the local geology and the typical engineering characteristics of the local metavolcanic bedrock. While every attempt has been made to provide accuracy and reliability to the findings submitted, readers and users of the attached report must keep in mind that the profiles and estimated depths to non-rippable rock are professional interpretations based on experience and familiarity with the equipment and software used. As such, site-specific conditions may be encountered on a localized basis that differ from the professional interpretations expressed in this engineering geologic evaluation and the geophysicists's attached seismic refraction rippability report.

4.0 CONCLUSIONS

We offer the following general geotechnical conclusions concerning this development project.

Site Suitability: The native soils, rock, and/or engineered fills composed of like materials and processed and compacted as recommended below are considered suitable for support of the planned improvements. The existing fill encountered in Boring No. B-3 is not anticipated to affect the proposed tank based on the foundation elevation. Other improvements such as underground utilities, equipment pads, and other structures at or near the surface could be affected, depending on their configuration and the condition of the material at that location. A determination of the condition of any fill material and its extent can be made at the time of grading, and specific recommendations provided at that time. General recommendations have been provided in the "Site Preparation" and "Engineered Fill" sections of this report to address any fills encountered on site.

Expansive Soils: The sandy silts, sands and rock materials encountered on the site are non-plastic materials which are considered to be relatively non-expansive. We encountered plastic clays which, based on our laboratory testing, are considered to be moderately to highly expansive. However, due to their limited presence, and provided they are removed from the proposed development area when encountered, special design considerations are not anticipated to be necessary.

Groundwater: Free groundwater was not encountered in the borings completed for this project; however, Borings B-1 and B-2 were not carried to design depth of the proposed improvements due to equipment refusal. A review of our previous work done in the vicinity of the two borings above indicates that free groundwater was generally not encountered during our subsurface exploration or during construction of the existing improvements. Therefore, we do not anticipate that groundwater would be encountered in the above areas. Elsewhere on site, groundwater levels could fluctuate depending on rainfall amounts, on and offsite construction activities, and other factors. Groundwater was encountered at an approximate elevation of 358 feet during our previous

work in the vicinity of the chlorine contact tank (see reference 2). However, at this depth it is not anticipated to affect the proposed tank. Perched groundwater and/or seepage could be encountered anywhere on site near the soil/bedrock contact after particularly wet winters, or due to other water sources such as on and off site landscaping, surface water runoff, etc.

A perched water table often develops in shallow bedrock horizons as surface water percolates down through the surface soils and perches on top of the relatively impermeable bedrock horizon. The perched water can saturate surface soils. Saturated soils may be unstable under construction equipment, and may require considerable aeration in order to achieve a moisture content which will allow compaction. The prospect of saturated soils should be considered in construction scheduling. Water inflow into any excavation approaching hard rock surface may be experienced in all but the driest summer and fall months.

Subdrainage: Improvement areas constructed in cut which approach the weathered bedrock horizon may require subdrainage measures. Such measures may include installation of subdrain trenches. Youngdahl Consulting Group, Inc. should review the final developement plans, when available, to obtain a preliminary indication of where subdrainage may be required. Subdrainage requirements should be based on our observations following grading.

Excavation: Based on the seismic refraction survey performed by Gasch & Associates (Appendix C), we expect that the site soils can be excavated using normal earthmoving equipment such as a rubber tired backhoe. The underlying rock materials can likely be excavated to depths of 30 to 40 feet using a Caterpillar D10R dozers equipped with rippers (see Caterpillar Performance Handbook, Edition 29). Deeper excavation into the less weathered rock below a depth of about 360 feet may require heavier equipment and possibly blasting.

Utility trenches may encounter isolated hard rock excavation conditions in deeper cut areas. Utility contractors should be prepared to use large excavators such as a CAT 235 or CAT 245. Blasting will most likely not be required, but cannot be precluded. Water inflow into any excavation approaching hard rock surface may be experienced in all but the driest summer and fall months.

Liquefaction: Liquefaction is the sudden loss of soil shear strength and sudden increase in porewater pressure caused by shear strains, as could result from an earthquake. Research has shown that saturated, loose to medium-dense sands with a silt content less than about 25 percent located within the top 40 feet are most susceptible to liquefaction. Due to the relatively shallow depth to bedrock, the potential for site liquefaction is considered negligible.

Slope Stability: The project site is proposed to have minor cuts and fill with a maximum slope orientation of 2H:1V (horizontal:vertical). Generally a cut slope orientation of 2H:1V is considered stable with the material types encountered on the site. A fill slope constructed at the same orientation is considered stable if compacted to the engineered fill recommendations as stated in the recommendations section of this report. All slopes should have appropriate drainage and vegetation measures to minimize erosion of slope soils.

Steeper cut slopes are feasible within the weathered bedrock for temporary construction purposes. Gradients of 1 ½ H:1V or 1H:1V are considered feasible provided the project engineering geologist is present to monitor the stability of the excavation and provide additional recommendations. Steeper fill slope gradients may be achievable through the use of geotextile materials to strengthen and/or provide erosion protection. Any slope excavations proposed to be greater than 10 feet in maximum height should be evaluated during and prior to completion of site grading.

Seismic Considerations: Based on our literature review and subsurface interpretations, we recommend that the project be designed in accordance with the latest applicable California Building Code (CBC), Chapter 16. This site is located within Seismic Risk Zone 3 and based on our subsurface interpretations is classified as Soil Profile Type S_C.

5.0 RECOMMENDATIONS

5.1 General

The site is suitable for the proposed improvements provided the recommendations presented in this report are incorporated into the project plans and specifications.

All final grading and foundation plans should be reviewed by Youngdahl Consulting Group, Inc., hereinafter described as the Geotechnical Engineer, prior to contract bidding. A review should be performed to determine whether the recommendations contained within this report are incorporated into the project plans and specifications.

The Geotechnical Engineer should be notified at least two working days before site clearing or grading operations commence, and should observe the stripping of deleterious material and provide consultation to the Grading Contractor in the field.

Our recommendations are based on limited windows into the subsurface conditions. Field observation and testing during the grading operations should be provided by the Geotechnical Engineer so that an opinion may be formed regarding the adequacy of the site preparation, the acceptability of fill materials, and the extent to which the earthwork construction and the degree of compaction comply with the project geotechnical specifications. Any work related to grading performed without the full knowledge of, and under direct observation by the Geotechnical Engineer may render the conclusions and recommendations of this report invalid.

Section 3317.8 in Appendix Chapter 33 of the latest California Building Code states that, in regard to the transfer of responsibility, if the Geotechnical Engineer of Record for the project site is not maintained through the grading phase of the project, the work shall be stopped until the replacement has agreed in writing to accept their responsibility within the area of technical competence for approval upon completion of the work. Our design recommendations should not be relied upon without our consultation, observation and testing services during all aspects of grading on the site.

We recommend that the applicable chapters of the latest edition of the CBC be adhered to during the design and construction of the proposed structures.

5.2 Site Preparation

Preparation of the project site should involve temporary drainage, dust control, clearing, stripping, existing fills, and groundwater considerations. The following paragraphs state our geotechnical comments and recommendations concerning site preparation.

Temporary Drainage: We recommend that initial site preparation involve intercepting and diverting any potential sources of surface or near-surface water within the construction zones. Because the selection of an appropriate drainage system will depend on the water quantity, season, weather conditions, construction sequence, and contractor's methods, final decisions regarding drainage systems are best made in the field at the time of construction. All drainage and/or water diversion

performed for the site should be in accordance with the Clean Water Act and applicable Storm Water Pollution Prevention Plan.

Dust Control: Dust control provisions should be provided for as required by the local jurisdiction's grading ordinance (i.e. water truck or other adequate water supply during grading).

Clearing and Stripping: Clearing and stripping operations should remove all organic laden materials including trees, bushes, root balls, root systems, and any soft or loose material generated from removal operations. Surface grass stripping operations may be necessary depending upon the in-situ conditions at the time of mass grading. Short or mowed dry grasses may be pulverized and lost within fill materials provided no concentrated pockets of organics result. It is the responsibility of the grading contractor to remove excess organics from the fill materials. No more than 2 percent of organic material, by weight, should be allowed within the fill materials at any given location.

General site clearing should also include removal of any loose or saturated materials from the proposed structural improvement and pavement areas. A representative of our firm should be present during site clearing operations to identify the location and depth of potential fills not disclosed by this report, to observe removal of deleterious materials, and to identify any existing site conditions which may require mitigation prior to site development.

Existing Fills: Following general site clearing, all existing fills and fill stockpiles should be over-excavated down to firm native materials. Reference should be made to the site description and boring logs for anticipated fill locations. Any depressions extending below final grade resulting from the removal of fill materials or other deleterious materials should be properly prepared as discussed below and backfilled with engineered fill. Prior to placement of engineered fill, the exposed soil surfaces receiving fills should be scarified to a minimum depth of 8 inches, moisture conditioned as necessary, and compacted to at least 90 percent of the maximum dry density based on the ASTM D1557 test method.

If existing fills were placed and documented as engineered fill materials, a review of the appropriate documentation should be performed.

Exposed Grade Compaction: Exposed soil grades following initial site preparation activities should be scarified to a minimum depth of 8 inches and compacted to the requirements for engineered fill. Prior to placing fill, the exposed subgrades should be in a firm, unyielding state. Any localized zones of soft or pumping soils observed within a subgrade should either be scarified and recompacted or be overexcavated and replaced with engineered fill as defined below in Section 5.3.

Groundwater Considerations: Due to the nature of the soils encountered in the area of the project site, we anticipate that a perched groundwater table may be encountered near the bedrock contact. Where cuts are proposed, subdrains may need to be installed to catch the water flowing along the soil/bedrock contact through the fractured rock.

5.3 Engineered Fills

All materials placed as fills on the site should be placed as "Engineered fill" observed and compacted as described in the following paragraphs.

On-site Soils: We anticipate that a large amount of on-site soils will be generated during mass grading operations. We expect that soil generated from excavations on the site, excluding deleterious material, may be used as engineered fill provided the material does not exceed the maximum size specifications listed below.

Rock fragments or boulders exceeding 24 inches in maximum dimension should not be placed within the upper five feet of lot and street grade. The upper two feet of lot or street grades should consist of predominantly rocks and rock fragments less than 12 inches in maximum dimension with no more than 20 percent between 12 and 24 inches in maximum dimension. The rock fragments should be thoroughly mixed with soil so that a uniform mixture of rocks and compacted soil is obtained without voids. Boulders over 24 inches in maximum dimension should be placed within the deeper portions of fill embankments below a depth of 5 feet and a minimum of 5 feet from the finish slope face. The individual boulders should be spaced such that compaction of finer rock and soil materials between the boulders can be achieved. Materials placed between the boulders should consist of predominantly soil and rock less than 12 inches in maximum dimension. The soil/rock mixture should be placed between the boulders so as to preclude nesting or the formation of voids and compacted to the requirements of engineered fill. Should insufficient deep fill areas exist for oversize rock disposal, contractor should (at his option) either dispose of the excess materials to an offsite location or mechanically reduce the rocks to less than 24 inches in maximum dimension. The contractor should avoid placing rocks or rock fragments larger than 12 inches in maximum dimension within zones of proposed underground facilities.

Fill Placement and Compaction: All areas proposed to receive fill should be scarified to a minimum depth of 8 inches, moisture conditioned as necessary, and compacted to at least 90 percent of the maximum dry density based on the ASTM D1557 test method. The fill should be placed in thin horizontal lifts not to exceed 12 inches in uncompacted thickness. The fill should be moisture conditioned as necessary and compacted to a relative compaction of not less than 90 percent based on the ASTM D1557 test method. The upper 8 inches of fills placed under proposed pavement areas should be compacted to a relative compaction of not less than 95 percent based on the ASTM D1557 test method. Expansive clays, if encountered, should not be placed within the upper three feet of pad grade and subgrade level. Alternatively, clays may be mixed thoroughly with less expansive on site materials (silts, sands, and gravels). Proper disposition of clays on site should be verified by a representative of Youngdahl Consulting Group, Inc.

Compaction Equipment: In areas to receive structural fill, a Caterpillar 825 steel-wheel compactor, or approved equivalent should be employed as a minimum to facilitate breakdown of oversize bedrock materials and generation of soil fines during the fill placement process. If the quantity of rock fragments in the fills preclude traditional compaction testing, then the proposed fills should be compacted using method specifications as indicated below.

Soils exposed in excavations should be moisture conditioned and compacted in place by a minimum of four completely covering passes with a Caterpillar 825, or approved equivalent. The compactor's last two passes should be at 90 degrees to the initial passes. In areas where 95% relative compaction is designated, an additional two passes should be applied, with three completely covering passes made at 90 degrees to the initial three passes. Engineered fill should be constructed in lifts not exceeding 12 inches in uncompacted thickness, moisture conditioned and

compacted in accordance with the above specification. Additional passes as deemed necessary during fill placement to achieve desired condition based upon field conditions may be recommended.

Import Materials: If imported fill material is needed for this project, import material should be approved by the Geotechnical Engineer prior to transporting it to the project. It is preferable that import material meet the following requirements:

1. Plasticity index not to exceed 12.
2. Should not contain rocks larger than 6 inches in diameter.
3. Not more than 15% passing through the No. 200 sieve.

If these requirements are not met, additional testing and evaluation may be necessary to determine the appropriate design parameters for foundations, pavement and other improvements.

Subgrade Verification and Compaction Testing: Fill soil compaction should be verified by means of in-place density tests performed during fill placement so that adequacy of soil compaction efforts may be evaluated as earthwork progresses, or by method specification if the quantity of rock fragments in the fills preclude traditional compaction testing. This will likely include the excavation of test pits within the fill materials to verify that a uniform over-optimum moisture condition, and absence of large and/or concentrated voids has been achieved prior to additional fill placement.

Soil Moisture Considerations: The near-surface fine grained soils may become partially or completely saturated during the rainy season. Grading operations during this time period may be difficult since compaction efforts may be hampered by saturated materials. It is, therefore, suggested that consideration be given to the seasonal limitations and costs of winter grading operations on the site.

5.4 Slope Grading

Placement of Fills on Slopes: Placement of fill material on natural slopes should be stabilized by means of keyways and benches. Where the slope of the original ground equals or exceeds 5H:1V, a keyway should be constructed at the base of the fill. The keyway should consist of a trench excavated to a depth of at least two feet into firm, competent materials. The keyway trench should be at least eight feet wide or as designated by the Geotechnical Engineer. Benches should be cut into the original slope as the filling operation proceeds. Each bench should consist of a level surface excavated at least six feet horizontally into firm soils or four feet horizontally into rock. The rise between successive benches should not exceed 36 inches. The need for subdrainage should be evaluated at the time of consturction.

Slope Face Compaction: All slope fills should be laterally overbuilt and cut back such that the required compaction is achieved at the proposed finish slope face. As a less preferable alternative, the slope face could be tracked walked or compacted with a wheel. If this second alternative is used, additional slope maintenance may be necessary.

Slope Drainage: Surface drainage should not be allowed to flow uncontrolled over any slope face. Adequate surface drainage control should be designed by the project civil engineer in accordance with the latest applicable edition of the CBC. All slopes should have appropriate drainage and vegetation measures to minimize erosion of slope soils.

5.5 Finish Soilgrade Preparation

Finish building pad soilgrades should be compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557 test method. Pavement subgrades compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557 test method and should be proof-rolled with a full water truck or equivalent immediately before paving, in order to verify their condition.

5.6 Drainage Considerations

Special attention should be given regarding the drainage of the project site. If the project is expected to work through the wet season, the contractor should install appropriate temporary drainage systems at the construction site and should minimize traffic over exposed subgrades due to the moisture-sensitive nature of the on-site soils. If the project improvements are constructed prior to the wet season, but are not proposed to be fine graded for permanent drainage until the next dry season, temporary drainage or erosion protection provisions should be made to address the possibility of erosion to cut and fill slopes. During wet weather operations, the soil should be graded to drain and should be sealed by rubber tire rolling to minimize water infiltration.

All final grades should provide rapid removal of surface water runoff; ponding water should not be allowed adjacent to foundations or other structural improvements.

5.7 Seismic Design Criteria

Based on the latest applicable edition of the California Building Code, Chapter 16, Division IV, and our site investigation findings, the following seismic parameters are recommended from a geotechnical perspective for structural design. The final choice of design parameters, however, remains the purview of the project structural engineer.

CBC - CHAP. 16 TABLE NO.	SEISMIC PARAMETER	RECOMMENDED VALUE
16-I	Seismic Zone Factor Z	0.30
16-J	Soil Profile Type	S_B
16-Q	Seismic Coefficient (C_a)	0.30
16-R	Seismic Coefficient (C_v)	0.30
16-S,-T	Near Source Factors (N_a, N_v)	1.0
16-U	Seismic Source Type	C

5.8 Foundations

In our opinion, continuous shallow footings or a thickened mat slab foundation will provide adequate support for the proposed structure. We offer the following comments and recommendations for purposes of footing design and construction.

Footing Depths and Widths: We anticipate that weathered bedrock will be encountered at the proposed foundation elevation for the structures. If continuous footings are used, we recommend that that they be embedded a minimum of 8 inches into weathered rock. The width of the footings should be based on the actual loads being supported. If a mat slab foundation is used, we recommend that a minimum of 6 inches of compacted aggregate base be placed beneath the slab in order to provide uniform support.

Bearing Capacities: For the above configurations, an allowable dead plus live load bearing pressure of 5,000 p.s.f. may be used for design of foundations based on weathered bedrock. A total settlement of less than ½ inch is anticipated. As indicated in Section 3.5 of this report, seismically induced settlement is anticipated to be negligible for foundations in weathered bedrock.

The above allowable pressures are for support of dead plus live loads and may be increased by one-third for short term wind and seismic loads.

Subgrade Conditions: Footings should never be cast atop soft, loose, organic, slough, debris, nor atop subgrades covered by ice or standing water. A representative of our firm should be retained to observe all subgrades before any concrete is poured in order to verify that they have been adequately prepared.

Lateral Pressures: Lateral forces on structures may be resisted by passive pressure acting against the sides of shallow footings and/or friction between the weathered rock and the bottom of the footing. For resistance to lateral loads, a friction factor of 0.40 may be utilized for sliding resistance at the base of spread footings in weathered bedrock. A passive resistance of 450 pcf equivalent fluid weight may be used against the side of shallow footings founded in weathered rock. If friction and passive pressures are combined, the lesser value should be reduced by 50%.

5.10 Underground Facilities Construction

We offer the following comments and recommendations concerning underground facility construction.

Trench Sidewalls: Trenches or excavations in soil should be shored or sloped back in accordance with current OSHA regulations prior to persons entering them. Where clay rind in combination with moist conditions is encountered in fractured bedrock, the project engineering geologist should be consulted for appropriate mitigation measures. The potential use of a shield to protect workers cannot be precluded.

Backfill Materials: Backfill materials for utilities should conform to the local jurisdiction's requirements. It should be realized that permeable backfill materials will likely carry water at some time in the future. The need for drainage of some of these facilities may be necessary.

Backfill Compaction: All backfill, placed after the underground facilities have been installed, should be compacted to a minimum of 90 percent relative compaction. Compaction should be accomplished using lifts which do not exceed 12 inches. However, thickness of the lifts should be determined by the contractor. If the contractor can achieve the required compaction using thicker lifts, the method may be judged acceptable based on field verification by a representative of our firm using standard density testing procedures. Light weight compaction equipment may require thinner lifts to achieve the required densities.

Excavation: Utility trenches may encounter isolated hard rock excavation conditions in deeper cut areas. Utility contractors should be prepared to use large excavators such as a CAT 235 or CAT 245. Blasting will most likely not be required, but cannot be precluded. Water inflow into any excavation approaching hard rock surface may be experienced in all but the driest summer and fall months.

5.11 Retaining Walls

Our design recommendations and comments regarding retaining walls for the project site are discussed below.

Retaining Wall Foundations: The allowable bearing pressure, depth of foundation, lateral pressure and friction coefficient should be as given in the "Foundations" section of this report. All backfill placed behind retaining walls or against retaining wall footings should be compacted in accordance with the "Engineered Fill" section of this report.

Retaining Wall Lateral Pressures: Based on our observations and testing, retaining walls should be designed to resist lateral pressure exerted from a soil media having an equivalent fluid weight as follows (assumes gravelly on site material will be used for backfilling walls).

Wall Type	Wall Slope Configuration	Equivalent Fluid Weight (pcf)	Surcharge Load (psf)*	Lateral Pressure Coefficient
Free Cantilever	Flat	35	per structural	0.24
	2H:1V	50	NA	NA
Restrained**	Flat	55	per structural	0.38

* The surcharge loads should be applied as uniform loads over the full height of the walls as follows: Surcharge Load (psf) = (q) (K), where q = surcharge in psf, and K = coefficient of lateral pressure. Final design is the purview of the project structural engineer.

** Restrained conditions shall be defined as walls which are not capable of yielding, or rigid wall configurations (i.e. walls with numerous turning points) which prevent the yielding necessary to generate active pressures.

Wall Drainage: The proposed improvements are tanks and basins which, when filled with water are expected to equalize any hydrostatic pressure which may develop on the outside of the structures. The decision whether or not to provide drainage for the wall, as well as drainage system design, is the purview of the project structural engineer; however, it should be noted that the pressures listed in the above table are based on drained conditions. If a drain is considered necessary, it should consist of, at a minimum, a blanket of filter material 12 inches thick extending from the bottom of the wall to within 12 inches of the ground surface. The filter material should conform to Class One, Type B permeable material as specified in Section 68 of the California Department of Transportation Standard Specifications, current edition. A typical 1"x#4 concrete coarse aggregate mix approximates this specification. A clean pea gravel or crushed rock is also acceptable, provided filter fabric is used to separate the open graded gravel/rock from the surrounding soils. The top 12 inches of wall backfill should consist of a compacted native soil cap. A filter fabric should be placed on top of the gravel filter material to separate it from the native soil cap. A 4 inch diameter drain pipe should be installed near the bottom of the filter blanket with perforations facing down. The drain pipe should be underlain by at least 4 inches of filter-type material. As an alternative to drain pipe, where deemed appropriate, weep holes may be provided. Adequate gradients should be provided to discharge water that collects behind the retaining wall to an controlled discharge system.

6.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. This report has been prepared for the exclusive use of Malcolm Pirnie for specific application to the Folsom Water Treatment Plant Phase 4 project. Youngdahl Consulting Group, Inc. has endeavored to comply with generally accepted geotechnical engineering practice common to the local area. Youngdahl Consulting Group, Inc. makes no other warranty, express or implied.

2. As of the present date, the findings of this report are valid for the property studied. With the passage of time, changes in the conditions of a property can occur whether they be due to natural processes or to the works of man on this or adjacent properties. Legislation or the broadening of knowledge may result in changes in applicable standards. Changes outside of our control may cause this report to be invalid, wholly or partially. Therefore, this report should not be relied upon after a period of three years without our review nor should it be used or is it applicable for any properties other than those studied.

3. Section 3317.8 in Appendix Chapter 33 of the latest edition of the California Building Code is applicable to this report. This section states that, in regard to the transfer of responsibility, if the Geotechnical Engineer of Record for the project site is not maintained into and through the grading phase of the project, the work shall be stopped until the replacement has agreed in writing to accept their responsibility within the area of technical competence for approval upon completion of the work.

   WARNING: Do not apply any of this report's conclusions or recommendations if the nature, design, or location of the facilities is changed. If changes are contemplated, Youngdahl Consulting Group, Inc. must review them to assess their impact on this report's applicability. Also note that Youngdahl Consulting Group, Inc. is not responsible for any claims, damages, or liability associated with any other party's interpretation of this report's subsurface data or reuse of this report's subsurface data or engineering analyses without the express written authorization of Youngdahl Consulting Group, Inc.

4. The analyses and recommendations contained in this report are based on limited windows into the subsurface conditions and data obtained from subsurface exploration. The methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations. Should any variations or undesirable conditions be encountered during the development of the site, Youngdahl Consulting Group, Inc., will provide supplemental recommendations as dictated by the field conditions.

5. The recommendations included in this report have been based in part on assumptions about strata variations that may be tested only during earthwork. Accordingly, these recommendations should not be applied in the field unless Youngdahl Consulting Group, Inc. is retained to perform construction observation and thereby provide a complete professional geotechnical engineering service through the observational method. Youngdahl Consulting Group, Inc. cannot assume responsibility or liability for the adequacy of its recommendations when they are used in the field without Youngdahl Consulting Group, Inc. being retained to observe construction. Unforseen subsurface conditions containing soft native soils, loose or previously placed non-engineered fills should be a consideration while preparing for the grading of the property. It should be noted that it is the responsibility of the owner or his/her representative to notify Youngdahl Consulting Group, Inc., in writing, a minimum of 48 hours before any excavations commence.

CHECKLIST OF RECOMMENDED SERVICES

	Item Description	Recommended	Not Anticipated
1	Provide foundation design parameters	Included	
2	Review grading plans and specifications	✓	
3	Review foundation plans and specifications	✓	
4	Observe and provide recommendations regarding demolition		✓
5	Observe and provide recommendations regarding site stripping	✓	
6	Observe and provide recommendations on moisture conditioning removal, and/or precompaction of unsuitable existing soils	✓	
7	Observe and provide recommendations on the installation of subdrain facilities	✓	
8	Observe and provide testing services on fill areas and/or imported fill materials	✓	
9	Review as-graded plans and provide additional foundation recommendations, if necessary	✓	
10	Observe and provide compaction tests on storm drains, water lines and utility trenches	✓	
11	Observe foundation excavations and provide supplemental recommendations, if necessary, prior to placing concrete	✓	
12	Observe and provide moisture conditioning recommendations for foundation areas and slab-on-grade areas prior to placing concrete	✓	
13	Provide design parameters for retaining walls	Included	
14	Provide finish grading and drainage recommendations	Included	
15	Provide geologic observations and recommendations for keyway excavations and cut slopes during grading	✓	
16	Excavate and recompact all test pits within structural areas		✓

APPENDIX A

Field Study

Vicinity Map
Site Plan
Logs of Exploratory Borings

Introduction

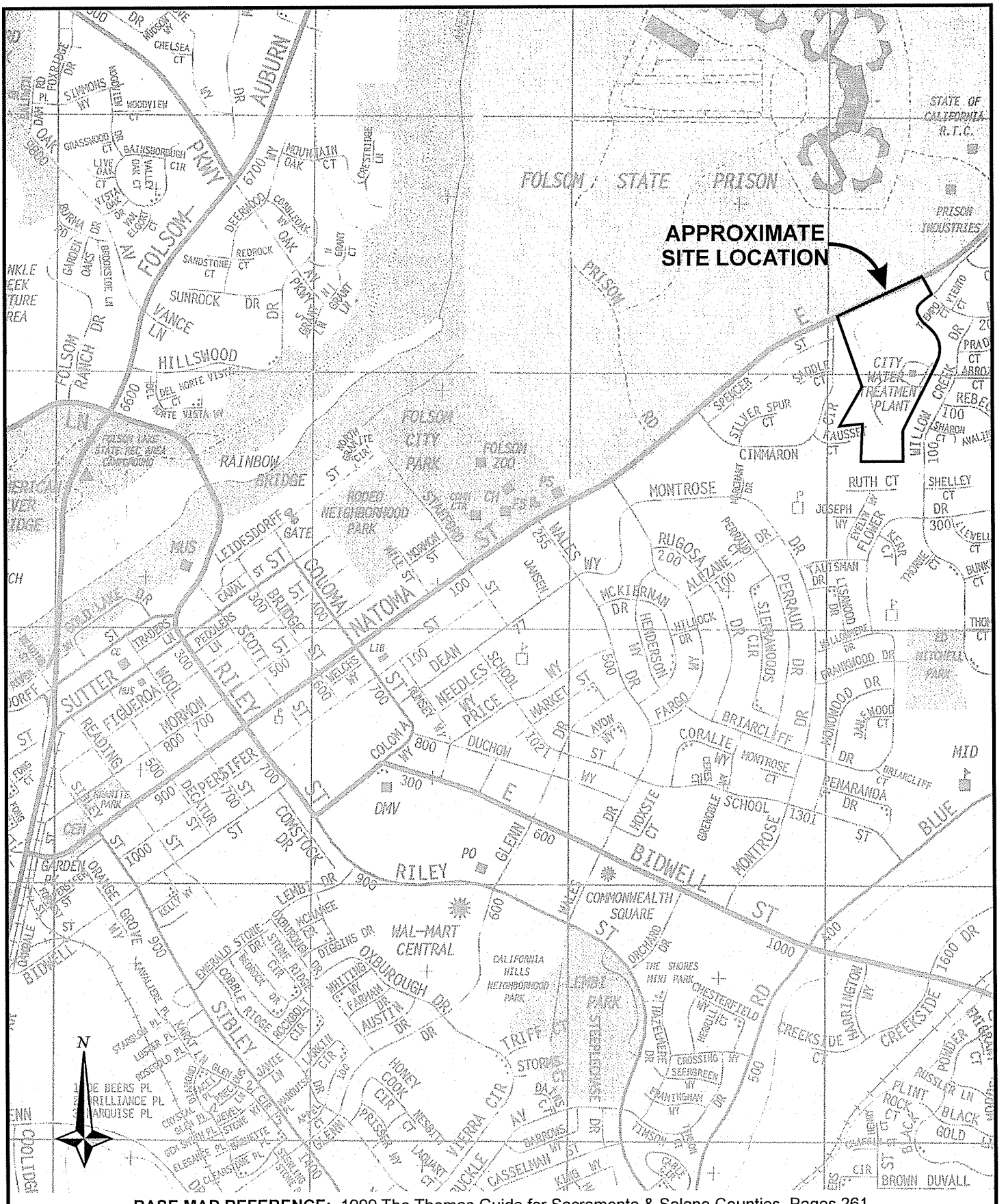
The contents of this appendix shall be integrated with the geotechnical engineering study of which it is a part. They shall not be used in whole or in part as a sole source for information or recommendations regarding the subject site.

Field study

Our field study included a site reconnaissance by a Youngdahl Consulting Group, Inc., representative followed by a subsurface exploration program conducted on 17 March 2003, which included the drilling of 3 exploratory borings under his direction at the approximate locations shown on Figure A-2, this Appendix. Drilling of the exploratory borings was accomplished with a CME 850 track mounted drill rig.

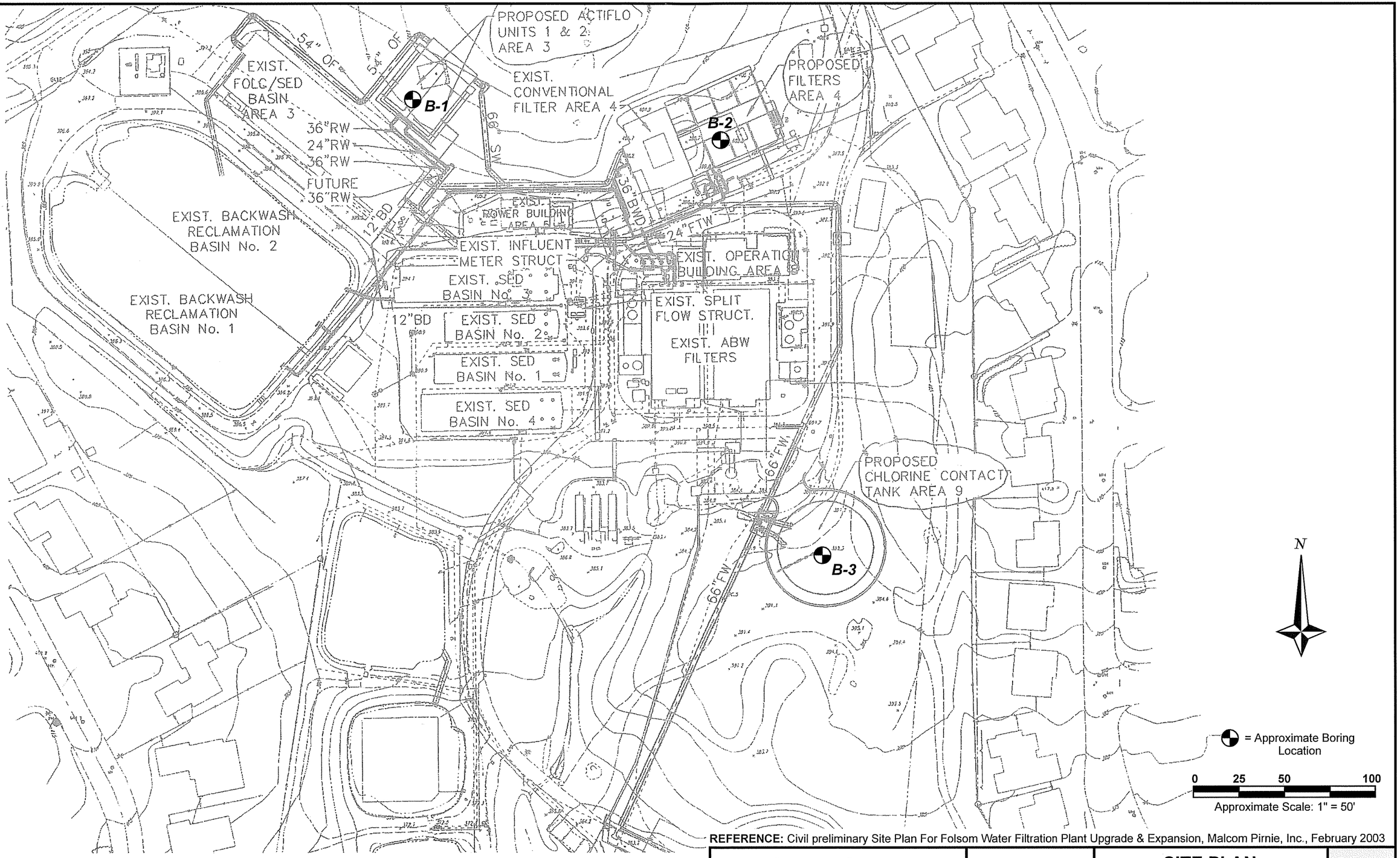
Throughout the drilling operation, soil samples were obtained at 5-foot depth intervals by means of a Modified California Sampler. This testing and sampling procedure consists of driving the steel sampler 18 inches into the soil with a 140-pound hammer free-falling 30 inches. The number of blows required to drive the sampler through each 6-inch interval is counted, and the total number of blows struck during the final 12 inches is recorded. If a total of 50 blows is struck within any 6-inch interval, the driving is stopped and the blow count is recorded as 50 blows for the actual penetration distance.

The soils encountered were logged during drilling and provide the basis for the "Boring Logs", Figures A-3 through A-5, this Appendix. The enclosed Boring Logs describe the vertical sequence of soils and materials encountered in each boring, based primarily on our field classifications and supported by our subsequent laboratory examination and testing. Where a soil contact was observed to be gradational, our logs indicate the average contact depth. Where a soil type changed between sample intervals, we inferred the contact depth. Our logs also graphically indicate the blow count, sample type, sample number, and approximate depth of each soil sample obtained from the borings, as well as any laboratory tests performed on these soil samples. If any groundwater was encountered in a borehole, the approximate groundwater depth is depicted on the boring log. Groundwater depth estimates are typically based on the moisture content of soil samples, the wetted height on the drilling rods, and the water level measured in the borehole after the auger has been extracted.



BASE MAP REFERENCE: 1999 The Thomas Guide for Sacramento & Solano Counties, Pages 261

YOUNGDAHL CONSULTING GROUP, INC. GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING	Project No.: 95176.8 **March 2003**	**VICINITY MAP** **Folsom Water Treatment Plant** Folsom, California	**FIGURE** **A-1**



REFERENCE: Civil preliminary Site Plan For Folsom Water Filtration Plant Upgrade & Expansion, Malcom Pirnie, Inc., February 2003

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Project No.: 95176.8

March 2003

SITE PLAN

Folsom Water Treatment Plant
Folsom, California

FIGURE
A-2

Logged By: **RFB**	Date: **17 March 2003**	Elevation: **unknown**	Boring No. **B-1**
Equipment: **CME 850 with 6" Solid Flight**			

Depth (Feet)	Graphic Log	Ground Water	Geotechnical Description & Unified Soil Classification	Sample	Blow Count	Dry Density (pcf)	Moisture Content (%)	Tests & Comments
1			Brown sandy **CLAY (CL)**, with gravel, very stiff, moist		33			
3			Gray brown metavolcanic **ROCK**, completely to highly weathered, moderately strong		50/5"			*Hard Drilling*
11			*Grades moderately weathered, strong*					
12			Boring terminated at 12' (due to practical refusal) No groundwater encountered					

Note: The boring log indicates subsurface conditions only at the specific location and time noted. Subsurface conditions, including groundwater levels, at other locations of the subject site may differ significantly from conditions which, in the opinion of Youngdahl Consulting Group, Inc., exist at the sampling locations. Note, too, that the passage of time may affect conditions at the sampling locations.

YOUNGDAHL CONSULTING GROUP, INC. GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING	Project No.: 95176.8 **March 2002**	**EXPLORATORY BORING LOG** **Folsom Water Treatment Plant** Folsom, California	FIGURE **A-3**

Logged By: **RFB**	Date: **17 March 2003**	Elevation: **unknown**	Boring No. **B-2**
Equipment: **CME 850 with 6" Solid Flight**			

Depth (Feet)	Graphic Log	Ground Water	Geotechnical Description & Unified Soil Classification	Sample	Blow Count	Dry Density (pcf)	Moisture Content (%)	Tests & Comments
1			Brown clayey **GRAVEL/SAND (GC/SC)** with rock fragments, medium dense, moist (completely weathered rock)		35			
2								
3			Gray metavolcanic **ROCK**, highly weathered, moderately strong to strong					
4								
5								
6					50/5"			*Very Hard Drilling*
7								
8								
9			*Grades moderately weathered*					
10			Boring terminated at 10' (due to practical refusal) No groundwater encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Note: The boring log indicates subsurface conditions only at the specific location and time noted. Subsurface conditions, including groundwater levels, at other locations of the subject site may differ significantly from conditions which, in the opinion of Youngdahl Consulting Group, Inc., exist at the sampling locations. Note, too, that the passage of time may affect conditions at the sampling locations.

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Project No.: 95176.8

March 2002

EXPLORATORY BORING LOG

Folsom Water Treatment Plant
Folsom, California

FIGURE **A-4**

Logged By: **RFB**	Date: **17 March 2003**	Elevation: **unknown**	Boring No. **B-3**
Equipment: **CME 850 with 6" Solid Flight**			

Depth (Feet)	Graphic Log	Ground Water	Geotechnical Description & Unified Soil Classification	Sample	Blow Count	Dry Density (pcf)	Moisture Content (%)	Tests & Comments
1			Brown silty/clayey **GRAVEL (GM)** with sand and rock fragments, medium dense, moist (FILL)		33			**BULK A** @ 0 - 5'
2								
3								**Note:** The boring log indicates subsurface conditions only at the specific location and time noted. Subsurface conditions, including groundwater levels, at other locations of the subject site may differ significantly from conditions which, in the opinion of Youngdahl Consulting Group, Inc., exist at the sampling locations. Note, too, that the passage of time may affect conditions at the sampling locations.
4								
5								
6					33			
7								
8			Brown **SILT (ML)** with sand and gravel, medium dense, damp (NATIVE)					
9								
10								
11			Gray metavolcanic **BEDROCK**, completely weathered, closely fractured, weak to moderately strong, damp		37			
12								
13								
14								
15								
16			*Grades highly weathered, moderately strong to strong, dry*		50/3"			
17								
18								
19								*Moderate Drilling*
20								
21								
22								
23								*Hard Drilling*
24								
25			Boring terminated at 25' No groundwater encountered					

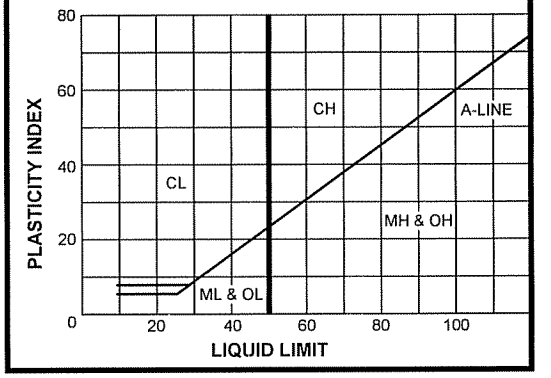
YOUNGDAHL CONSULTING GROUP, INC. GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING	Project No.: 95176.8	**EXPLORATORY BORING LOG** **Folsom Water Treatment Plant** Folsom, California	FIGURE **A-5**
	March 2002		

UNIFIED SOIL CLASSIFICATION SYSTEMS

MAJOR DIVISION			SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS Over 50% > #200 sieve	GRAVELS Over 50% > #4 sieve	Clean GRAVELS With Little Or No Fines	GW	Well graded **GRAVELS, GRAVEL-SAND** mixtures
			GP	Poorly graded **GRAVELS, GRAVEL-SAND** mixtures
		GRAVELS With Over 12% Fines	GM	Silty **GRAVELS**, poorly graded **GRAVEL-SAND-SILT** mixtures
			GC	Clayey **GRAVELS**, poorly graded **GRAVEL-SAND-CLAY** mixtures
	SANDS Over 50% < #4 sieve	Clean SANDS With Little Or No Fines	SW	Well graded **SANDS**, gravelly **SANDS**
			SP	Poorly graded **SANDS**, gravelly **SANDS**
		SANDS With Over 12% Fines	SM	Silty **SANDS**, poorly graded **SAND-SILT** mixtures
			SC	Clayey **SANDS**, poorly graded **SAND-CLAY** mixtures
FINE GRAINED SOILS Over 50% < #200 sieve	SILTS & CLAYS Liquid Limit < 50		ML	Inorganic **SILTS**, silty or clayey fine **SANDS**, or clayey **SILTS** with plasticity
			CL	Inorganic **CLAYS** of low to medium plasticity, gravelly, sandy, or silty **CLAYS**, lean **CLAYS**
			OL	Organic **CLAYS** and organic silty **CLAYS** of low plasticity
	SILTS & CLAYS Liquid Limit > 50		MH	Inorganic **SILTS**, micaceous or diamacious fine sandy or silty soils, elastic **SILTS**
			CH	Inorganic **CLAYS** of high plasticity, fat **CLAYS**
			OH	Organic **CLAYS** of medium to high plasticity, organic **SILTS**
HIGHLY ORGANIC CLAYS			PT	PEAT & other highly organic soils

PLASTICITY CHART

USED FOR CLASSIFICATION OF FINE GRAINED SOILS



SAMPLE DRIVING RECORD

BLOWS PER FOOT	DESCRIPTION
25	25 Blows drove sampler 12 inches, after initial 6 inches of seating
50/7"	50 Blows drove sampler 7 inches, after initial 6 inches of seating
50/3"	50 Blows drove sampler 3 inches during or after initial 6 inches of seating

Note: To avoid damage to sampling tools, driving is limited to 50 blows per 6 inches during or after seating interval.

SOIL GRAIN SIZE

U.S. STANDARD SIEVE	6"	3"	¾"	4	10	40	200		
	BOULDER	COBBLE	GRAVEL		SAND			SILT	CLAY
			COARSE	FINE	COARSE	MEDIUM	FINE		
SOIL GRAIN SIZE IN MILLIMETERS	150	75	19	4.75	2.0	.425	0.075	0.002	

KEY TO TEST DATA

	Standard Penetration test
	2.5" O.D. Modified California Sampler
	3" O.D. Modified California Sampler
	Shelby Tube Sampler
	2.5" Hand Driven Liner
	Bulk Sample
	Water Level At Time Of Drilling
	Water Level After Time Of Drilling
P	Perched Water

KEY TO TEST DATA

	Water Seepage
MD	Moisture Density Test
NFWE	No Free Water Encountered
FWE	Free Water Encountered
REF	Sampling Refusal
DD	Dry Density (pcf)
MC	Moisture Content (%)
LL	Liquid Limit
PI	Plasticity Index
PP	Pocket Penetrometer
UCC	Unconfined Compression (ASTM D2166)
TVS	Pocket Torvane Shear
EI	Expansion Index (ASTM D4829)
Su	Undrained Shear Strength

YOUNGDAHL CONSULTING GROUP, INC.
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Project No.: 95176.8

March 2002

SOIL CLASSIFICATION CHART & LOG EXPLANATION
Folsom Water Treatment Plant
Folsom, California

FIGURE
A-6

APPENDIX B

Laboratory Testing

Sieve Analysis
Modified Proctor Test

Introduction

Our laboratory testing program for this evaluation included numerous visual classifications, Sieve Analysis, and Modified Proctor tests. The following paragraphs describe our procedures associated with each type of test. Graphical results of certain laboratory tests are enclosed in this appendix. The contents of this appendix shall be integrated with the geotechnical engineering study of which it is a part. They shall not be used in whole or in part as a sole source for information or recommendations regarding the subject site.

Laboratory Testing

Visual Classification Procedures

Visual soil classifications were conducted on all samples in the field and on selected samples in our laboratory. All soils were classified in general accordance with the United Soil Classification System, which includes color, relative moisture content, primary soil type (based on grain size), and any accessory soil types. The resulting soil classifications are presented on the exploration logs in Appendix A.

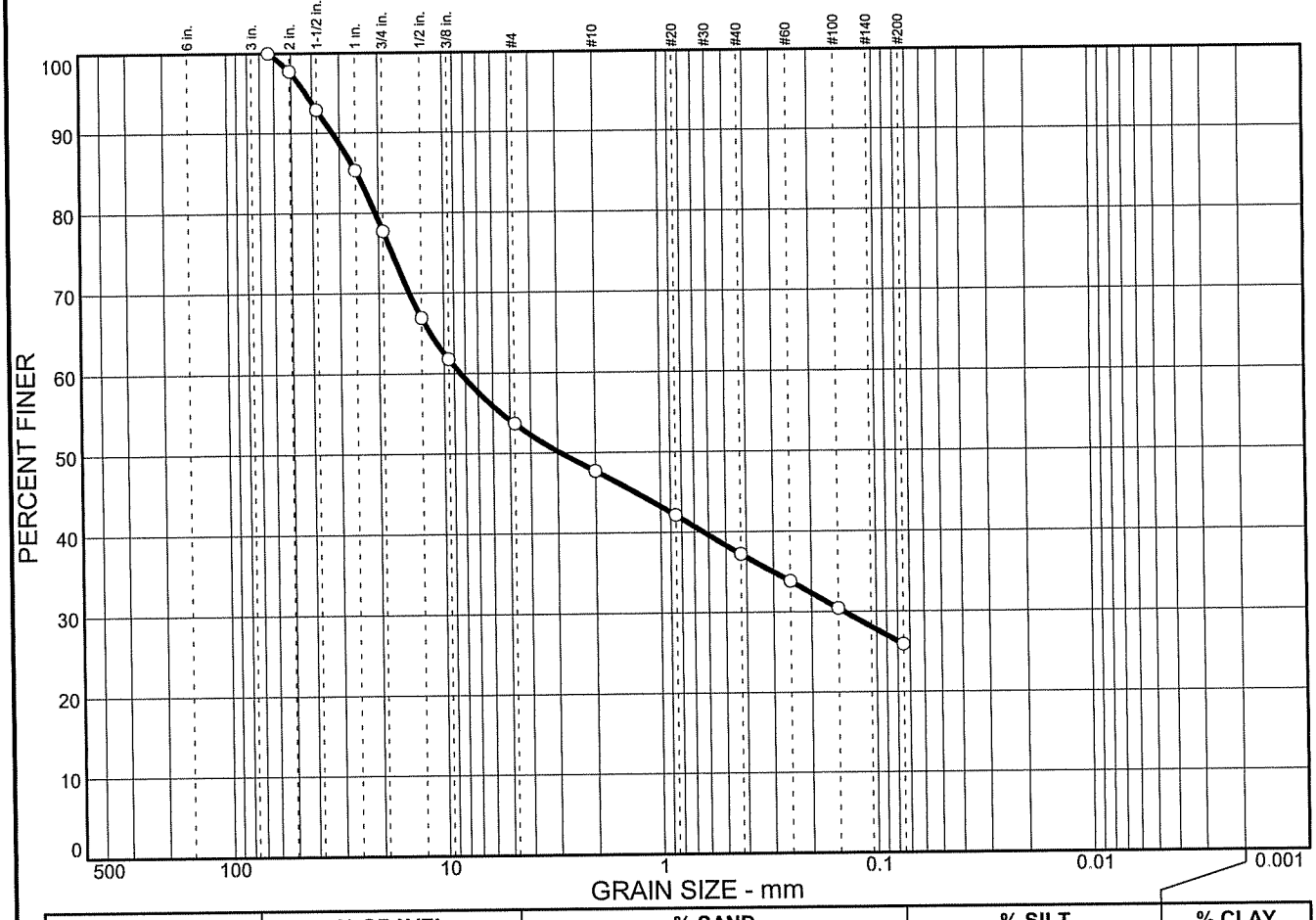
Grain Size Analysis

A grain size analysis indicates the range of soil particle diameters included in a particular sample. Grain size analyses were performed on representative samples in general accordance with ASTM:D-422. The results of these tests are presented on Figure B-1, this Appendix.

Maximum Dry Density Determination Procedures

A modified Proctor Test (ASTM D1557-91A) was conducted to provide the optimum moisture and maximum dry density on the near surface material. The results of this test is presented on Figure B-2, this Appendix.

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	46.3	27.8	25.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2-1/2 in.	100.0		
2 in.	97.7		
1-1/2 in.	92.9		
1 in.	85.3		
3/4 in.	77.7		
1/2 in.	66.9		
3/8 in.	61.8		
#4	53.7		
#10	47.7		
#20	42.1		
#40	37.2		
#60	33.8		
#100	30.4		
#200	25.9		

* (no specification provided)

Soil Description

Silty GRAVEL
w/sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 25.1 D_{60}= 8.39 D_{50}= 2.90
D_{30}= 0.141 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

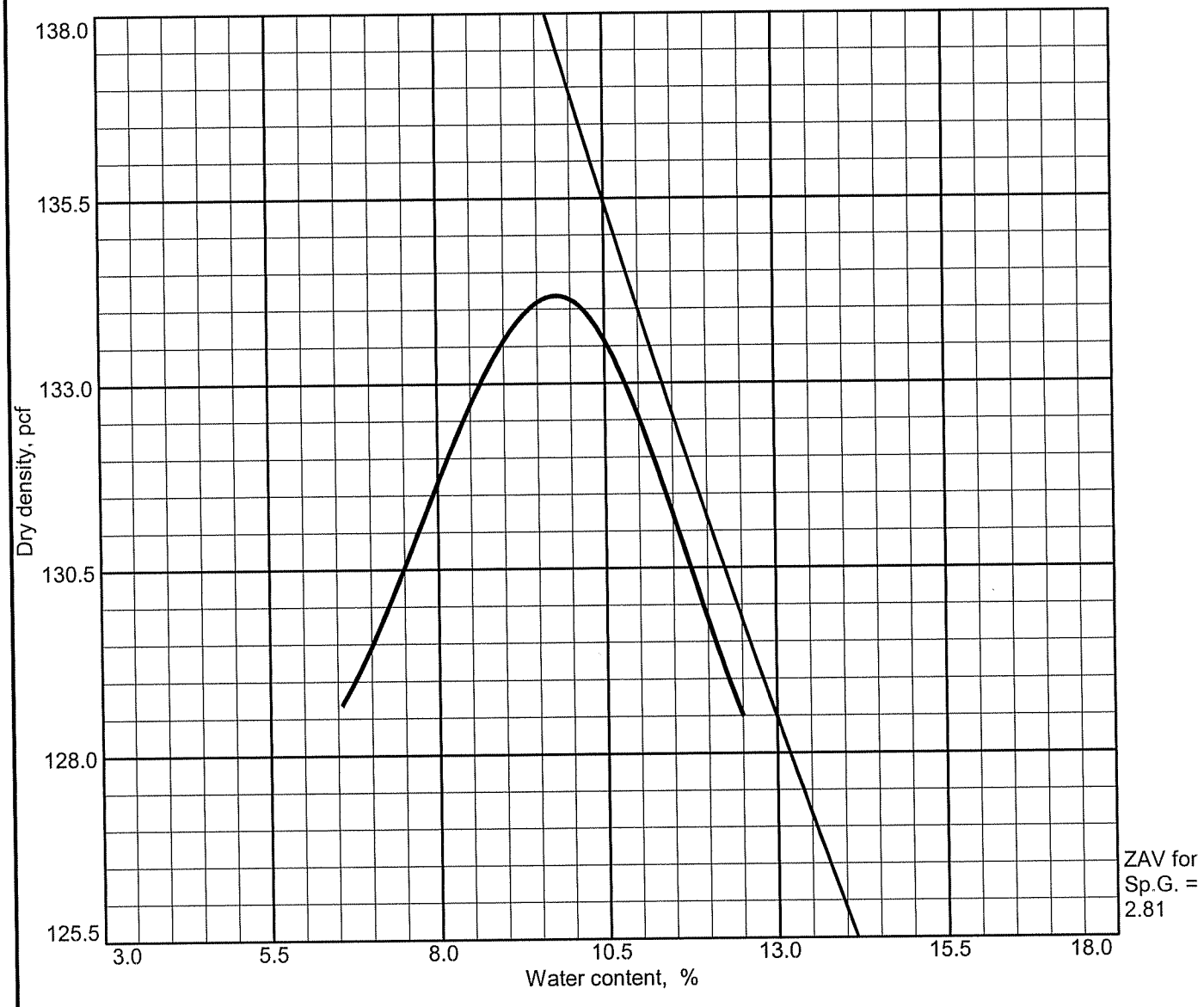
Sample No.: BK A, 3/18/03 **Source of Sample:** NATIVE MATERIAL **Date:** 3/21/03
Location: **Elev./Depth:**

YOUNGDAHL CONSULTING GROUP, INC.

Client:
Project: FOLSOM WATER TREATMENT PLANT

Project No: 95176.8 **Figure Number** B-1

COMPACTION CURVE REPORT



Test specification: ASTM D 1557-91 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	GM			2.77			46.3	25.9

TEST RESULTS

Maximum dry density = 134.2 pcf

Optimum moisture = 9.8 %

MATERIAL DESCRIPTION

Silty GRAVEL
w/sand

Project No. 95176.8 **Client:**

Project: FOLSOM WATER TREATMENT PLANT

● **Source:** NATIVE MATERIAL **Sample No.:** BK A, 3/18/03

Remarks:

0-5'
+ #4 MATERIAL = 46.3%

COMPACTION CURVE REPORT

YOUNGDAHL CONSULTING GROUP, INC.

Figure Number B-2

APPENDIX C

Refraction Seismic Rippability/Excavatibility
& Seismic Shear Wave Investigation (Gasch & Associates)

APPENDIX A
Field Study
Site Plan
Logs of Borings

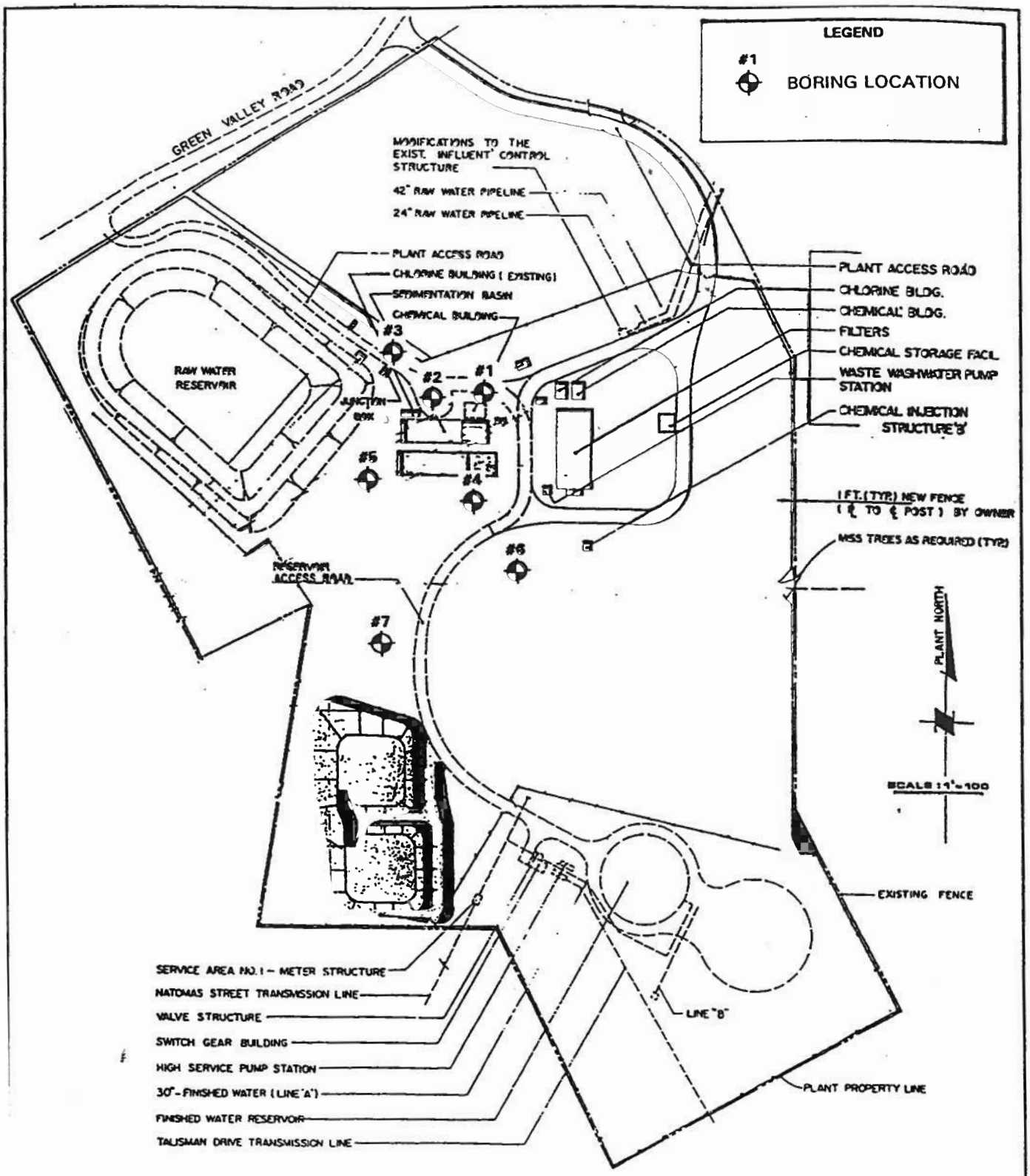
Introduction

The contents of this appendix shall be integrated with the geotechnical engineering study of which it is a part. They shall not be used in whole or in part as a sole source for information or recommendations regarding the subject site.

Field study

Our field study included a site reconnaissance by a *Youngdahl & Associates, Inc.*, representative followed by a subsurface exploration program conducted on 28 June 1995, which included the drilling and logging of 7 borings under his direction at the approximate locations shown on Figure A-1, this Appendix. Drilling of the borings was accomplished with a B53 truck-mounted drill rig equipped with a 4 inch diameter solid stem auger. As the drilling proceeded, relatively undisturbed soil samples were collected using a 2.5 inch O.D. split-tube sampler containing 2.0 inch O.D. brass liners. The sampler was advanced into the soil at various depths under impact of a 140 pound hammer falling 30 inches. The number of blows required to advance the sampler a measured distance of 12 inches into the soil, after seating the sampler 6 inches, was adjusted to the corresponding standard penetration resistance (N) value. The samples collected from the borings were sealed and returned to our laboratory for testing.

The soils encountered were logged during drilling and provide the basis for the "Logs of Borings", Figures A-2 through A-8, this Appendix. These logs show a graphic representation of the soil profile, the location and depths at which samples were collected and the laboratory test results.



Project No. 95176.E	JULY 1995	**SITE PLAN** WATER TREATMENT PLANT EXPANSION Folsom, California	FIGURE A-1

YOUNGDAHL & ASSOCIATES, INC.
GEOTECHNICAL & ENVIRONMENTAL

LOGGED BY JM	SURFACE ELEVATION 394.0 -feet	BORING NO. 1
DRILL RIG Mobile B-53	BORING DIAMETER 4 -inch	DATE DRILLED 6/28/95

ELEVATION (FEET) DEPTH	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
390 / 0				Light brown fine sandy SILT - slightly moist, loose to medium dense, with some gravel and cobbles (FILL)	ML					
				Medium dense						
5	1A			Slightly clayey, with gravel and rock fragments		7	116.3	18.7		BAG
385 / 10				Moist						
	1B					7				BAG
380				Light brown to gray-brown silty sandy gravel and cobbles - moist, medium dense, difficult drilling (FILL)	GM					
15				Light brown and brown fine sandy SILT - very moist, medium stiff to stiff, with occasional rock fragments (NATIVE)	ML					
				Hole sloughing						
				Grading wet						
375				Brown and gray-brown and gray COPPER HILL VOLCANICS - damp, weathered, hard, with occasional silty and sandy seams						
20	1C					52/6"		14.0		
370 / 25				Boring terminated at 25 ft; Perched water level at 16 feet following drilling.						
365										

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EXPLORATORY BORING LOG

FOLSOM WATER TREATMENT PLANT

PROJECT NO.	DATE	FIGURE NO
95176.E	July 1995	A -2

LOGGED BY JM	SURFACE ELEVATION 393.0 -feet	BORING NO. 2
DRILL RIG Mobile B-53	BORING DIAMETER 4 -inch	DATE DRILLED 6/28/95

ELEVATION (FEET) DEPTH	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
				Light brown silty CLAY with gravel - very moist, stiff (FILL)	CL					
390				Mottled brown silty SAND with gravel - moist, medium dense (NATIVE)	SM					
5	2A			Brown and gray-brown and gray COPPER HILL VOLCANICS - moist to damp, weathered, moderately hard, with occasional silt and sand seams and clayey nodules						
	2B					72	123.5	8.5		
385										
10	2C					65	108.3	11.6		
	2D									
380				Hard drilling						
15										
375				▽						
	2E			Green to gray to gray-brown				16.6		
20										
370				▼ Green with rusty mottles, completely weathered lense, with clayey nodules, crumbles easily						
25	2F					66		20.8		
				Boring hole terminated at 26.5 feet. Perched water level at 18.5 feet following drilling.						
365										

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EXPLORATORY BORING LOG

FOLSOM WATER TREATMENT PLANT

PROJECT NO.	DATE	FIGURE NO
95176.E	July 1995	A -3

LOGGED BY JM	SURFACE ELEVATION 393.5 -feet	BORING NO. 3
DRILL RIG Mobile B-53	BORING DIAMETER 4 -inch	DATE DRILLED 6/28/95

ELEVATION (FEET) DEPTH	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
				Light brown silty sandy GRAVEL - damp, medium dense (FILL)	GM					
390				Mottled green and red COPPER HILL VOLCANICS - damp, moderately weathered, moderately hard (NATIVE)						
5	3A 3B					68	106.5	9.4		
385										
10	3C					90	109.4	12.0		
380										
15	3D			▽		74		7.4		BAG
375										
20	3E							11.1		BAG
370				▼ Grading wet near 23.0 feet						
25				Boring hole terminated at 25 feet; Perched water encountered at 23.0 feet.						
365										

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EXPLORATORY BORING LOG

FOLSOM WATER TREATMENT PLANT

PROJECT NO.	DATE	FIGURE NO
95176.E	July 1995	A -4

LOGGED BY JM	SURFACE ELEVATION 390.5 -feet	BORING NO. 4
DRILL RIG Mobile B-53	BORING DIAMETER 4 -inch	DATE DRILLED 6/28/95

ELEVATION (FEET) DEPTH	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
390				Brown silty sandy GRAVEL - damp, dense (FILL)	GM					
				With some cobbles						
5 385	4A					90		11.5		
				Olive brown clayey silty SAND - moist, medium dense	SM					
10 380	4B					30	101.7	13.3		BAG
15 375	4C			Olive-brown and brown Copper Hill Volcanics - moist, completely weathered, moderately hard, with numerous silt and sand lenses and clay nodules		5 0/5 i	n.			BAG
20 370	4D					18				BAG
25 365				Boring hole terminated at 25.0 feet; Perched water level at 23.0 feet.						

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EXPLORATORY BORING LOG

FOLSOM WATER TREATMENT PLANT

PROJECT NO.	DATE	FIGURE NO
95176.E	July 1995	A-5

LOGGED BY JM	SURFACE ELEVATION 390.5 -feet	BORING NO. 5
DRILL RIG Mobile B-53	BORING DIAMETER 4 -inch	DATE DRILLED 6/28/95

ELEVATION (FEET) DEPTH	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
390				Brown silty sandy GRAVEL - damp, medium dense (FILL)	GM					
5										
385				Brown sandy silty CLAY - moist, stiff (FILL)	CL					
10										
380	5A 5B			Olive-brown clayey silty SAND - moist, medium dense (FILL)	SC	10	111.4	17.0		
15	5C			Olive-brown clayey silty fine sand - moist, medium dense, with occasional weathered rock fragments	SM			18.0		BAG
375										
20	5D			Olive-brown and gray COPPER HILL VOLCANICS - moist, weathered, moderately hard to hard, with occasional silt and sand lenses		66		7.9		BAG
370				Grades less weathered						
25				Refusal Boring hole terminated at 23.0 feet; No groundwater encountered.						
365										

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EXPLORATORY BORING LOG

FOLSOM WATER TREATMENT PLANT

PROJECT NO.	DATE	FIGURE NO
95176.E	July 1995	A -6

LOGGED BY JM	SURFACE ELEVATION 386.5 -feet	BORING NO. 6
DRILL RIG Mobile B-53	BORING DIAMETER 4 -inch	DATE DRILLED 6/28/95

ELEVATION (FEET) DEPTH	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
385				Brown, silty SAND with gravel - damp, loose to medium dense (FILL)	SM GM					
5	6A					6		8.9		
380										
10										
375				Light brown to olive-brown silty sand with rock fragments - moist, medium dense (NATIVE)	SM					
				Mottled red-brown COPPER HILL VOLCANICS - damp, moderately weathered, moderately hard						
15	6B					52				
370										
20				Grades less weathered, difficult drilling						
365										
25				Boring hole terminated at 25 feet; No groundwater encountered.						
360										

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EXPLORATORY BORING LOG

FOLSOM WATER TREATMENT PLANT

PROJECT NO.	DATE	FIGURE NO
95176.E	July 1995	A-7

LOGGED BY JM	SURFACE ELEVATION 380.0 -feet	BORING NO. 7
DRILL RIG Mobile B-53	BORING DIAMETER 4 -inch	DATE DRILLED 6/28/95

ELEVATION (FEET)	DEPTH	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
					Brown silty clayey SAND - damp, medium dense	SC					
375	5	7A			Loose, very moist		5		15.2		BAG
					Light brown and brown slightly clayey silty fine SAND - moist, medium dense, with occasional weathered rock fragments	SM					
370	10	7B			Mottled brown and gray-brown COPPER HILL VOLCANICS - damp, weathered, hard		63		14.7		BAG
365	15	7C					90		10.2		BAG
360	20										
355	25	7D			Boring hole terminated at 25.0 feet; Perched water encountered at 24.5 feet.				19.3		BAG

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EXPLORATORY BORING LOG

FOLSOM WATER TREATMENT PLANT

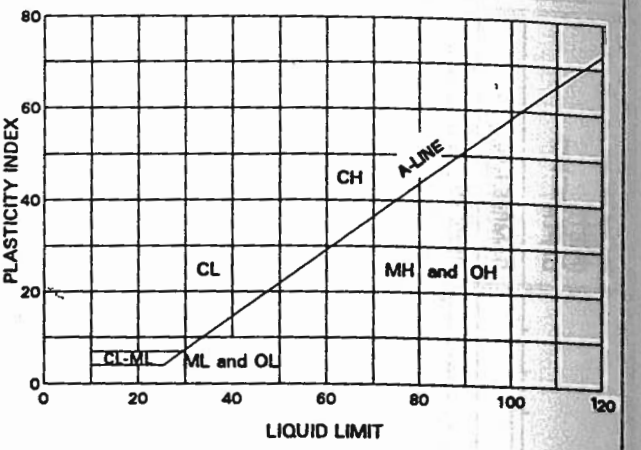
PROJECT NO.	DATE	FIGURE NO
95176.E	July 1995	A -8

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS More than Half > #200 sieve	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL - SAND - SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL - SAND - CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND - CLAY MIXTURES
FINE GRAINED SOILS More than Half < #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

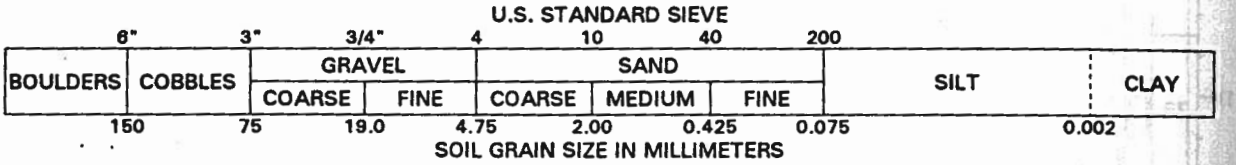
PLASTICITY CHART

USED FOR CLASSIFICATION OF FINE GRAINED SOILS



SOIL GRAIN SIZE

U.S. STANDARD SIEVE



SOIL GRAIN SIZE IN MILLIMETERS

SAMPLER DRIVING RECORD

Blows Per Foot	Description
25	25 blows drove sampler 12 inches, after initial 6 inches of seating.
50/7"	50 blows drove sampler 7 inches, after initial 6 inches of seating.
Ref/3"	50 blows drove sampler 3 inches during initial 6-inch seating interval.

Note: To avoid damage to sampling tools, driving is limited to 50 blows during or after seating interval.

LL	Liquid Limit (in %)	CONS	Consolidation (ASTM D2435)
PI	Plasticity Index	UU	Unconsolidated Undrained Triaxial (ASTM D2850)
▣	Bag Sample	CU	Consolidated Undrained Triaxial (ASTM D4767)
◫	Drive, No Sample Collected	DS	Consolidated Drained Direct Shear (ASTM D3080)
◪	2 1/2" O.D. Sampler, Not Tested	PP	Pocket Penetrometer
◪	2 1/2" O.D. Mod. Calif. Sampler, Tested	UCC	Unconfined Compression (ASTM D2166)
◧	Standard Penetration Test	TVS	Pocket Torvane Shear
⊠	3" O.D. Split Spoon Sampler, Not Tested	CP	Compaction Test (ASTM D1557)
◆	3" O.D. Split Spoon Sampler, Tested	EI	Expansion Index (ASTM D4829)
⊡	Sample Attempt With No Recovery	PERM	Permeability (ASTM D2434)
▽	Water Level At Time Of Drilling	GSD	Grain Size Distribution (ASTM D422)
▼	Water Level After Drilling	PH & R	Corrosivity (ASTM D4972)

KEY TO TEST DATA

YOUNGDAHL & ASSOCIATES, INC.
GEOTECHNICAL & ENVIRONMENTAL

Job No: 95176.E
Date: July 1995

SOIL CLASSIFICATION CHART AND BORING LOG LEGEND

FOLSOM WATER TREATMENT PLANT

FIGURE NO A-9

APPENDIX B

Laboratory Testing

Direct Shear Test

"R" Value Test

Laboratory Testing

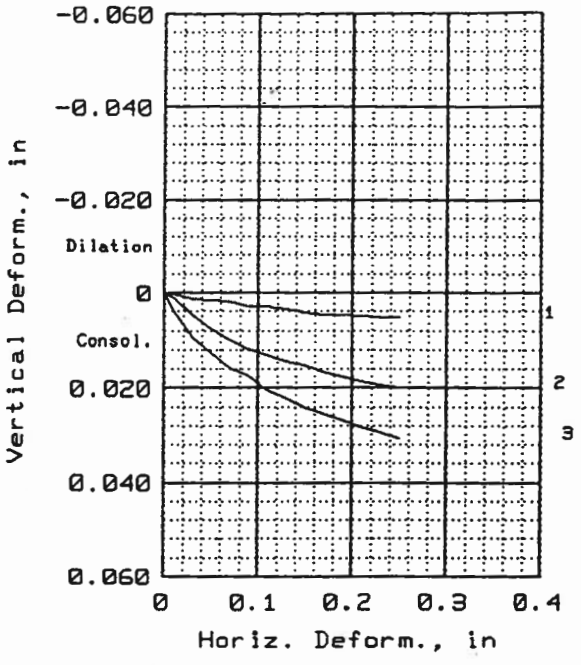
The laboratory testing of undisturbed samples was directed toward determining the physical and engineering properties of the soils underlying the site.

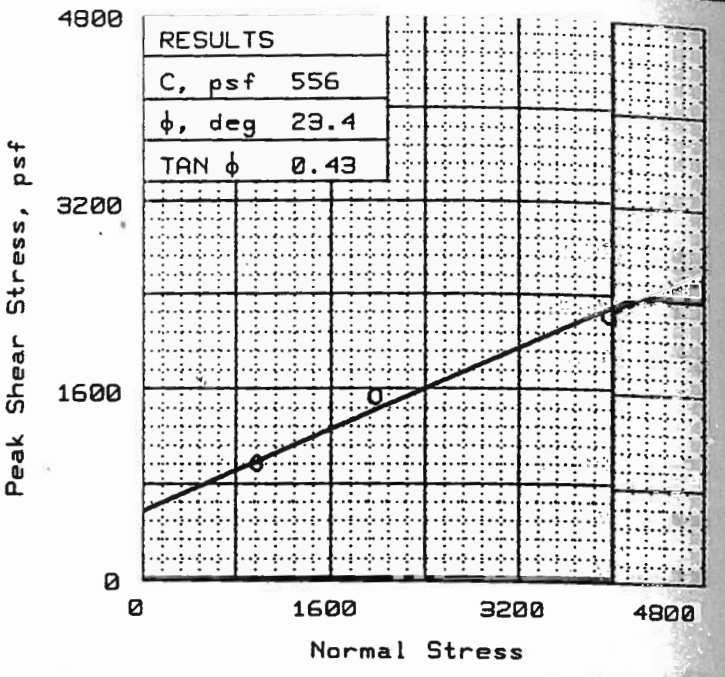
Moisture content and dry density tests (ASTM D2937-83) were performed on representative undisturbed soil samples to determine the consistency of the soil and the moisture variation throughout the studied soil profile.

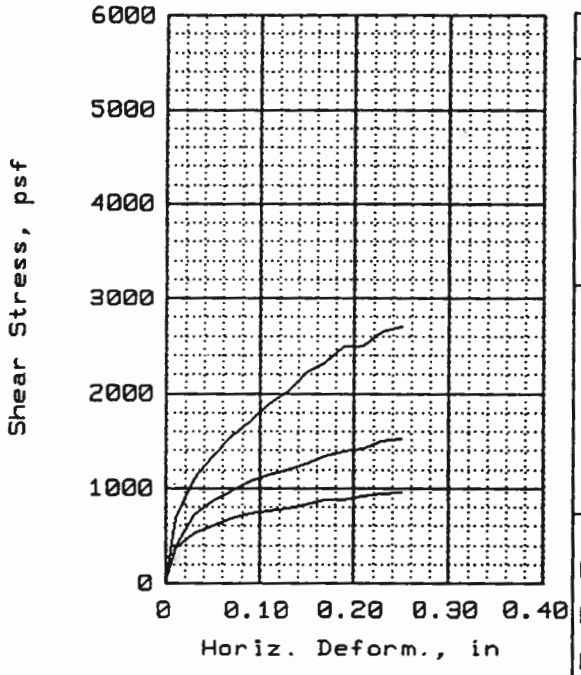
The strength parameters of onsite materials were based on a direct shear test (ASTM D3080-90) performed on a remolded sample representative of the near surface soils encountered at the site. The results of this test are presented in Figure B-1, this Appendix.

An R-Value test (California Test Method 301 - F) was performed to obtain pavement design parameters. The results of this test are presented on Figure B-2, this Appendix.

The results of the laboratory testing of undisturbed soil samples are summarized on the Exploratory Logs, Appendix A, Figure No.'s A-2 through A-8.







SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	8.7	8.0	8.7
	DRY DENSITY, pcf	110.7	111.5	110.9
	SATURATION, %	46.7	43.9	46.8
	VOID RATIO	0.494	0.483	0.492
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.5	17.6	16.4
	DRY DENSITY, pcf	111.9	114.2	116.8
	SATURATION, %	102.7	103.9	104.3
	VOID RATIO	0.478	0.449	0.416
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.99	0.98	0.95
NORMAL STRESS, psf		1000	2000	4000
MAXIMUM SHEAR, psf		961	1526	2219
RESIDUAL SHEAR, psf				
Strain rate, %/min		0.029	0.028	0.024

SAMPLE DATA

SAMPLE TYPE: REMOLDED DRAINED

DESCRIPTION: Olive Brown silty SAND

LL= PL= PI=

SPECIFIC GRAVITY= 2.65

REMARKS:

CLIENT:

PROJECT: FOLSOM WATER TREATMENT

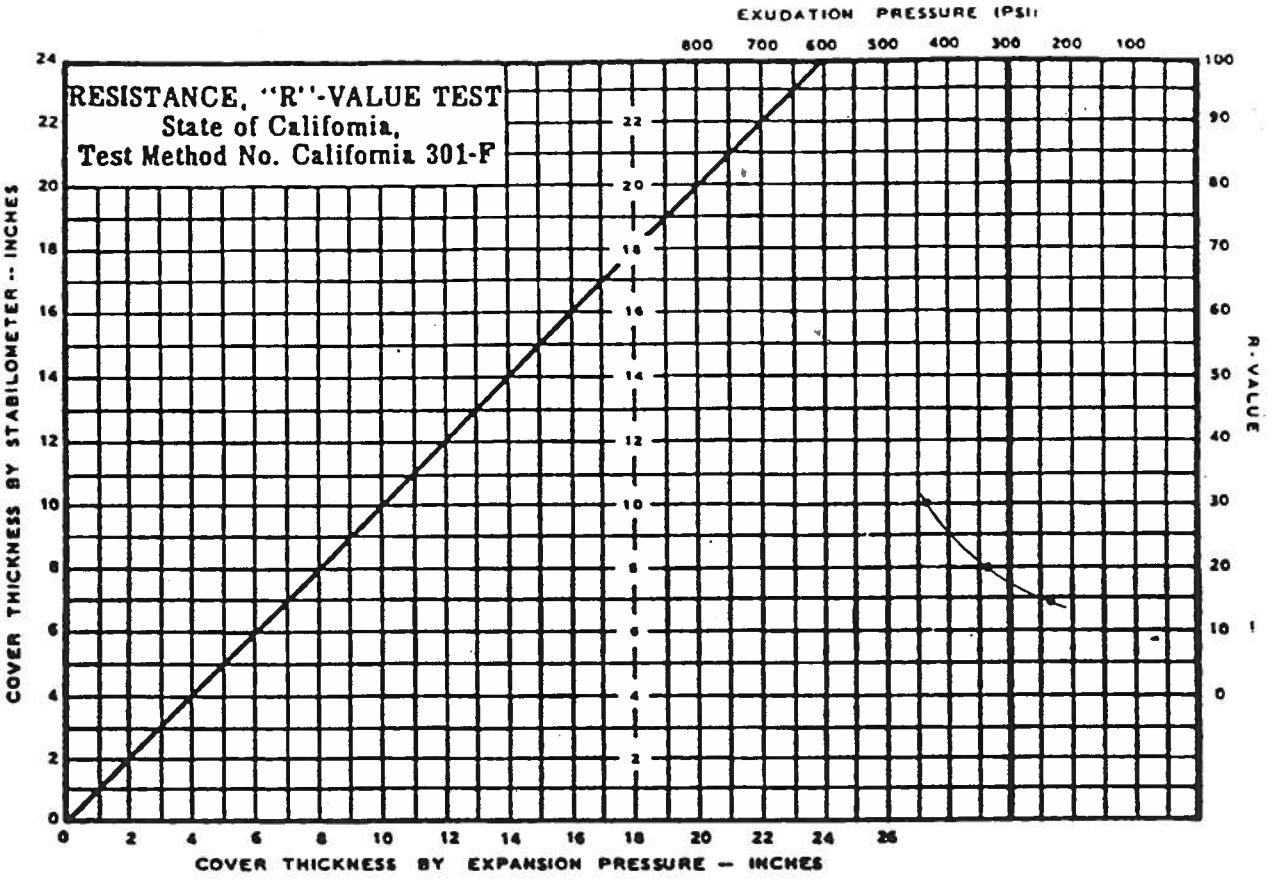
SAMPLE LOCATION: BULK #1

PROJ. NO.: 95176 DATE: 7/10/95

FIG. NO. **B-1**

DIRECT SHEAR TEST REPORT

YOUNGDAHL & ASSOCIATES, INC.



Sample: Bulk #1 (near Boring 7)
Description: Yellow-brown sandy SILT with gravel

Specimen	A	B	C
Exudation Pressure, p.s.i.	235	339	442
Expansion dial (.0001")	16	23	33
Expansion Pressure, p.s.i.	69	100	143
Resistance Value, "R"	14	20	30
% Moisture at Test	12.1	11.4	10.8
Dry Density at Test,p.c.f.	127.3	129.2	131.2
"R" Value at 300 p.s.i., Exudation Pressure	=(18)		

Project No. 95176E

YOUNGDAHL & ASSOCIATES, INC.
GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION LAB

"R VALUE" TEST
(Cal. 301-F)

FIGURE
B-2

ATTACHMENT 1 – UPDATED 100% PROJECT DRAWINGS

Contract Drawings For

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

CITY OF
FOLSOM
DISTINCTIVE BY NATURE

DRAWING INDEX

GENERAL

1.	G01	COVER SHEET, LOCATION MAPS AND DRAWING INDEX
2.	G02	SYMBOLS AND ABBREVIATIONS AND GENERAL NOTES
3.	G03	PROCESS FLOW DIAGRAM
4.	G04	SITE PLAN AND SEQUENCING NOTES
5.	G05	SITE PHOTOS

DEMOLITION

6.	D01	DEMOLITION PLAN AND SECTIONS

CIVIL

7.	C01	ENLARGED 36" RBW-WSP PIPING PLAN
8.	C02	STANDARD DETAILS

STRUCTURAL PROCESS

9.	SP01	DECANT PUMP STATION PLAN AND SECTION
10.	SP02	STANDARD DETAILS

ELECTRICAL

11.	E01	LEGEND, SYMBOLS, AND ABBREVIATIONS
12.	E02	EXISTING MCC 1A ONE LINE DIAGRAM - DEMOLITION
13.	E03	RECLAMATION PUMP STATION - DEMOLITION
14.	E04	OVERALL SITE PLAN
15.	E05	EXISTING MCC 1A ONE LINE DIAGRAM - MODIFIED
16.	E06	POWER BUILDING PLAN
17.	E07	RECLAMATION PUMP STATION
18.	E08	VFD CONTROL DIAGRAM RECLAMATION BACKWASH PUMPS
19.	E09	DETAILS

PROCESS AND INSTRUMENTATION

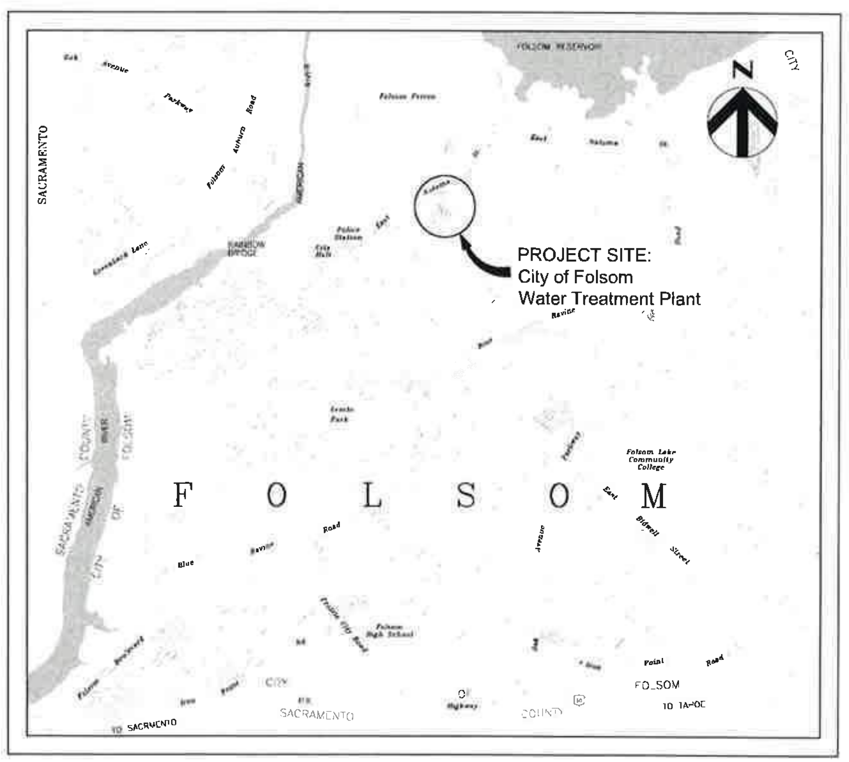
20.	I01	LEGEND, SYMBOLS AND ABBREVIATIONS
21.	I02	DECANT PUMP STATION P&ID

ISSUED FOR BIDS

FEBRUARY 2022

City Of Folsom

Project No. WA2103



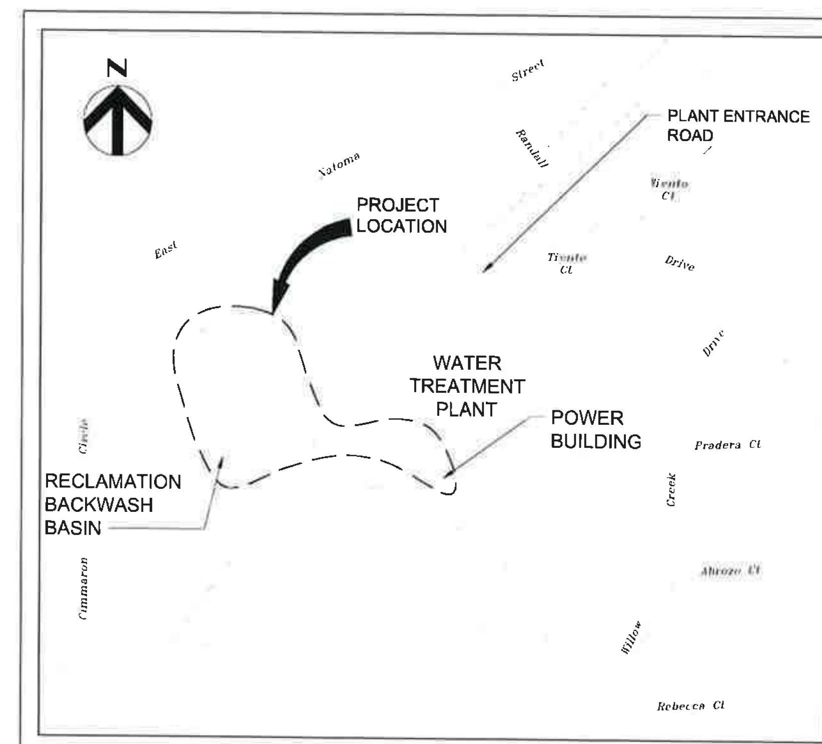
LOCATION MAP

APPROVED BY:

MARCUS YASUTAKE, P.E. ENVIRONMENTAL AND WATER RESOURCES DIRECTOR	2/10/2022 DATE
STEVEN KRAHN, P.E. CITY ENGINEER	2/10/22 DATE
ARASHDEEP SINGH, P.E. HDR, PROJECT MANAGER	02/10/22 DATE

LICENSED PROFESSIONAL ENGINEER ARASHDEEP SINGH No. C 90090 EXP. 06-30-23 CIVIL STATE OF CALIFORNIA

02/10/22



GENERAL VICINITY MAP

ABBREVIATION

A/E	ARCHITECT/ENGINEER
ABAN	ABANDON
ABC	AGGREGATE BASE COURSE
AGGR	AGGREGATE
ALIG	ALIGNMENT
APRX	APPROXIMATE
APVD	APPROVED
AVE	AVENUE
AVG	AVERAGE
AWG	AMERICAN WIRE GAGE
BF	BLIND FLANGE
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BM	BENCHMARK
BPS	BOOSTER PUMP STATION
CB	CATCH BASIN
CF	CUBIC FEET (FOOT)
CIP	CAST-IN-PLACE
CL	CENTERLINE
CMU	CONCRETE MANSONRY UNIT
CMLC	CEMENT MORTAR LINED AND COATED
CO	CLEANOUT, CONCRETE OPENING
COMB	COMBINATION
CONC	CONCRETE
CONST	CONSTRUCTION
CP	CONTROL POINT
CPLG	COUPLING
DG	DEGENERATED GRANITE
DEG	DEGREE
DEMO	DEMOLITION
DET	DETAIL
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DIST	DISTANCE, DISTRIBUTION
DWG	DRAWING
E	EAST
EL	ELBOW, ELEVATION
EMH	ELECTRICAL MANHOLE
ENGR	ENGINEER
EOP	EDGE OF PAVEMENT
ESEW	EMERGENCY SHOWER AND EYE WASH
EX	EXISTING
EXT	EXTERIOR, EXTERNAL, EXTENSION
FBO	FURNISHED BY OWNER
FCA	FLANGED COUPLING ADAPTER
FDC	FIRE DEPARTMENT CONNECTION
FE	FLANGED END
FG	FINISHED GRADE
FH	FIRE HYDRANT
FL	FLOW, FLOW LINE
FLG	FLANGE
FN	FENCE
FRP	FIBER-REINFORCED PLASTIC
FT	FEET, FOOT
FTG	FITTING
FUT	FUTURE
G	GAS
GR	GRADE
GV	GATE VALVE
GVL	GRAVEL
H	HEIGHT
HP	HIGH POINT
ID	INSIDE DIAMETER, INTERIOR DIMENSION
IE	INVERT ELEVATION
IN	INCH
INV	INVERT
JT	JOINT
L	LEFT
LATL	LATERAL
LP	LOW POINT
LOTO	LOCK OUT TAG OUT
MAX	MAXIMUM
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
N	NORTH
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OVERFLOW
OH	OVERHEAD
PB	PULL BOX
PE	PLANE END
PL	PROPERTY LINE
PP	POWER POLE
PROP	PROPERTY, PROPOSED
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PS	PUMP STATION
QTY	QUANTITY
R	RIGHT
RED	REDUCER
REM	REMOVE
REQD	REQUIRED
RFCA	RESTRAINED FLANGE COUPLING ADAPTOR
ROW	RIGHT-OF-WAY
S	SOUTH
SAM	SAMPLE LINE
SCH	SCHEDULE
SECT	SECTION
SHT	SHEET
SL	SLOPE
SLV	SLEEVE
SPEC	SPECIFICATION
ST	STREET
STA	STATION
STD	STANDARD
SYM	SYMBOL
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
VT	VENT
VTR	VENT THROUGH ROOF
W/	WITH
W/O	WITHOUT
W	WEST, WATER MAIN
WS	WATERSTOP, WATER SURFACE
WSP	WELDED STEEL PIPE
XSECT	CROSS SECTION

SITE PLAN SYMBOLOGY

- 50.5 — CONTOUR
- VEGETATION
- CO — CLEAN OUT
- MH — MANHOLE
- CB — STORM DRAIN CATCH BASIN
- UV — UTILITY VAULT
- PP — POWER POLE
- TP — TELEPHONE POLE
- FH — FIRE HYDRANT
- YH-X — YARD HYDRANT
- 75.5 — EXISTING SPOT ELEVATION
- 75.8 — FINISHED SPOT ELEVATION
- DOWNGUY
- CP-X — HORIZONTAL CONTROL POINT
- BENCHMARK

NOTES:

- T — TELEPHONE LINE
- E — ELECTRIC LINE
- F — FIBER OPTIC
- C — COMMUNICATION
- HANDRAIL
- PIPELINE
- LARGE PIPELINE (> 10"±)
- PIPELINE BENEATH CONCRETE OR STRUCTURE
- X — CHAIN LINK FENCE
- PROPERTY LINE
- CENTERLINE
- EASEMENT
- LIMITS OF CONSTRUCTION
- ROW

PIPING SYMBOLOGY

SYMBOLOGY SHOWN IS FOR SINGLE LINE PIPING. DOUBLE LINE PIPING SYMBOLS ARE SIMILAR.

VALVES

- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- CHECK VALVE
- DOUBLE DISK CHECK VALVE
- BALL CHECK VALVE
- BUTTERFLY VALVE
- DIAPHRAGM VALVE
- PINCH VALVE
- KNIFE GATE VALVE
- OR — PRESSURE RELIEF VALVE
- PLUG VALVE
- NEEDLE VALVE
- PRESSURE REDUCING VALVE
- X — AIR RELEASE / VACUUM VALVE
  - A = AIR RELEASE
  - V = VACUUM
  - C = COMBINATION
- PRESSURE REGULATING VALVE
- THREE WAY BALL VALVE
- THREE WAY PLUG VALVE
- THREE WAY BALL VALVE

MISCELLANEOUS

- VARIABLE AREA METER
- UNION
- Y-STRAINER
- FLEXIBLE HOSE OR TUBING
- FLEXIBLE PIPING CONNECTION
- LINE SIZE CHANGE (CONCENTRIC REDUCER)
- LINE SIZE CHANGE (ECCENTRIC REDUCER)
- LINE TURNING DOWN
- LINE TURNING UP
- BLIND FLANGE
- COMPRESSION SLEEVE COUPLING
- FLANGED COUPLING ADAPTER (FCA)
- FLEXIBLE CONNECTION OR EXPANSION JOINT
- HARNESSED MECHANICAL COUPLING
- WELDED CONNECTION
- WELDING NECK CONNECTION
- GROOVED COUPLING
- FLANGED JOINT
- MECHANICAL OR PUSH ON JOINT
- PVC JOINT

MISCELLANEOUS (CONTINUED)

- PRESSURE GAGE (W/COCK)
- TRAP
- QUICK DISCONNECT CAM & GROOVE COUPLING
- CAP or PLUG
- CO — INTERIOR CLEANOUT
- HB-X — HOSE VALVE, HOSE BIBB OR FLUSHING CONNECTION
- HR-X — HOSE RACK
- FD-X — FLOOR DRAIN

X = TYPE DESIGNATED IN SPECIFICATIONS

- PIPE IN SECTION
- BU — BELL UP (PLAN)
- BU — BELL UP (SECTION OR SCHEMATIC)
- D — DRAIN (SECTION OR SCHEMATIC)
- ATA — AIR TOOL ASSEMBLY
- AVS — AUTOMATIC VALVE STATION
- PRS — PRESSURE REDUCING STATION

PLUMBING PIPING:

- VT — VENT (VT)
- POTABLE WATER, COLD (PWC)
- POTABLE WATER, HOT (PWH)

MATERIALS IN PLAN/SECTION

- DEMOLITION
- CONCRETE
- MASONRY (CMU)
- ASPHALT LANDSCAPE MATERIAL/DRAIN ROCK (PLAN)
- GRANULAR FILL (SECTION)
- SAND (SECTION), CRUSHED ROCK (PLAN),
- EARTH
- METAL (SECTION)
- GRATING (PLAN)
- CHECKERED PLATE
- WOOD - CONTINUOUS
- WOOD - NON CONTINUOUS
- GYPSUM BOARD

GENERAL SYMBOLOGY

PLAN
1/4" = 1'-0"
N — ARROW INDICATES DIRECTION OF PLAN NORTH

XXX / XXX — SECTION LETTER; FLAG INDICATES DIRECTION OF SECTION CUT; * SHEET WHERE SECTION VIEW IS LOCATED

SECTION CUT MARKER

SECTION
3/8" = 1'-0"
X / XXX — SECTION LETTER; * SHEET WHERE SECTION VIEW IS FIRST CUT

X / XXX — DETAIL NUMBER; * SHEET WHERE DETAIL IS LOCATED

DETAIL MARKER

DETAIL
1" = 1'-0"
/ XXX — DETAIL NUMBER; * SHEET WHERE DETAIL WAS TAKEN

XXX / XXX — ELEVATION LETTER; ARROW INDICATES POINT OF VIEW; * SHEET WHERE ELEVATION IS LOCATED

SINGLE ELEVATION OR PHOTO MARKER

X X X X / A-11 — ELEVATION LETTER; ARROW INDICATES POINT OF VIEW ELEVATION; INDICATES SHEET WHERE ELEVATION IS LOCATED

MULTIPLE ELEVATION OR PHOTO MARKER

ELEVATION
1/4" = 1'-0"
X / XXX — ELEVATION IDENTIFICATION LETTER; * SHEET WHERE POINT OF VIEW MARKER CAN BE FOUND

* IF PLAN AND SECTION, OR DETAIL CALL-OUT AND DETAIL ARE SHOWN ON SAME SHEET, DRAWING NUMBER IS REPLACED BY A LINE (-).

KEYNOTE NUMBER

KEYNOTE DESIGNATION

IDENTIFICATION SYMBOLOGY

PIPING:

FIGURE	16"-RW	EXAMPLE
LINE SIZE		16"
SERVICE		RAW WATER

EQUIPMENT TAG NUMBERS:

FIGURE	RWP-1000	EXAMPLE
SERVICE ABBREVIATION		INDICATES RAW WATER
EQUIPMENT ABBREVIATION		INDICATES PUMP
EQUIPMENT NUMBER		PUMP 1000

PIPING SYSTEM ABBREVIATIONS

RW	RAW WATER
SW	SETTLED WATER
FW	FILTERED WATER
FTW	FILTER TO WASTE WATER
BA	BACKWASH AIR SUPPLY
BW	BACKWASH WATER SUPPLY
BWD	BACKWASH WATER DRAIN
RBW	RECLAIMED BACKWASH WATER
BD	ACTIFLO BLOW DOWN
RC	SAND RECIRCULATION
SL	SLUDGE
OF	OVERFLOW
MS	MICRO SAND
TD	TANK DRAIN
SWS	SETTLED WASTE STREAM

IDENTIFICATION SYMBOLOGY

ARCHITECTURAL:

- XX-XX — DOOR NUMBER
- ### — ROOM NUMBER
- X — COLUMN GRID LINE
- X — WALL TYPE
- WINDOW AND LOUVER TYPE
- DIMENSION TO FACE OF FINISH

GENERAL NOTES:

1. THIS IS A STANDARD SHEET SHOWING COMMON SYMBOLOGY. ALL SYMBOLS ARE NOT NECESSARILY USED ON THIS PROJECT.
2. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.
3. SEE PROJECT EQUIPMENT AND PIPING SYSTEMS SHEET FOR SYMBOLS AND ABBREVIATIONS SPECIFIC TO THE PROJECT.

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12/1/2021 3:24 PM, LARI, STEVEN

HDR

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R. STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER ARASHDEEP SINGH No. C 90090 EXP 09-30-23 CIVIL STATE OF CALIFORNIA
02/10/22

CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

GENERAL SYMBOLS AND ABBREVIATIONS AND GENERAL NOTES

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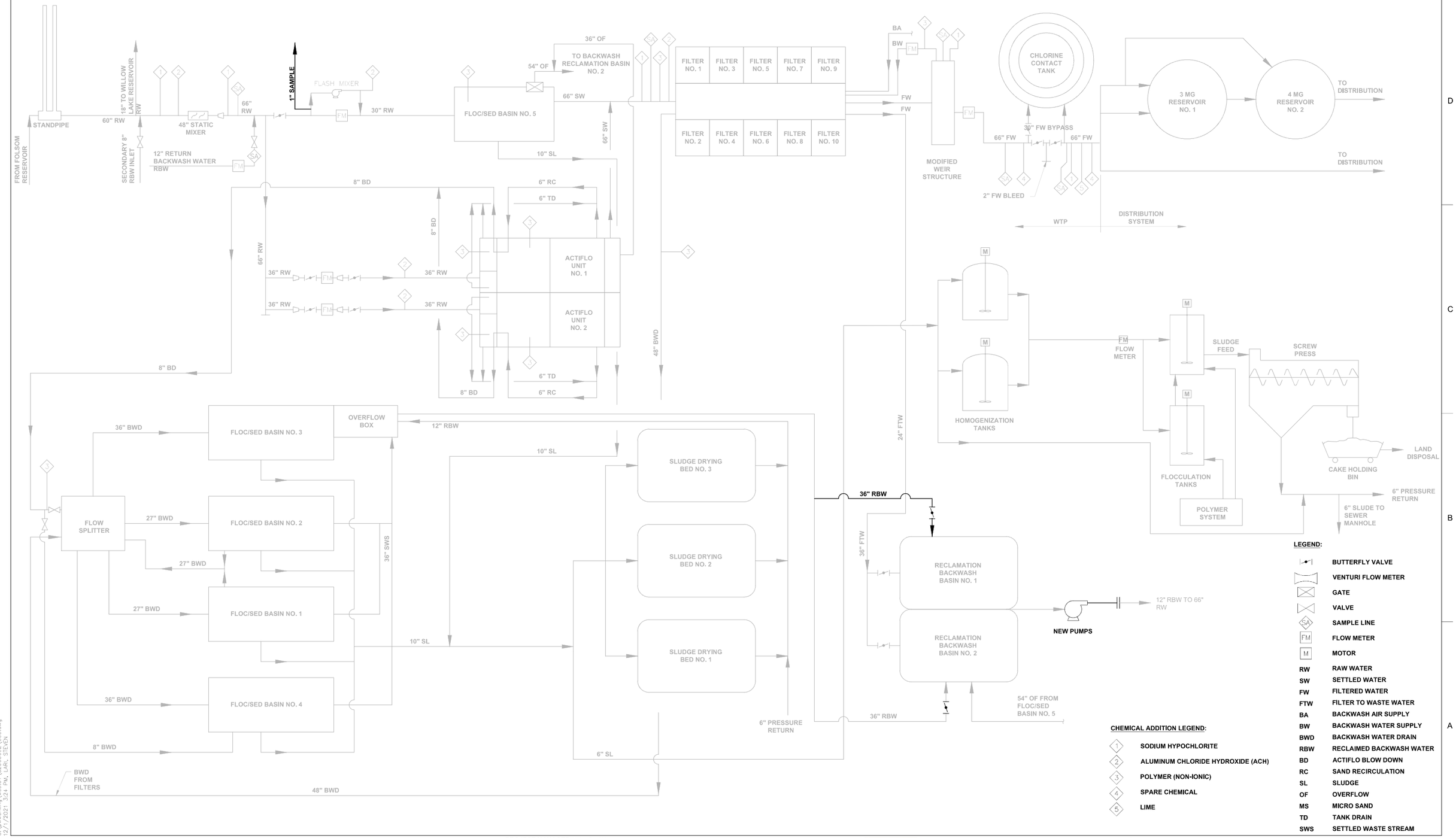

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ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R. STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER ARASHDEEP SINGH No. C 90090 EXP 06-30-23 CIVIL STATE OF CALIFORNIA 02/10/22

CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

GENERAL PROCESS FLOW DIAGRAM

0 1" 2"

FILENAME

SCALE NONE

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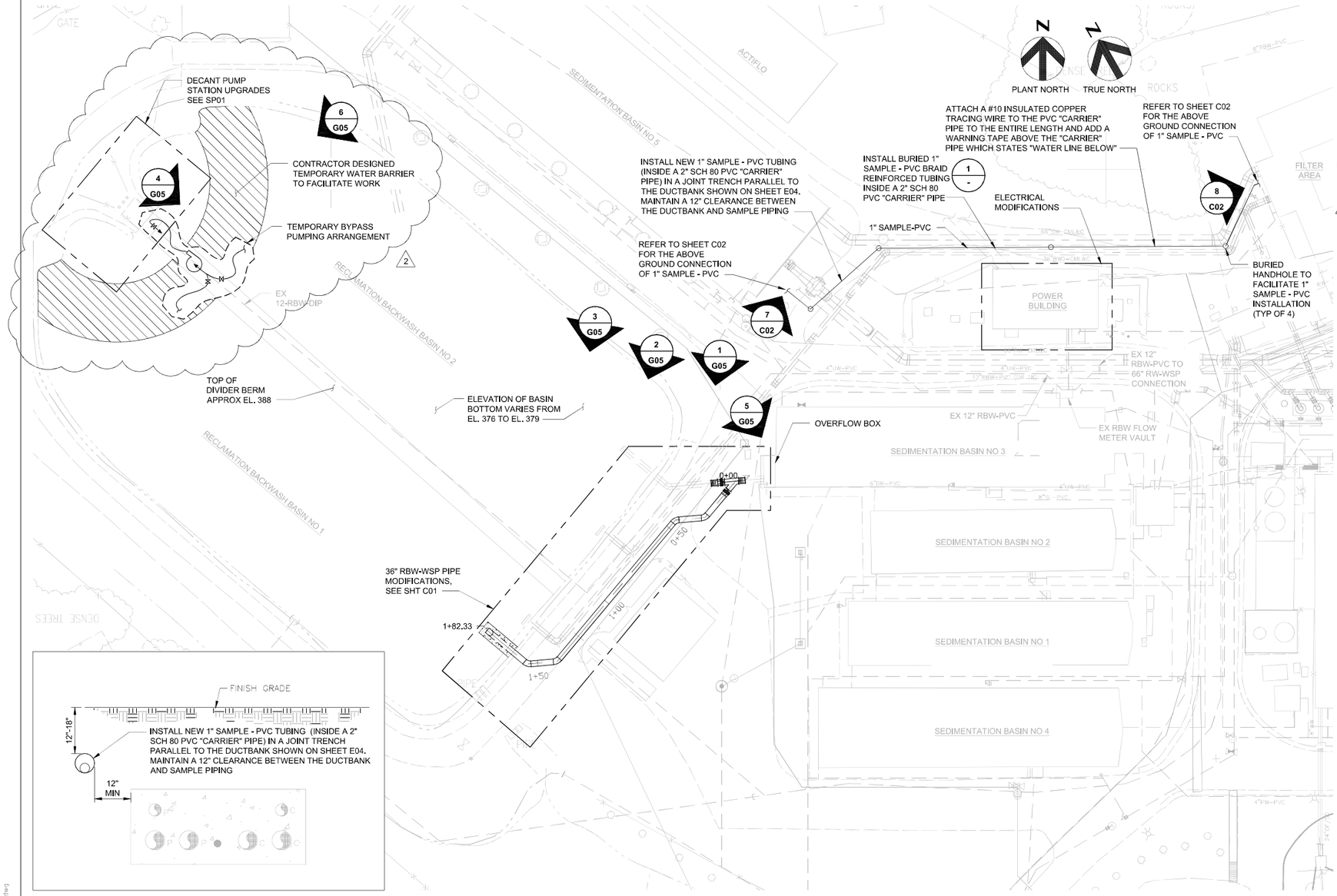

GENERAL JOINT TRENCH SECTION
1 NTS

SITE PLAN
1" = 30'

SEQUENCING NOTES:

PHASE I

I. COMPLETE PHASE I ACTIVITIES PRIOR TO START OF PHASE II ACTIVITIES. ALL PHASE I ACTIVITIES SHALL OCCUR DURING AND SHALL BE FULLY EXECUTED WITHIN THE WINTER/LOW-FLOW SEASON.

II. EXISTING DECANT PUMPS SHALL BE CONTINUOUSLY OPERATIONAL THROUGHOUT PHASE I WITH THE EXCEPTION OF A, PLANT STAFF APPROVED, 24 HOUR TEMPORARY SHUTDOWN.

III. INSTALL ALL NEW ELECTRICAL REQUIRED FOR NEW DECANT PUMPS.

IV. POTHOLE TO IDENTIFY UTILITY CROSSINGS IMPACTING THE NEW 36 IN RBW-WSP PIPE AND TO VERIFY ELEVATION OF EXISTING PIPING. PROCURE AND PRE-ASSEMBLE PIPING AND VALVE IN PREPARATION FOR A TIE-IN DURING PHASE II.

V. COMPLETELY DRAIN THE RECLAMATION BACKWASH BASIN (RBB) NO. 1 AND 2 AND SETUP TEMPORARY WATER BARRIER.

A. THE BOTTOM OF THE RBB CONTAINS 24 INCH THICK BLANKET OF SLUDGE WHICH SHALL BE PUMPED OUT, AS NECESSARY, TO ACHIEVE A FUNCTIONAL WATER TIGHT INTERFACE BETWEEN THE TEMPORARY WATER BARRIER AND RBB CONCRETE LINING TO FACILITATE WORK. THE SLUDGE MAY BE PUMPED TO THE WET SIDE OF THE TEMPORARY WATER BARRIER.

2 B. COORDINATE WITH PLANT STAFF TO DRAIN THE RBB USING THE EXISTING DECANT PUMPS. THE DECANT PUMPS ARE ONLY CAPABLE OF DRAINING THE BASIN DOWN TO THE TOP OF SETTLED SLUDGE.

C. COORDINATE WITH PLANT STAFF TO TEMPORARILY SHUTDOWN THE RBW SYSTEM. SHUTDOWN PERIOD DURING THIS PHASE SHALL BE LIMITED TO 24 CONSECUTIVE HOURS.

D. SETUP TEMPORARY PIPING TO CONVEY PROCESS FLOW FROM DOWNSTREAM OF THE WATER BARRIER TO THE DECANT PUMP STATION TO MAKE THE DECANT PUMP STATION OPERATIONAL AGAIN AFTER THE WATER BARRIER IS SATISFACTORILY INSTALLED.

E. PREVENT PROCESS FLOW FROM ENTERING RBB NO.1 TO FACILITATE INSTALLATION OF 36" RBW-WSP PIPE PENETRATION INTO RBB NO. 1.

VII. SETUP TEMPORARY BYPASS PUMPING SYSTEM TO BYPASS THE DECANT PS. CONTRACTOR MAY UTILIZE EXISTING POWER FEED TO THE EXISTING DECANT PUMPS, HOWEVER, CONTRACTOR MUST PROVIDE A BACK-UP, REDUNDANT, POWER SOURCE AND PUMPING SYSTEM TO MA`INTAIN CONTINUOUS PUMPING THROUGHOUT THE BYPASS PERIOD.

A. BE AWARE OF NOISE ORDINANCES IN THE NEIGHBORHOOD SURROUNDING THE WATER TREATMENT PLANT. COMPLIANCE WITH NOISE RESTRICTIONS IS REQUIRED. SATURDAY, SUNDAY, AND NIGHT WORK ARE NOT PERMITTED. CONSTRUCTION EQUIPMENT SHALL BE MUFFLED AND SHROUDED TO SATISFY NOISE LEVELS REQUIREMENTS.

VII. PRE-ASSEMBLE NEW RBW/DECANT PS DISCHARGE PIPING IN PREPARATION FOR AN EXPEDITED REPLACEMENT DURING PHASE II.

PHASE II

I. COMPLETE PHASE I ACTIVITIES PRIOR TO START OF PHASE II. ALL PHASE II ACTIVITIES SHALL OCCUR DURING AND SHALL BE FULLY EXECUTED WITHIN THE WINTER/LOW-FLOW SEASON.

II. COORDINATE WITH PLANT STAFF FOR A TEMPORARY SHUTDOWN OF DECANT PS TO FACILITATE REPLACEMENT OF 12" RBW-DIP DISCHARGE PIPING AND IMPLEMENTATION OF TEMPORARY BYPASS PUMPING SYSTEM. SHUTDOWN PERIOD DURING THIS PHASE SHALL BE LIMITED TO 24 CONSECUTIVE HOURS, UNLESS OTHERWISE APPROVED BY PLANT STAFF.

III. REPLACE 12" RBW-DIP DISCHARGE PIPING AND MAKE TEMPORARY BYPASS PUMPING SYSTEM OPERATIONAL. TEMPORARY BYPASS PUMPING SHALL REMAIN IN CONTINUOUS OPERATION THROUGHOUT PHASE II.

IV. EXECUTE WORK ASSOCIATED WITH DECANT PS WHICH INCLUDES BUT IS NOT LIMITED TO:

A. PUMP REPLACEMENT.
B. GATE REPLACEMENT.
C. DISCHARGE PIPING REPLACEMENT AND ASSOCIATED COATING.
D. ELECTRICAL WORK.
E. SITEWORK AND STRUCTURAL WORK.
F. START-UP AND FUNCTIONAL TESTING.

V. TIE-IN 36" RBW-WSP PIPING AND ASSOCIATED VALVING DURING THE SAME SHUTDOWN MENTIONED IN LINE 2 OF PHASE II SEQUENCING.

VI. INSTALL 36" RBW-WSP PIPE PENETRATION AND ALLOW THE NEW CONCRETE TO ADEQUATELY CURE AND REACH MINIMUM SPECIFIED COMPRESSIVE STRENGTH PRIOR TO ALLOWING PROCESS FLOW BACK INTO RBB NO. 1.

PHASE III

I. COMPLETE PHASE II ACTIVITIES PRIOR TO START OF PHASE III.

II. TRANSITION FROM TEMPORARY BYPASS PUMPING TO NEW DECANT PS. REMOVE TEMPORARY BYPASS PUMPING SYSTEM.

III. COMPLETELY DRAIN THE RBB TO FACILITATE REMOVAL OF TEMPORARY WATER BARRIER. THIS WORK SHALL BE ACCOMPLISHED DURING A 24 HOUR PLANT SHUTDOWN COORDINATE WITH PLANT STAFF.

IV. INSTALL AC PAVING AND OTHER WORK.

GENERAL NOTES:

I. WINTER/LOW-FLOW PERIOD: NOVEMBER TO APRIL

II. TEMPORARY BYPASS PUMPING REQUIREMENTS

A. CAPACITY: 300 - 1,200 GPM
B. CAPABLE OF MEETING SPECIFIED FLOW RANGE WITH A THROTTLING VALVE.
C. FLOW CHARACTERISTIC: GRITTY BACKWASH WATER.
D. NSF-61 CERTIFIED.
E. PROVIDE REDUNDANT PUMP AND POWER SOURCE.
F. UTILIZE EXISTING POWER FEED TO DECANT PUMP STATION AS PRIMARY POWER SOURCE. 2

III. ALLOW FOR A MINIMUM OF 7 CALENDAR DAYS BETWEEN 24 HR RBW SYSTEM SHUTDOWN / OUTAGE PERIOD.

IV. THE TOP OF THE TEMPORARY WATER BARRIER SHALL BE EL. 390'. ASSUME A TOTAL HEIGHT OF 14'-0" FOR THE TEMPORARY WATER BARRIER, THIS SHALL BE FIELD VERIFIED BY THE CONTRACTOR DURING CONSTRUCTION.

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ISSUE	DATE	DESCRIPTION
02	03/17/22	ADDENDUM NO. 2
01	12/01/21	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R.STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
PROJECT NUMBER	10292477

LICENSED PROFESSIONAL ENGINEER ARASHDEEP SINGH No. C 90090 EXP 06-30-23 CIVIL STATE OF CALIFORNIA 03/16/22

CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

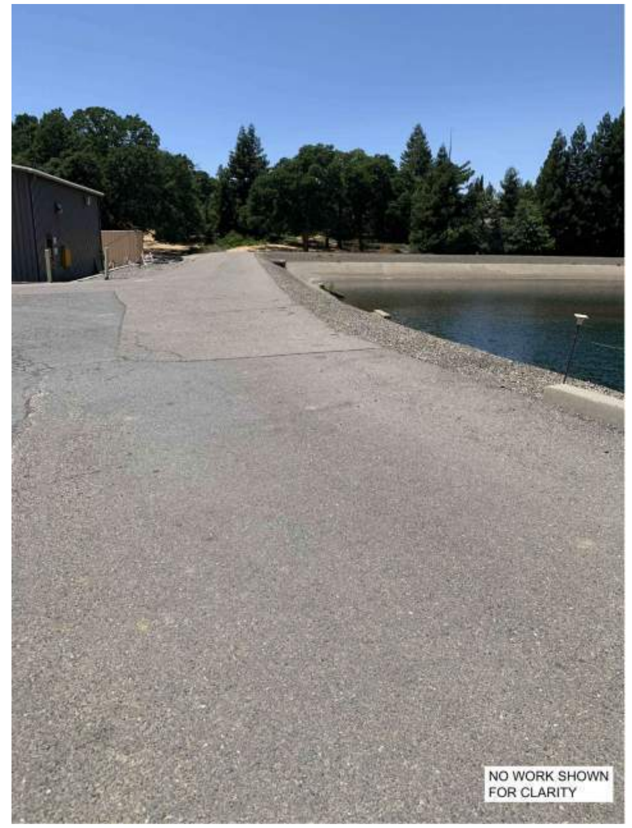
GENERAL SITE PLAN AND SEQUENCING NOTES

0 1" 2"

FILENAME
SCALE 1" = 30'
SHEET G04

1	2	3	4	5	6	7	8

PHOTOGRAPH 1 / G04
NTS

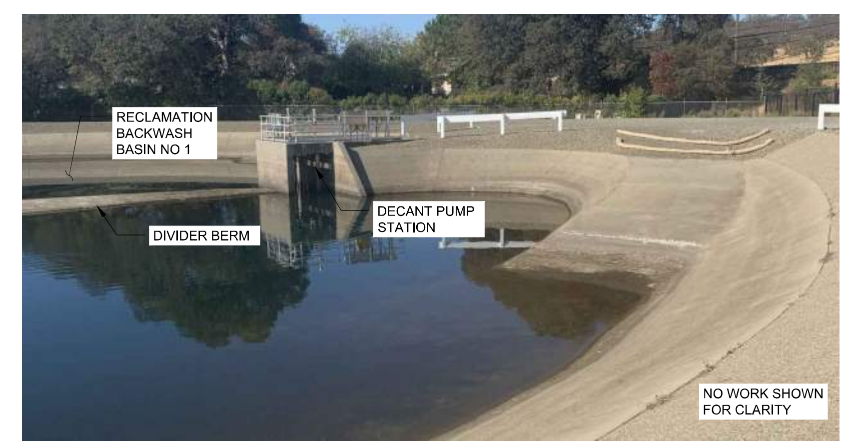


PHOTOGRAPH 2 / G04
NTS

PHOTOGRAPH 3 / G04
NTS

PHOTOGRAPH 4 / G04
NTS

PHOTOGRAPH 5 / G04
NTS



PHOTOGRAPH 6 / G04
NTS

D C B A

HDR

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R.STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER ARASHDEEP SINGH No. C 90090 EXP. 06-30-23 CIVIL STATE OF CALIFORNIA
02/10/22

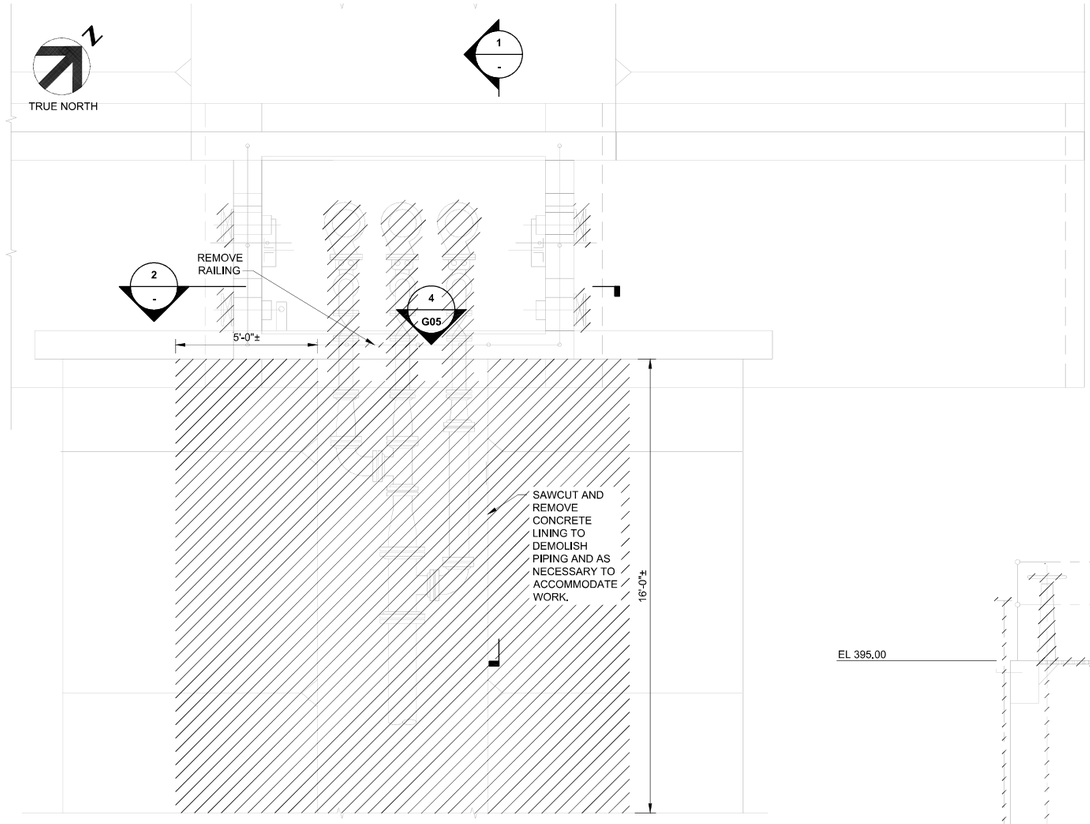
CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

GENERAL SITE PHOTOS

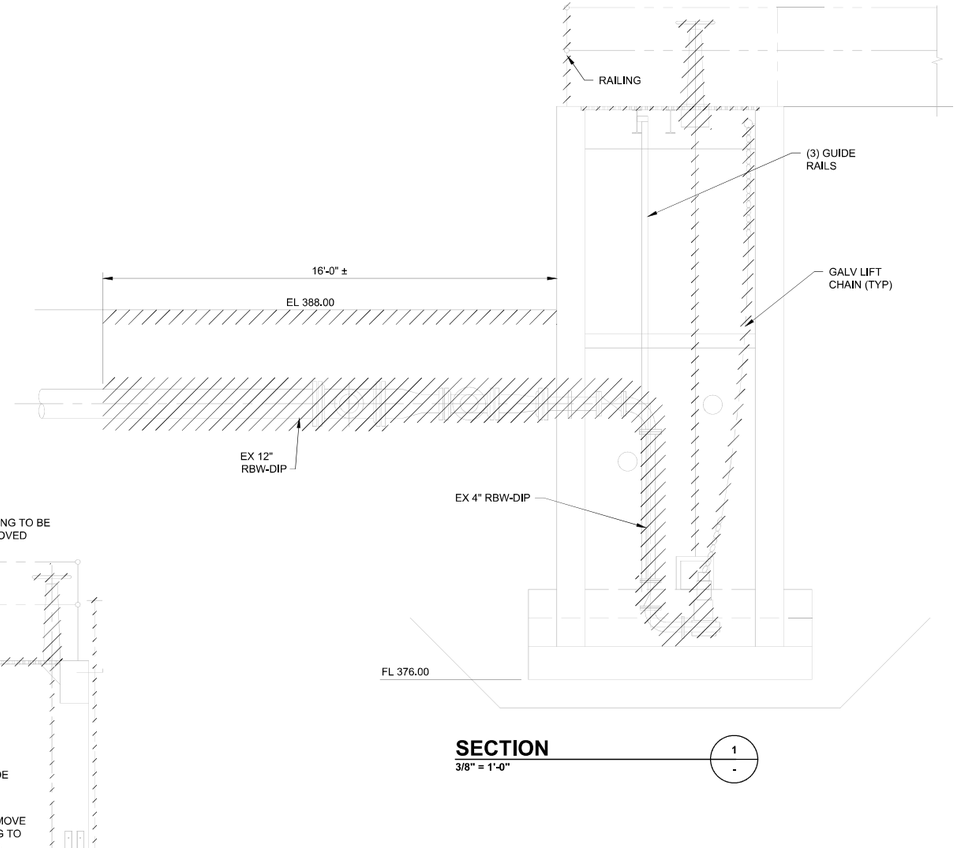
0 1" 2"

FILENAME
SCALE NONE
SHEET **G05**



RECLAMATION BACKWASH BASINS DECANT PUMP STATION--PLAN

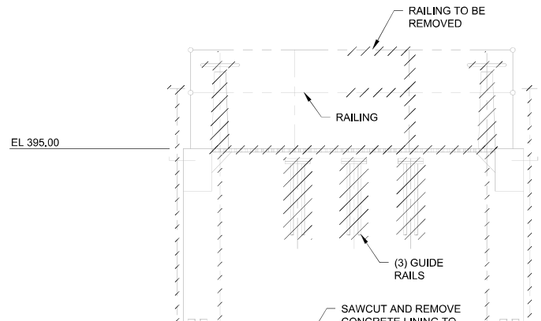
3/8" = 1'-0"



SECTION

3/8" = 1'-0"

1
-



SECTION

3/8" = 1'-0"

2
-

LEGEND

DEMOLISH

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R. STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER
ARASHDEEP SINGH
No. C 90090 EXP 06-30-23
CIVIL
STATE OF CALIFORNIA
02/10/22

CITY OF FOLSOM
DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED
WATER CAPACITY PROJECT

DEMOLITION
DEMOLITION PLAN AND SECTION

0 1" 2"

FILENAME

SCALE 3/8" = 1'

SHEET D01

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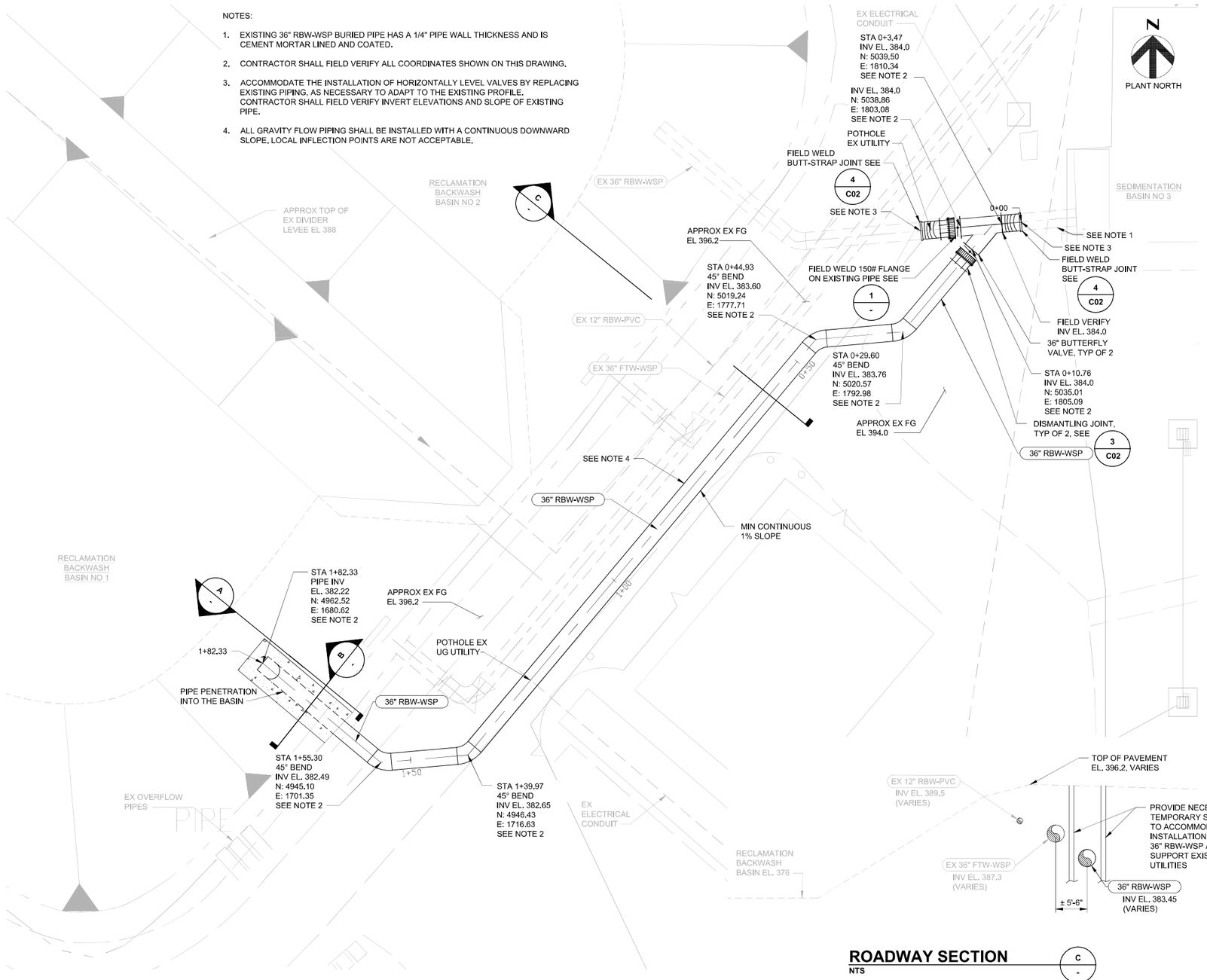
12/7/2021 3:17 PM, LARI, STEVEN

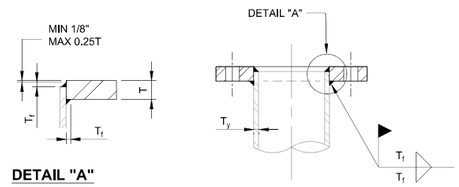
NOTES:

1. EXISTING 36" RBW-WSP BURIED PIPE HAS A 1/4" PIPE WALL THICKNESS AND IS CEMENT MORTAR LINED AND COATED.
2. CONTRACTOR SHALL FIELD VERIFY ALL COORDINATES SHOWN ON THIS DRAWING.
3. ACCOMMODATE THE INSTALLATION OF HORIZONTALLY LEVEL VALVES BY REPLACING EXISTING PIPING, AS NECESSARY TO ADAPT TO THE EXISTING PROFILE. CONTRACTOR SHALL FIELD VERIFY INVERT ELEVATIONS AND SLOPE OF EXISTING PIPE.
4. ALL GRAVITY FLOW PIPING SHALL BE INSTALLED WITH A CONTINUOUS DOWNWARD SLOPE. LOCAL INFLECTION POINTS ARE NOT ACCEPTABLE.



ENLARGED PLAN OF 36" RBW-WSP PIPELINE

1" = 10'

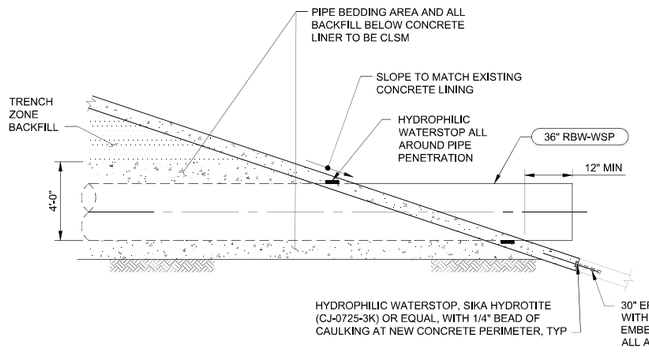


DETAIL "A"

T_f - FILLET WELD SIZE
T - FLANGE THICKNESS
T_y - PIPE CYLINDER THICKNESS

FIELD WELDED FLANGE DETAIL

NTS — 1 -

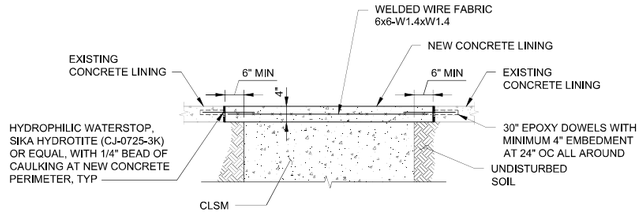


SECTION

NTS — A -

ROADWAY SECTION

NTS — C -



CONCRETE LINER REPLACEMENT SECTION DETAIL

NTS — B -

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ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R. STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER — ARASADEEP SINGH — No. C 90090 EXP 06-30-23 — CIVIL — STATE OF CALIFORNIA
02/10/22

CITY OF FOLSOM — DISTINCTIVE BY NATURE

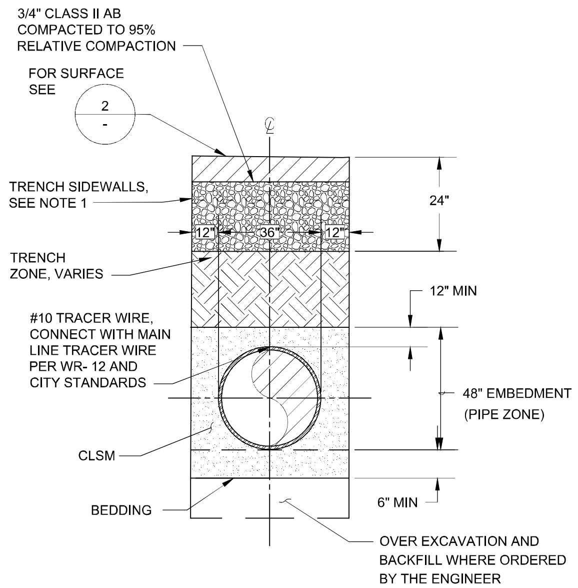
City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

CIVIL
ENLARGED 36" RBW-WSP PIPING PLAN

0 1" 2"

FILENAME
SCALE AS NOTED
SHEET C01

1 2 3 4 5 6 7 8

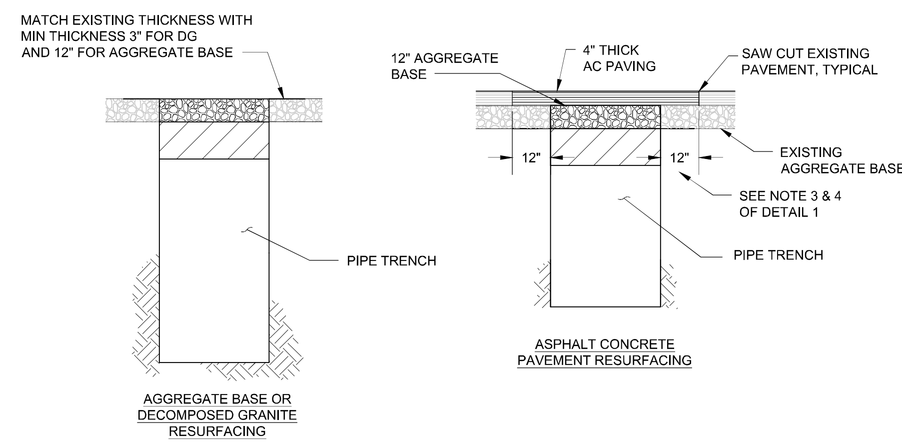


NOTES:

1. TRENCH SIDEWALLS SHALL BE VERTICAL IN ORDER TO MINIMIZE DISTURBANCE ON EXISTING FINISH GRADE. PROVIDE SHORING TO SUPPORT TRENCH SIDEWALLS TO ACCOMMODATE CONSTRUCTION AND TO SATISFY APPLICABLE TRENCH SAFETY REGULATIONS.
2. A.C. THICKNESS: 4" MINIMUM.
3. SAW CUT 12" BEYOND THE WIDTH OF THE TRENCH.
4. T-GRIND REQUIRED FOR ALL PAVEMENTS (12" MINIMUM WIDTH 1 1/2" DEEP GRIND AND PAVE TO THE LIP OF GUTTER (IF APPLICABLE)
5. BACKFILL SHALL BE MECHANICALLY CONSOLIDATED. SEE CITY SPECIFICATIONS FOR BACKFILL AND COMPACTION REQUIREMENTS.
6. 3" WIDE (MINIMUM) MARKING TAPE, 18" ABOVE PIPE. TAPE SHOULD READ "CAUTION BURIED PIPELINE BELOW"
7. PIPE ZONE COVER OVER THE TOP OF PIPELINES SHALL BE MINIMUM OF 12".
8. SEE SPECIFICATIONS FOR MATERIAL REQUIRED FOR BEDDING, EMBEDMENT AND TRENCH ZONE BACKFILL; COMPACTION AND OTHER TRENCHING REQUIREMENTS.
9. IN AREAS OF FLOWING GROUNDWATER, FILER FABRIC SHALL BE PLACED AROUND THE PIPE ZONE BEDDING AND SHADING IN ACCORDANCE WITH THE ON-SITE GEOTECHNICAL ENGINEER, AS WELL AS METHODS FOR COLLECTING AND CONVEYING GROUNDWATER AWAY FROM UNDERGROUND ROADWAY AND INFRASTRUCTURE PER GEOTECHNICAL ENGINEER.

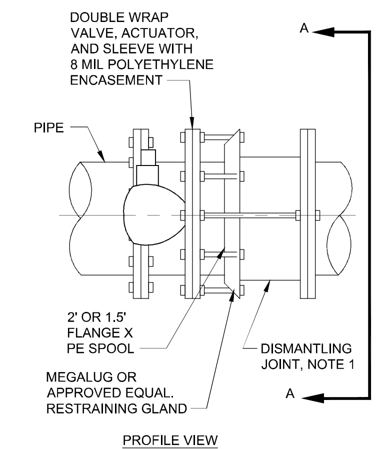
TRENCH SECTION FOR PIPE INSTALLATION

NTS — 1 / -



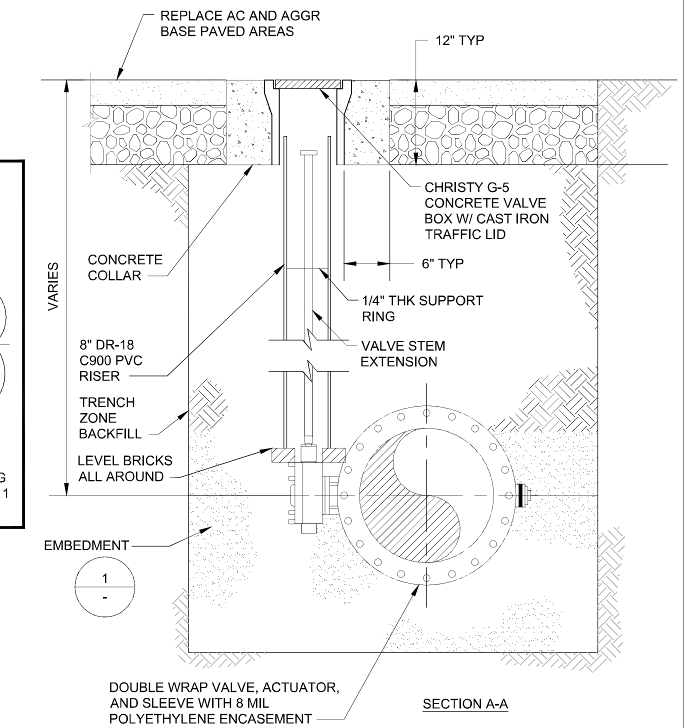
TYPICAL PIPE TRENCH RESURFACING

NTS — 2 / -



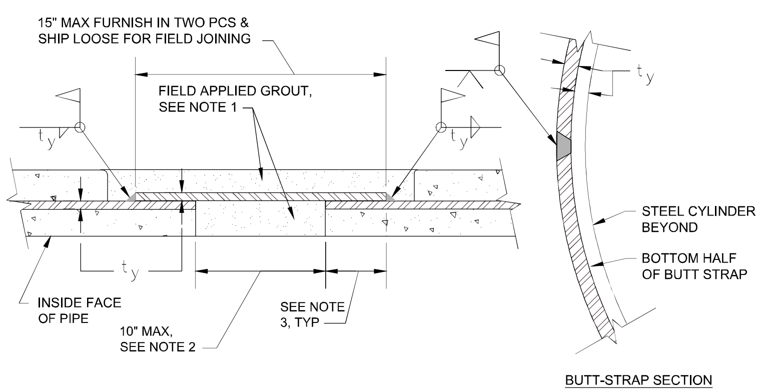
NOTES:

1. RESTRAINED DISMANTLING JOINT, SMITH-BLAIR MODEL #972, ROMAC #DJ400 OR EQUAL. TIE-RODS AND BOLTS TO BE TYPE 304 STAINLESS STEEL FURNISH ASSEMBLY WITH NSF APPROVED FUSION EPOXY COATING & LINING.



TYPICAL BURIED VALVE ASSEMBLY

NTS — 3 / C01

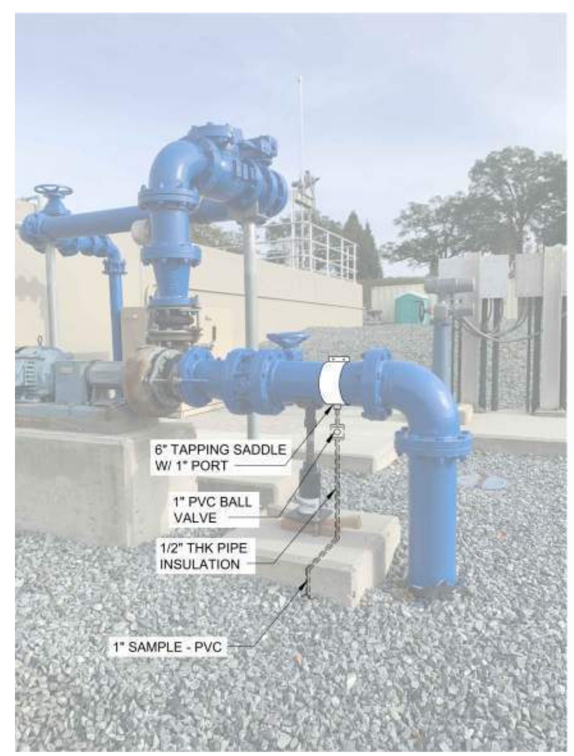


NOTES:

1. FIELD APPLIED REINFORCED JOINT GROUT, INSIDE AND OUTSIDE. REINFORCED WITH 2x4 12 GAUGE WELDED WIRE FABRIC ON OUTSIDE ONLY. SPOT WELD FABRIC TO STEEL BUTT STRAP
2. DISTANCE BETWEEN FILLET WELDS SHALL BE MINIMUM OF 10 ty OR 4", WHICHEVER IS GREATEST
3. LAP DISTANCE SHALL BE MINIMUM OF 5 x ty OR 2" WHICHEVER IS GREATEST
4. PROVIDE 4" THREADED OPENING HAND HOLES FOR ACCESS FOR GROUTING PER AWWA C200 AS NECESSARY.
5. CONTRACTOR TO POTHOLE AND CONFIRM EX PIPE MATERIAL AND DIMENSIONS PRIOR TO ORDERING PIPE, ELBOWS AND BUTT STRAPS.
6. FOLLOW AWWA C602 FOR FIELD APPLICATION OF CEMENT - MORTAR LINING AND COATING.
7. ALL FIELD WELDS SHALL BE MAGNETIC PARTICLE TESTED PER AWS D1.1.

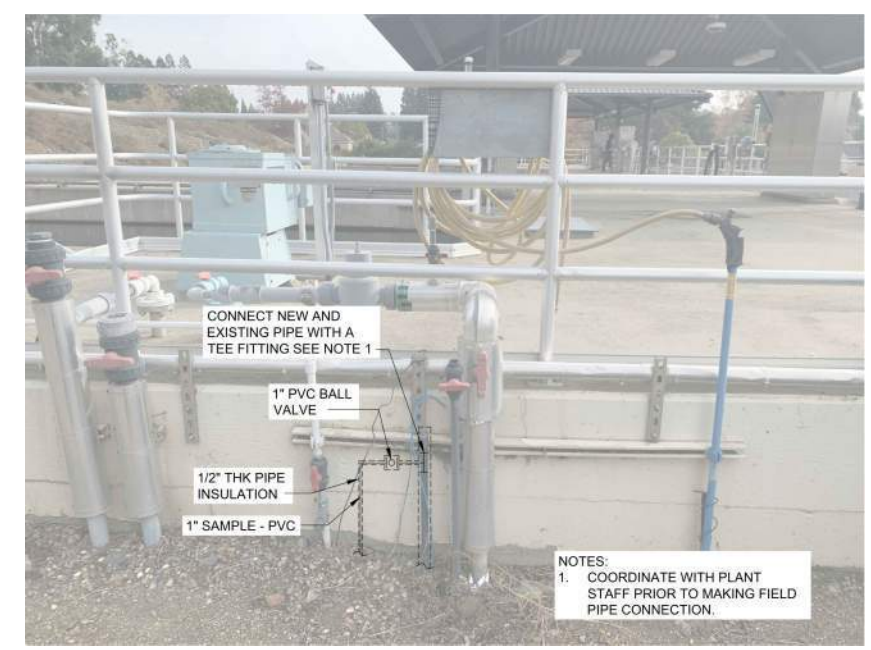
BUTT STRAP FOR STEEL PIPE DETAIL

NTS — 4 / -



1" SAMPLE - PVC CONNECTION PHOTO 1

NTS — 7 / G04



1" SAMPLE - PVC CONNECTION PHOTO 2

NTS — 8 / G04

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ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R. STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER ARASHDEEP SINGH No. C 90090 EXP. 06-30-23 CIVIL STATE OF CALIFORNIA 02/10/22

CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

CIVIL STANDARD DETAILS

0' 1' 2'

FILENAME
SCALE NONE
SHEET C02

SITE PLAN

1" = 60'

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ISSUE	DATE	DESCRIPTION
02	03/17/22	ADDENDUM NO. 2
01	12/01/21	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R.STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
PROJECT NUMBER	10292477

LICENSED PROFESSIONAL ENGINEER — ARASHDEEP SINGH — No. C 90090 EXP. 06-30-23 — CIVIL — STATE OF CALIFORNIA — 03/16/22

CITY OF FOLSOM — DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

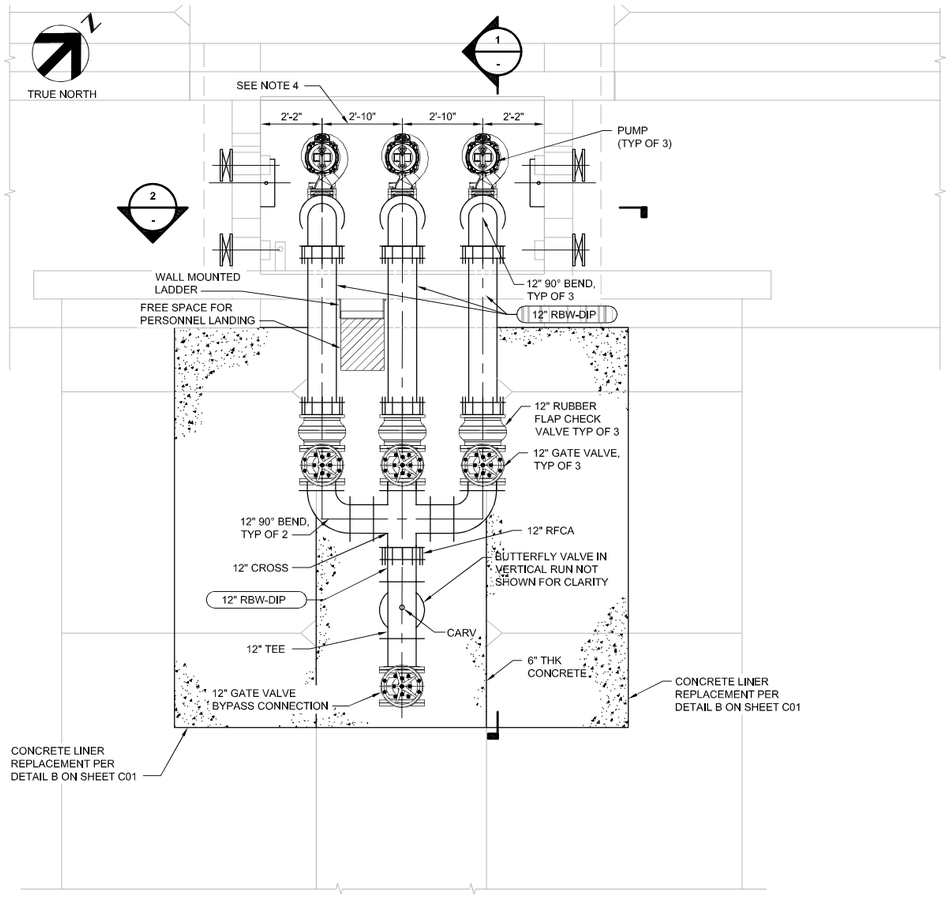
CIVIL
PAVING AND STAGING AREA PLAN

0 1" 2"

FILENAME

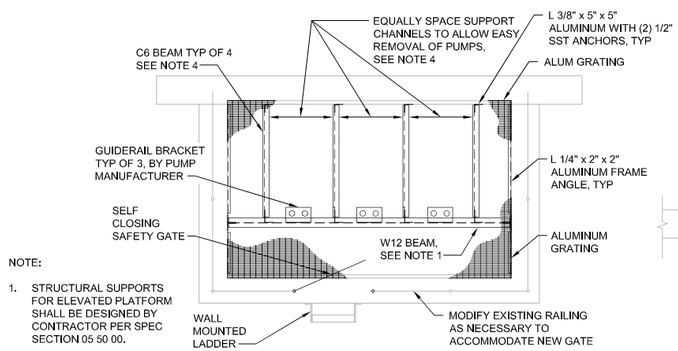
SCALE 1" = 30'

SHEET C03



DECANT PUMP STATION BOTTOM PROCESS PLAN

3/8" = 1'-0"

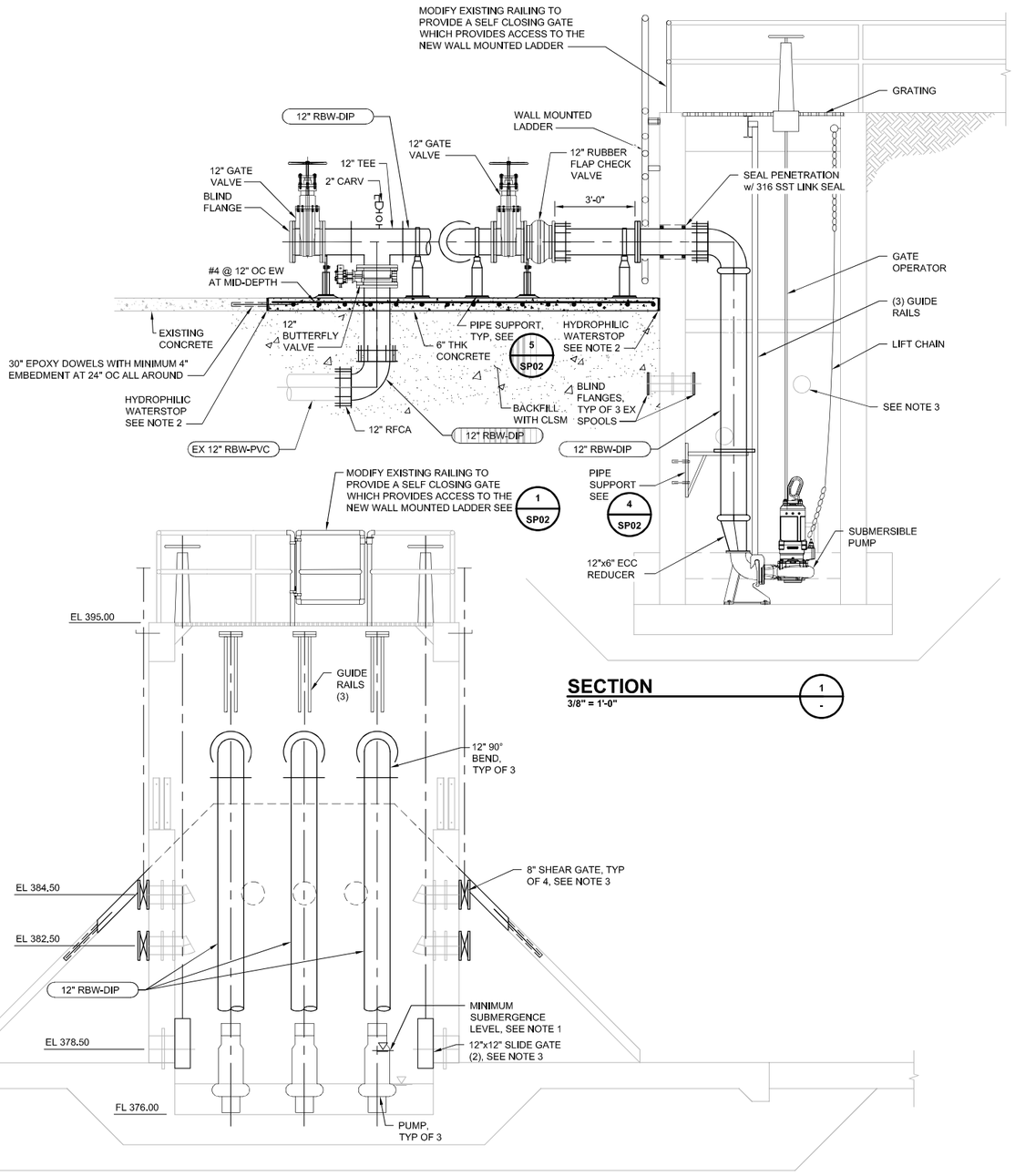


NOTE:

1. STRUCTURAL SUPPORTS FOR ELEVATED PLATFORM SHALL BE DESIGNED BY CONTRACTOR PER SPEC SECTION 05 50 00.

DECANT PUMP STATION STRUCTURAL PLAN

3/8" = 1'-0"



SECTION

3/8" = 1'-0"

1

-

SECTION

3/8" = 1'-0"

2

-

NOTES:

1. VERIFY WITH PUMP MANUFACTURER.
2. HYDROPHILIC WATERSTOP, SIKA HYDROTITE (CJ-0725-3K) OR EQUAL, WITH 1/4" BEAD OF CAULKING AT NEW CONCRETE PERIMETER, TYP.
3. ALL THE EXISTING GATES IN THE DECANT PUMP STATION WET WELL SHALL BE REPLACED, AFTER REPLACEMENT, ALL GATES SHALL UNDERGO FIELD LEAKAGE TESTING PER AWWA STANDARDS, UNDER THE OPERATING HEAD, SEATING OR UNSEATING, THE ALLOWABLE LEAKAGE SHALL NOT EXCEED 0.10 GPM/FT OF SEATING PERIMETER. CONTRACTOR SHALL ASSUME THAT ALL OF THE EXISTING CONCRETE PENETRATIONS RELATED TO THE GATES LEAK, THEREFORE, NEED TO BE REPAIRED. REPAIR LEAKS IN CONCRETE PENETRATIONS USING XYPEX PATCH'N PLUG, A HYDRAULIC CEMENT COMPOUND.
4. PUMP SPACING MAY REQUIRE ADJUSTMENT BASED ON DIMENSIONS OF SELECTED PUMP.

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R. STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER — ARASHDEEP SINGH — No. C 90090 EXP 06-30-23 — CIVIL — STATE OF CALIFORNIA

02/10/22

CITY OF FOLSOM — DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

STRUCTURAL PROCESS
DECANT PUMP STATION PLAN AND SECTIONS

0 1" 2"

FILENAME

SCALE NONE

SHEET SP01

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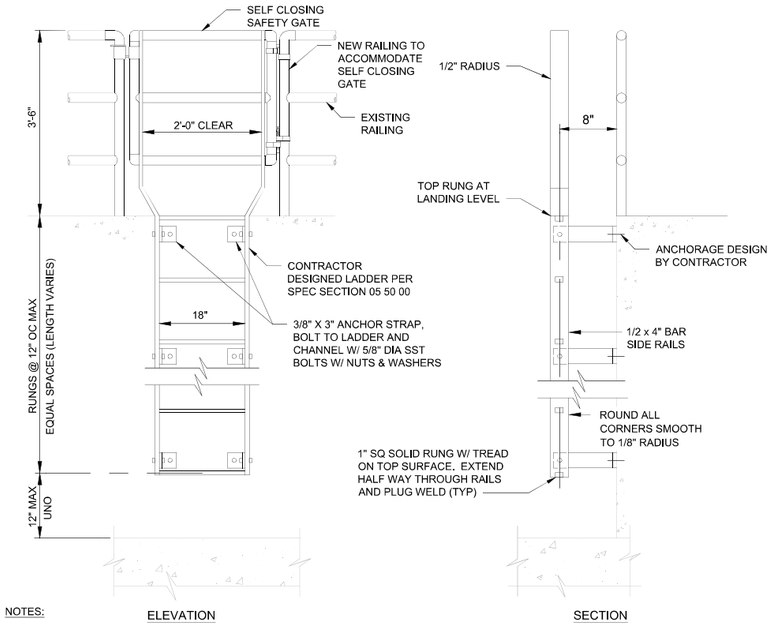
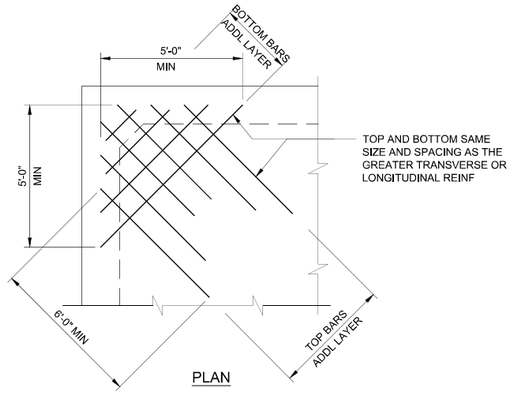


NOTES:

1. MINIMUM CLEARANCE TO ANY OBSTRUCTION ADJACENT TO LADDER: 2'-6" AT CLIMBING SIDE (2'-3" AT SMOOTH WALL) 1'-3" EACH SIDE OF CENTER LINE, AT SIDES OF LADDER.
2. LADDER TO BE ALUMINUM PER SPECIFICATIONS. PROVIDE ISOLATION OF DISSIMILAR METALS WHERE REQUIRED.

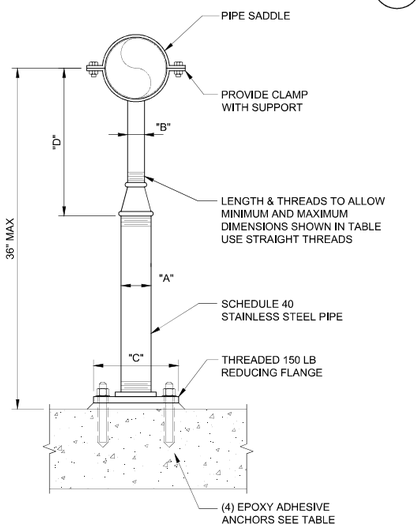
WALK-THRU LADDER (FOR REFERENCE)

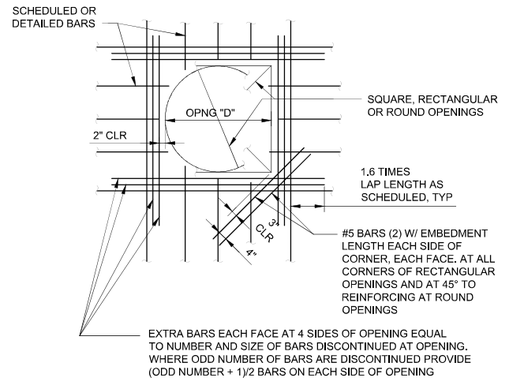
NTS — 1 / -



SLAB CORNER

NTS — 2 / -



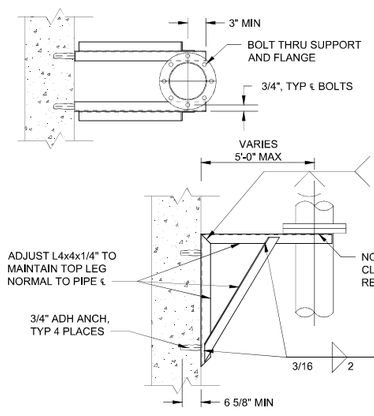


NOTES:

1. THIS DETAIL IS APPLICABLE ONLY TO WALLS OR SLABS WITH THICKNESS 36" OR LESS. FOR CONDITIONS AT THICKER CONCRETE, SEE PLANS AND DETAILS.
2. UNLESS SHOWN OTHERWISE ON DRAWINGS, PROVIDE EXTRA BARS AROUND OPENINGS IN WALLS, FLOORS, AND ROOFS AS SHOWN.
3. EVERY BAR DISCONTINUED AT AN OPENING SHALL BE REPLACED IN KIND BY ONE EXTRA BAR PLACED AT ONE SIDE OF THE OPENING AS SHOWN ABOVE.
4. FOR OPENINGS 8" OR LESS IN SLABS AND WALLS, NO EXTRA BARS ARE REQUIRED UNLESS OTHERWISE NOTED. SCHEDULED REBARS SHALL BE RESPACED (NOT CUT) TO ALLOW FOR UNIMPAIRED OPENINGS.

REINFORCING AT RECTANGULAR / CIRCULAR OPENINGS

NTS — 3 / -



RISER PIPE SUPPORT

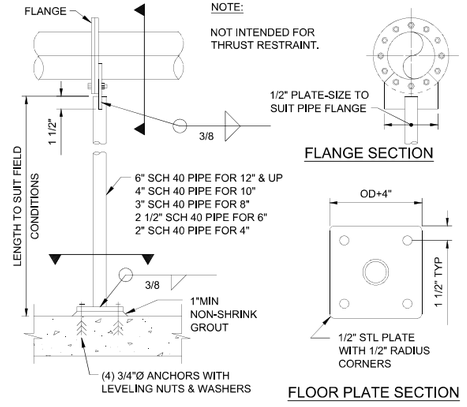
NTS — 4 / -

FLOOR PIPE SUPPORT SCHEDULE
DIMENSIONS IN INCHES

PIPE SIZE	"A"	"B"	"C"	"D"		ANCHORS	
				MINIMUM	MAXIMUM	DIA	EMBED
≤ 2 1/2	2 1/2	1 1/2	9	8	13	5/8	5
3	2 1/2	1 1/2	9	8 1/2	13 1/2	5/8	5
3 1/2	2 1/2	1 1/2	9	8 1/2	13 1/2	5/8	5
4	3	2 1/2	9	9 1/2	14	5/8	5
6	3	2 1/2	9	10 1/2	15 1/2	5/8	5
8	3	2 1/2	9	11 1/2	16 1/2	5/8	5
10	3	2 1/2	9	13 1/2	18 1/2	5/8	5
12	3	2 1/2	9	15	19 1/2	5/8	5
14	4	3	11	16 1/2	20 1/2	3/4	6 5/8
16	4	3	11	17 1/2	22 1/2	3/4	6 5/8
18	6	3 1/2	13 1/2	19 1/2	24	3/4	6 5/8
20	6	3 1/2	13 1/2	21	25 1/2	3/4	6 5/8
24	6	4	13 1/2	23 1/2	28 1/2	3/4	6 5/8

ADJUSTIABLE PIPE SUPPORT

NTS — 5 / -



FLANGED PIPE SUPPORT

NTS — 6 / -

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ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	A. SINGH
DESIGNED BY	
CHECKED BY	R. STRATTON
DRAWN BY	S.LARI
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER — ARASHDEEP SINGH — No. C 90090 EXP 06-30-23 — CIVIL — STATE OF CALIFORNIA

02/10/22

CITY OF FOLSOM — DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

STRUCTURAL PROCESS STANDARD DETAILS

0 1" 2"

FILENAME

SCALE NONE

SHEET SP02

1 2 3 4 5 6 7 8

X 20A 3P OR X 100AF 80AT 3P — LOW - VOLTAGE CIRCUIT BREAKER (CB). RATINGS AND NO. OF POLES AS SHOWN. WHEN SPECIFIC TYPE IS REQUIRED, X INDICATES TYPE.

TYPES:
MCCB - MOLDED CASE
ICCB - INSULATED CASE
LVP - LOW - VOLTAGE POWER
MCP - MOTOR CIRCUIT PROTECTOR (RATING PER CONNECTED LOAD)

CB — SEPARATELY MOUNTED CIRCUIT BREAKER; SEE ELECTRICAL ONE - LINE DIAGRAM OR SCHEDULE FOR DESCRIPTION

GFP — GROUND FAULT PROTECTION

52 — MEDIUM - VOLTAGE CIRCUIT BREAKER

FUSE, SIZE, AND NUMBER OF FUSES AS NOTED

FUSED CUTOUT, CURRENT RATING, FUSE SIZE, AND NUMBER OF POLES AS NOTED

FUSIBLE SWITCH, CURRENT RATING, FUSE SIZE, AND QUANTITY AS NOTED

NON-FUSED SWITCH, CURRENT RATING, AND NUMBER OF POLES AS NOTED

DISCONNECT OR DRAWOUT CONNECTION

A B & B — MAGNETIC MOTOR STARTER AND SEPARATELY MOUNTED COMBINATION MAGNETIC MOTOR STARTER

D & D — MOTOR CONTROLLER AND SEPARATELY MOUNTED MOTOR CONTROLLER WITH SHORT CIRCUIT PROTECTION AND DISCONNECT

MOTOR STARTER AND CONTROLLER SUBSCRIPTS:

A - MAGNETIC STARTER NEMA SIZE

B - STARTER TYPE
NONE - FULL VOLTAGE NON-REVERSING (FVNR)
FVR - FULL VOLTAGE REVERSING
2S - TWO SPEED
RVAT - REDUCED VOLTAGE AUTO TRANSFORMER

C - CONTROL DIAGRAM OR CONTROLS SCHEDULE NUMBER (IF REQUIRED)

D - CONTROLLER TYPE
VFD - VARIABLE FREQUENCY DRIVE
SS - SOLID STATE

MOTOR CONTROLLER

THERMAL OVERLOAD ELEMENT

OL — THERMAL OVERLOAD RELAY CONTACT

DISCONNECT OR SAFETY SWITCH, 30A, 3P, NON-FUSED UNLESS OTHERWISE NOTED

7 1/2 OR HP — MOTOR WITH DESIGN HORSEPOWER (WHEN INDICATED)

G — GENERATOR

ATS — TRANSFER SWITCH, CURRENT RATING, AND NUMBER OF POLES AS NOTED
ATS - AUTOMATIC
MTS - MANUAL

TRANSFORMER
3-PHASE, 3-WIRE DELTA CONNECTION
3-PHASE, 4-WIRE GROUNDED WYE CONNECTION

LP100 208/120V 3Ø, 4W — SWITCHBOARD OR PANELBOARD; NAME, VOLTAGE, PHASE, NUMBER OF WIRES WHEN INDICATED

M — UTILITY METER

100 KVA — NON-MOTOR LOAD WITH DESIGN KVA, KW, OR AMP

CPT — CONTROL POWER TRANSFORMER (CPT)

VOLTAGE TRANSFORMER (VT OR PT)

CURRENT TRANSFORMER (CT)

DMP — DIGITAL METERING PACKAGE

RTM — RUN TIME METER

N — NEUTRAL BUS

GROUND

LIGHTNING ARRESTER

SPD — LOW VOLTAGE SURGE PROTECTIVE DEVICE

ELECTRICAL CONNECTION

OR OR — NO ELECTRICAL CONNECTION

SV OR — SOLENOID VALVE

X Y — CONTROL/RELAY COIL; X INDICATES TYPE, Y INDICATES LOOP NO. WHEN USED

TYPES:
CR - CONTROL RELAY
DP - DEFINITE PURPOSE RELAY
LC - LIGHTING CONTACTOR
M - MOTOR STARTER
PC - PHOTO CELL
TC - TIME CLOCK
TD - TIME DELAY RELAY
TR - TIMING RELAY

NORMALLY OPEN TIME DELAY RELAY CONTACT WITH TIME DELAY ON CLOSING AFTER COIL IS ENERGIZED

NORMALLY CLOSED TIME DELAY RELAY CONTACT WITH TIME DELAY ON OPENING AFTER COIL IS ENERGIZED

NORMALLY OPEN TIME DELAY RELAY CONTACT WITH TIME DELAY ON OPENING AFTER COIL IS DE-ENERGIZED

NORMALLY CLOSED TIME DELAY RELAY CONTACT WITH TIME DELAY ON CLOSING AFTER COIL IS DE-ENERGIZED

NORMALLY OPEN TEMPERATURE SWITCH; CLOSE ON RISING TEMPERATURE

NORMALLY CLOSED TEMPERATURE SWITCH; OPEN ON RISING TEMPERATURE

NORMALLY OPEN FLOW SWITCH; CLOSE ON INCREASING FLOW

NORMALLY CLOSED FLOW SWITCH; OPEN ON INCREASING FLOW

NORMALLY OPEN LEVEL SWITCH, CLOSE ON RISING LEVEL

NORMALLY CLOSED LEVEL SWITCH, OPEN ON RISING LEVEL

NORMALLY OPEN PRESSURE SWITCH, CLOSE ON INCREASING PRESSURE

NORMALLY CLOSED PRESSURE SWITCH, OPEN ON INCREASING PRESSURE

NORMALLY OPEN LIMIT SWITCH, CLOSE ON REACHING LIMIT

NORMALLY CLOSED LIMIT SWITCH, OPEN ON REACHING LIMIT

PM-# — POWER MONITOR

NORMALLY OPEN CONTACT (N.O.)

NORMALLY CLOSED CONTACT (N.C.)

FIELD WIRING EXTERNAL TO CONTROL PANEL

X — INTERLOCK; X INDICATES TYPE

TYPES:
E - ELECTRICAL
M - MECHANICAL
K - KEY

HAND OFF AUTO XOO OOX — 3 POSITION SELECTOR SWITCH, MAINTAINED CONTACTS; UNLESS OTHERWISE NOTED, 2-POSITION SIMILAR

NORMALLY OPEN PUSHBUTTON, MOMENTARY CONTACT UNLESS OTHERWISE NOTED

NORMALLY CLOSED PUSHBUTTON, MOMENTARY CONTACT UNLESS OTHERWISE NOTED

X — INDICATING LIGHT, X INDICATES LENS COLOR

X — PUSH TO TEST INDICATING LIGHT, X INDICATES LENS COLOR

LENS COLORS:

R - RED	Y - YELLOW
G - GREEN	W - WHITE
B - BLUE	A - AMBER

Z — ELECTRICAL MONITORING DEVICE

TYPES:
WHM - UTILITY WATT-HOUR METER PER UTILITY REQUIREMENTS
AS - CURRENT SENSOR
AM - AMP METER
WM - WATT METER
VS - VOLT SENSOR
VM - VOLT METER

CONTROL PANEL INTEGRAL OR PROVIDED WITH ASSOCIATED EQUIPMENT

CONTROL PANEL WITH DISCONNECT SWITCH INTEGRAL OR PROVIDED WITH ASSOCIATED EQUIPMENT

J — JUNCTION OR PULL BOX

PANELBOARD (250V TO 600V)

PANELBOARD (LESS THAN 250V)

ELECTRICAL EQUIPMENT ENCLOSURE: SWITCHBOARD, MOTOR CONTROL CENTER, CONTROL PANEL, OR OTHER EQUIPMENT AS INDICATED

Z X Y — CEILING/PENDANT-MOUNTED LED LUMINAIRE

Z X Y — WALL-MOUNTED LED LUMINAIRE

Z X Y — CEILING/PENDANT-MOUNTED LED FIXTURE

Z X Y — WALL-MOUNTED LED FIXTURE

Z X Y — CEILING/PENDANT-MOUNTED LED FIXTURE NORMAL/EMERGENCY

Z X Y — WALL-MOUNTED LED FIXTURE NORMAL/EMERGENCY

X Y — DOUBLE-FACED CEILING OR WALL-MOUNTED EXIT LIGHT; DIRECTIONAL ARROWS (IF REQUIRED) AS INDICATED ON PLANS

X Y — SINGLE-FACED CEILING OR WALL-MOUNTED EXIT LIGHT; DIRECTIONAL ARROWS (IF REQUIRED) AS INDICATED ON PLANS

X Y — AREA OR ROADWAY LIGHT - POLE-MOUNTED

LIGHTING FIXTURE SUBSCRIPTS:
X - INDICATES FIXTURE TYPE PER LIGHTING FIXTURE SCHEDULE
Y - INDICATES CIRCUIT NUMBER FROM PANELBOARD
z - INDICATES CONTROLLING SWITCH (IF REQUIRED)

X Y — EMERGENCY LIGHT FIXTURE, 2 ATTACHED HEADS AS SHOWN

X Y — EMERGENCY LIGHT, REMOTE MOUNTED HEAD

PC — PHOTOCELL

$ Y X — TOGGLE SWITCH

SUBSCRIPTS:
X - INDICATES TYPE
NONE - SINGLE POLE
3 - THREE-WAY
4 - FOUR-WAY
HP - TOGGLE SWITCH, HORSEPOWER RATED
K - KEY SWITCH
TE - MANUAL MOTOR STARTER W/ THERMAL ELEMENT
P - PILOT LIGHT
L - LIGHTED HANDLE
Y - INDICATES CONTROLLING SWITCH (IF REQUIRED)

T — TRANSFORMER

CS — CONTROL STATION

HS — HAND SWITCH

SS — SELECTOR SWITCH

PB — PUSHBUTTON

IC — INSTRUMENTATION/CONTROL DEVICE

S — NETWORK SWITCH

SD — NETWORK SWITCH/DIMMER

SO — NETWORK SWITCH/OCCUPANCY SENSOR

O — CEILING MOUNTED NETWORK OCCUPANCY SENSOR

D — CEILING MOUNTED NETWORK DIMMING PHOTOCELL

SPECIAL-PURPOSE RECEPTACLE AS DEFINED ON PLANS

PLUG-IN RECEPTACLE STRIP, QUANTITY AND SPACING OF RECEPTACLES AS NOTED OR SPECIFIED

TELECOMMUNICATIONS OUTLET JUNCTION BOX, NUMBER OF PORTS SHOWN, RUN EQUAL NUMBER OF CAT 6 CABLES TO COMMUNICATIONS BACKBOARD

FLOOR MOUNTED TELECOMMUNICATIONS OUTLET JUNCTION BOX

X Y — QUAD-DUPLEX RECEPTACLE, TWO NEMA 5-20R UNDER COMMON COVER PLATE

X Y — DUPLEX RECEPTACLE, NEMA 5-20R

X Y — FLOOR MOUNTED DUPLEX RECEPTACLE, NEMA 5-20R

X Y — SIMPLEX RECEPTACLE, NEMA 5-20R

SUBSCRIPTS:
X - INDICATES TYPE
GFCI - GROUND FAULT CIRCUIT INTERRUPTER
Y - INDICATES CIRCUIT NUMBER FROM PANELBOARD

PEDESTAL

CONDUIT TURNING DOWN

CONDUIT TURNING UP

HOME RUN TO PANEL, 2 #12, 1 #12G IN 3/4"C UNLESS OTHERWISE NOTED

CIRCUIT RUN BETWEEN DEVICES EXPOSED IN NON-ARCHITECTURALLY FINISHED AREAS; CONCEALED IN ARCHITECTURALLY FINISHED AREAS. CONDUIT AND CONDUCTOR SIZES SHALL BE THE SAME AS THE HOMERUN FOR THE CIRCUIT.

CONDUIT RUN BETWEEN DEVICES CONCEALED IN NON-ARCHITECTURALLY FINISHED AREAS, DIRECT BURIED, OR UNDER FLOOR SLAB. CONDUIT AND CONDUCTOR SIZES SHALL BE THE SAME AS THE HOMERUN FOR THE CIRCUIT.

CIRCUIT HASH MARKS (WHEN INDICATED); LONG, SHORT, SINGLE DOT, AND DOUBLE DOT REPRESENT PHASE, NEUTRAL, EQUIPMENT GROUND, AND ISOLATED EQUIPMENT GROUND, RESPECTIVELY. #12 IN 3/4" CONDUIT UNLESS OTHERWISE INDICATED.

MLO; MAIN LUGS ONLY

CIRCUIT CONTINUATION

CONDUIT STUBBED OUT AND CAPPED

XXX — CONDUIT TAG OR CIRCUIT NUMBER - WIRE AND CONDUIT SIZE AS SPECIFIED:
P: POWER
C: CONTROL
S: SIGNAL

G — G — GROUND CABLE

GROUND ROD

ROD TEST WELL

T — THERMOSTAT

FACP — FIRE ALARM CONTROL PANEL

F — FIRE ALARM MANUAL PULL STATION

CR — FIRE ALARM CONTROL RELAY

FS — FIRE ALARM CONTACT, FLOW SWITCH

TS — FIRE ALARM CONTACT, TAMPER SWITCH

PS — FIRE ALARM CONTACT, PRESSURE SWITCH

X AND X — SMOKE AND DUCT DETECTOR

SUBSCRIPT:
I - IONIZATION TYPE
P - PHOTOELECTRIC TYPE

X — HEAT DETECTOR

SUBSCRIPT:
R/C - RATE COMPENSATION
R/F - COMBINATION RATE OF RISE AND FIXED TEMP
R - RATE OF RISE
F - FIXED

X — ALARM BELL

X — ALARM HORN

X — ALARM FLASHING LIGHT

X — ALARM BELL AND FLASHING LIGHT COMBINATION UNIT

X — ALARM HORN AND FLASHING LIGHT COMBINATION UNIT

SUBSCRIPT:
NONE - GENERAL ALARM DEVICE
F - FIRE ALARM DEVICE

C — CONDULET

GENERAL NOTES:

1. THIS IS A STANDARD ELECTRICAL SYMBOLS SHEET. ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT.
2. IN GENERAL CONDUIT ROUTING IS NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS INCLUDING THOSE SHOWN ON ONE-LINES AND HOME RUNS. SEE SPECIFICATIONS FOR CONDUIT INSTALLATION REQUIREMENTS. CONDUIT ROUTINGS AND STUB-UP LOCATIONS THAT ARE SHOWN ARE APPROXIMATE, EXACT ROUTINGS SHALL BE AS REQUIRED FOR EQUIPMENT FURNISHED, FREE OF ANY INTERFERENCES.
3. WHEN BRANCH CIRCUITS ARE NOT SHOWN ON THE PLANS THE CONTRACTOR SHALL FURNISH AND INSTALL ALL CONDUITS AND CONDUCTORS REQUIRED. CONDUIT AND CONDUCTOR SIZES SHALL BE THE SAME AS THE HOMERUN FOR THE BRANCH CIRCUIT.
4. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH DRAWING FOR USAGE.
5. SEE PROJECT EQUIPMENT AND PIPING SYSTEMS DRAWING FOR SYMBOLS AND ABBREVIATIONS SPECIFIC TO THE PROJECT.

D C B A

HDR

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
CHECKED BY	R. GENATO
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
HDR PROJECT NO.	10292477

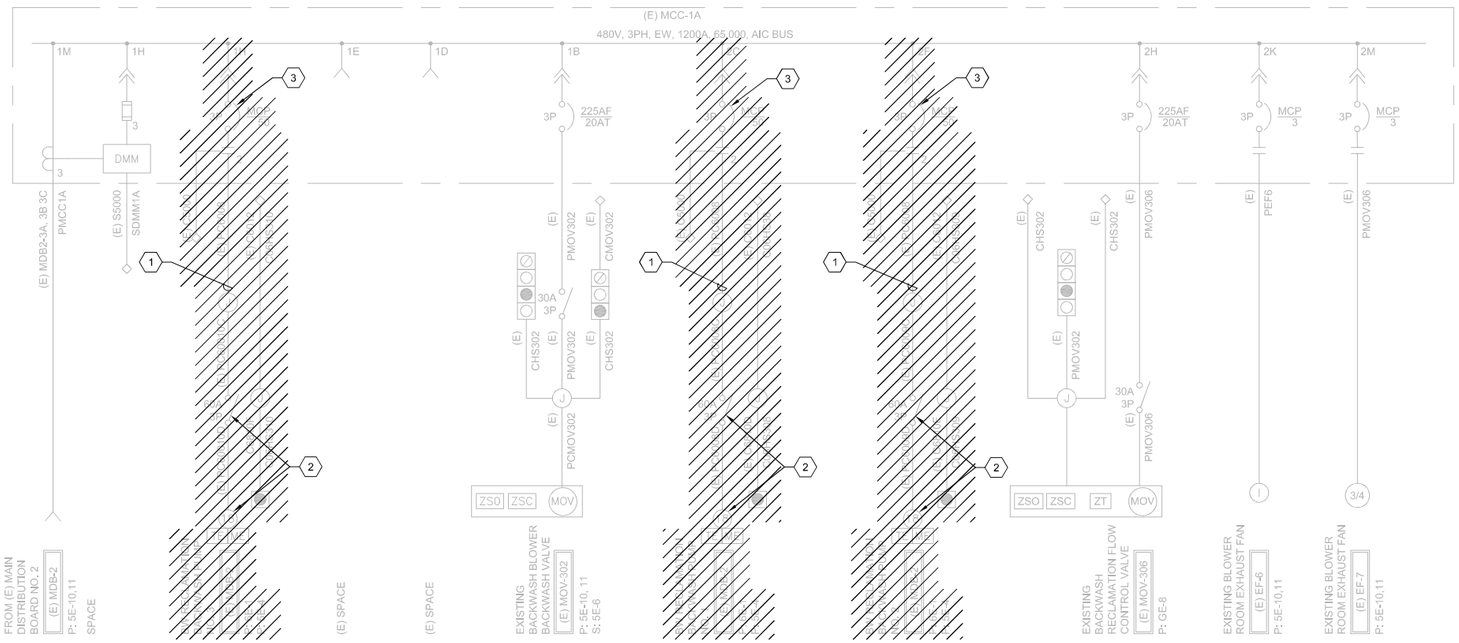
LICENSED PROFESSIONAL ENGINEER JEFFREY JOSEPH INFERRERA No. E 22582 Exp. 12-31-22 ELECTRICAL STATE OF CALIFORNIA
02/10/22

CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom Water Treatment Plant BACKWASH AND RECYCLED WATER CAPACITY PROJECT

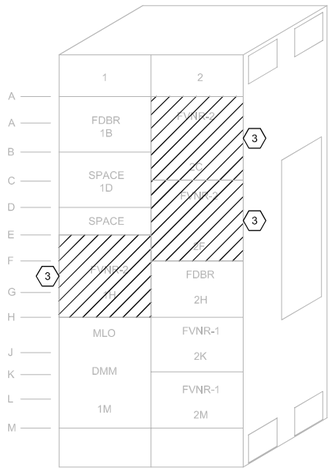
ELECTRICAL LEGEND, SYMBOLS, AND ABBREVIATIONS

FILENAME
SCALE NONE
0 1" 2"
SHEET E01



EXISTING MCC-1A ONE LINE DIAGRAM - DEMOLITION

NONE



EXISTING MOTOR CONTROL CENTER, MCC-1A

NONE

EXISTING MCC 1A PHOTO

NONE

KEYNOTES:

1. DEMOLISH CONDUCTORS BETWEEN RECLAMATION PUMPS P-308, P-309, AND P-310 AND MCC A1. DEMOLISH EXPOSED CONDUITS. CAP AND ABANDON EXISTING EMBEDDED CONDUITS.
2. REMOVE EXISTING 18 HP RECLAMATION PUMP AND 60A DISCONNECT SWITCH. SALVAGE TO OWNER.
3. REMOVE EXISTING RECLAMATION PUMP MOTOR STARTER BUCKETS FROM MCC 1A. SALVAGE TO OWNER.

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ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
CHECKED BY	R. GENATO
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
PROJECT NUMBER	10292477

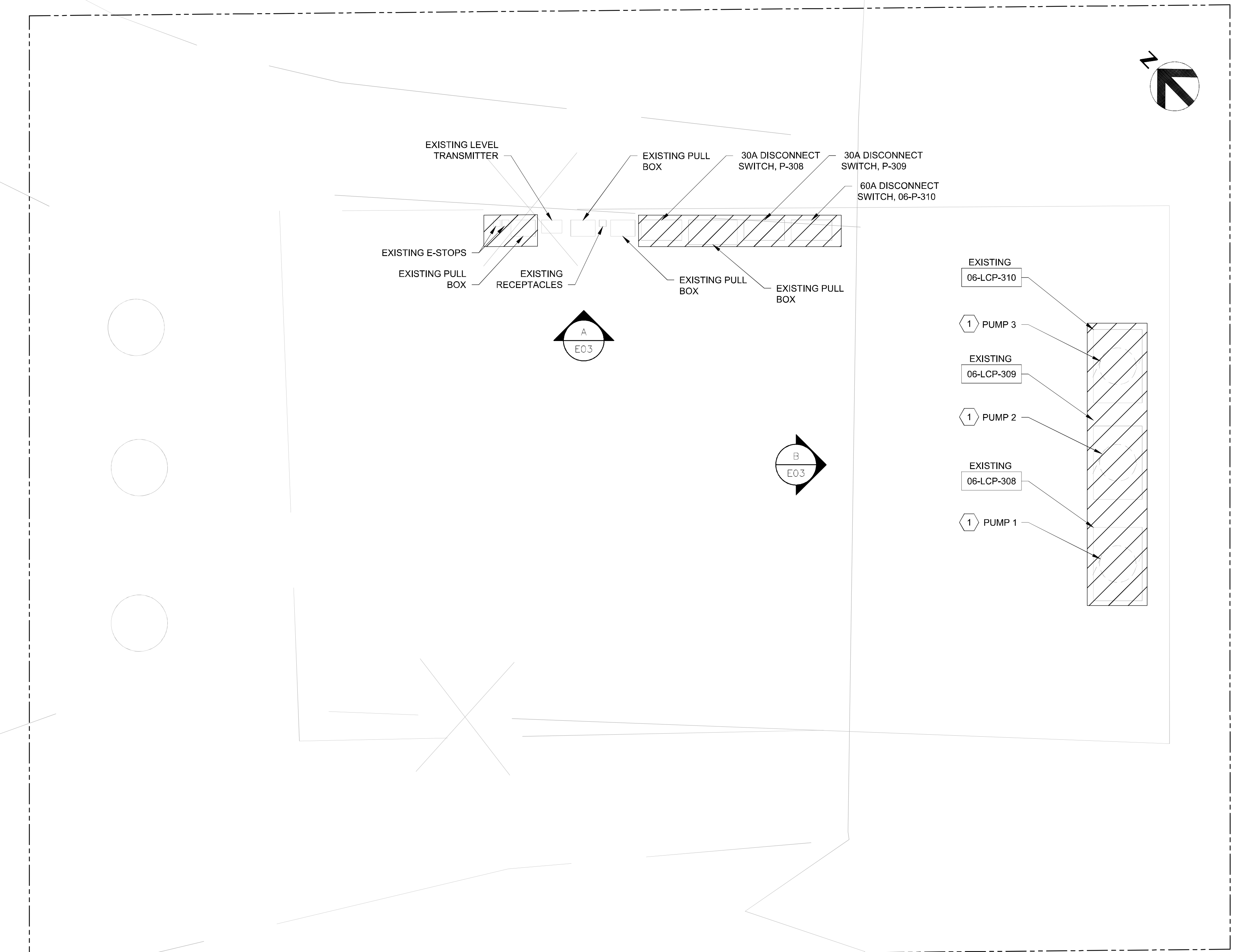
LICENSED PROFESSIONAL ENGINEER — JEFFREY JOSEPH INFERRERA — No. E 22582 — Exp. 12-31-22 — ELECTRICAL — STATE OF CALIFORNIA — 02/10/22

CITY OF FOLSOM — DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

ELECTRICAL
EXISTING MCC 1A ONE LINE DIAGRAM - DEMOLITION

0 1" 2" — FILENAME — SCALE: NONE — SHEET: E02



RECLAMATION PUMP STATION SITE PLAN: DEMOLITION
3/4" = 1'

A E03 EXISTING ELECTRICAL APPURTENANCES

B E03 EXISTING LOCAL CONTROL PANELS

GENERAL NOTES:

1. AREA CLASSIFICATION: OUTDOOR, WET.

KEYNOTES:

1. PUMP LOCATED INSIDE OF WELL BELOW LOCAL CONTROL PANEL.
2. REMOVE CONDUCTORS BETWEEN EXISTING DISCONNECT SWITCH AND EXISTING LOCAL CONTROL PANEL. REMOVE LOCAL CONTROL PANEL AND SALVAGE TO OWNER. TYPICAL FOR ALL THREE PUMPS.
3. DEMOLISH EXPOSED CONDUITS TO NEAREST PULLBOX/CONDULET. CAP AND ABANDON IN PLACE. TYPICAL FOR ALL THREE PUMPS.
4. DISCONNECT AND REMOVE EXISTING EQUIPMENT AS SHOWN, SALVAGE TO OWNER.
5. DEMOLISH EXPOSED CONDUITS, CAP EXISTING, AND ABANDON IN PLACE. DEMOLISH ASSOCIATED CONDUCTORS BACK TO SOURCE. TYPICAL.

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HDR

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
CHECKED BY	R. GENATO
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER JEFFREY JOSEPH INFERRERA No. E 22582 Exp. 12-31-22 ELECTRICAL STATE OF CALIFORNIA
02/10/22

CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

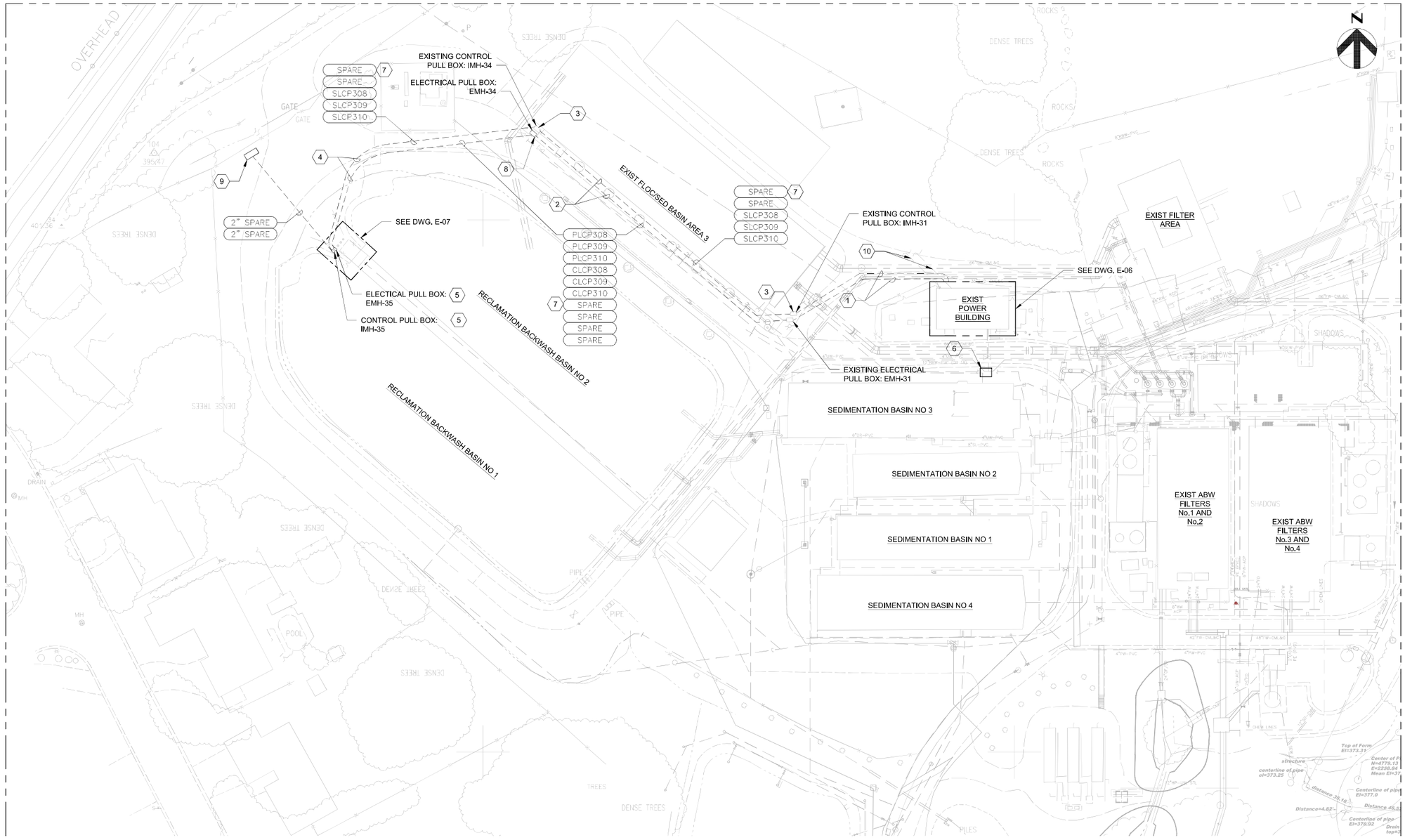
ELECTRICAL
RECLAMATION PUMP STATION - DEMOLITION

0' 1' 2'

FILENAME

SCALE 3/4" = 1'

SHEET E03



GENERAL NOTES:

1. AREA CLASSIFICATION: OUTDOOR, WET.

KEYNOTES:

1. INSTALL DUCT BANK PER DETAIL 1 ON DWG. E09. CONTRACTOR TO FIELD ROUTE DUCT BANKS FROM POWER BUILDING TO EXISTING PULL BOXES IMH-31 AND EMH-31. REFILL AND REPAIR GROUND TO MATCH EXISTING.
2. RUN DUCT BANKS FROM EXISTING PULL BOXES IMH-31 AND EMH-31 TO EXISTING PULLBOXES IMH-34 AND EMH-34 PARALLEL TO EXISTING DUCT BANKS. BACKFILL AND REPAIR GROUND TO MATCH EXISTING. INSTALL DUCT BANK PER DETAIL 1 ON DWG. E09.
3. DUCTBANK TO INTERCEPT EXISTING PULL BOX.
4. SAW CUT EXISTING ASPHALT PAVING TO INSTALL DUCT BANKS PER DETAIL 2 ON DWG. E09. REPLACE AND REPAIR EXISTING ASPHALT PER DETAIL 2 ON DWG. C02. MATCH EXISTING PAVING.
5. PROVIDE 36"WX36"L MINIMUM, PRECAST CONCRETE PULL BOX, H-20 RATED WITH STEEL COVERS. STEEL COVERS SHALL BE ENGRAVED WITH THE WORD "ELECTRICAL" FOR EMH-35 AND "CONTROLS" FOR IMH-35. DEPTH OF PULLBOX AS REQUIRED. INSTALL PER DETAIL 5 ON DWG. E09.
6. LOCATION OF EXISTING MAG FLOW METER. REFER TO DRAWING I02 FOR INSTRUCTION ON WORK TO BE DONE ON THE FLOW METER.
7. PROVIDE TWO 2" SPARE CONDUITS FOR SIGNALS, TWO 2" SPARE CONDUITS FOR CONTROL, AND TWO 2" SPARE CONDUITS FOR POWER. ROUTE SPARE CONDUITS FROM POWER BUILDING TO PULL BOXES IMH-35 AND EMH-35. PROVIDE PULL TAPE, CAP CONDUITS AT EVERY PULL POX.
8. REMOVE EXISTING ELECTRICAL PULL BOX, EMH-34 AND SALVAGE TO OWNER. PROTECT EXISTING CONDUITS AND CONDUCTORS. INSTALL IN THE SAME LOCATION WITH A 36"WX36"L MINIMUM PRECAST CONCRETE PULL BOX. PROVIDE STEEL COVER. STEEL COVER SHALL BE ENGRAVED WITH THE WORD "ELECTRICAL". MATCH DEPTH OF PULL BOX TO EXISTING CONTROL PULL BOX IMH-34. INSTALL PER DETAIL 6 ON DWG. E09.
9. INSTALL A N17 CHRISTY BOX 12" FROM THE FENCE POST.
10. EXISTING DUCTBANKS MAY BE PRESENT IN THIS AREA, CONTRACTOR TO FIELD VERIFY.

OVERALL ELECTRICAL SITE PLAN

1" = 40'

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ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
CHECKED BY	R. GENATO
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER
JEFFREY JOSEPH HERRERA
No. E 22582
Exp. 12-31-22
ELECTRICAL
STATE OF CALIFORNIA
02/10/22

CITY OF FOLSOM
DISTINCTIVE BY NATURE

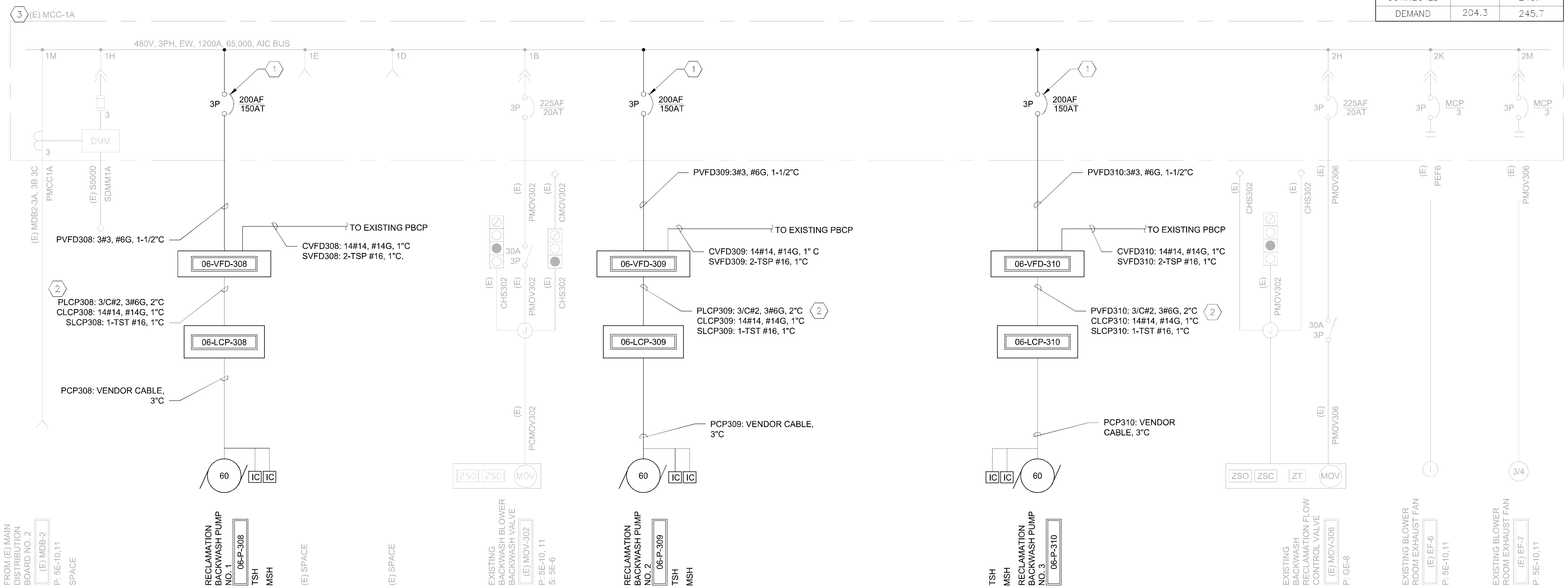
City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

ELECTRICAL
OVERALL SITE PLAN

0' 40' 80'

FILENAME	
SCALE	1" = 40'
SHEET	E04

	KVA	AMPS
CONNECTED	204.3	245.7
DEMAND	204.3	245.7

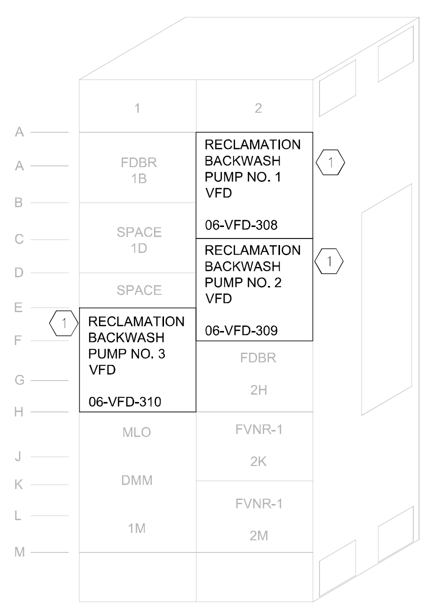


EXISTING MCC–1A ONE LINE DIAGRAM – MODIFIED

NONE

KEYNOTES:

1. PROVIDE 200AF/150AT CIRCUIT BREAKERS AND INSTALL IN THE SAME LOCATION AS EXISTING MOTOR STARTER.
2. PROVIDE VFD CABLE FROM VFD TO LOCAL CONTROL PANEL. TYPICAL FOR ALL THREE PUMPS.
3. EXISTING MCC-A1 IS A ALLEN-BRADLEY, CENTERLINE SERIES. CONTRACTOR TO PROVIDE CIRCUIT BREAKERS THAT ARE COMPATIBLE WITH EXISTING MCC.



EXISTING MOTOR CONTROL CENTER, MCC–1A – MODIFIED

NONE

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

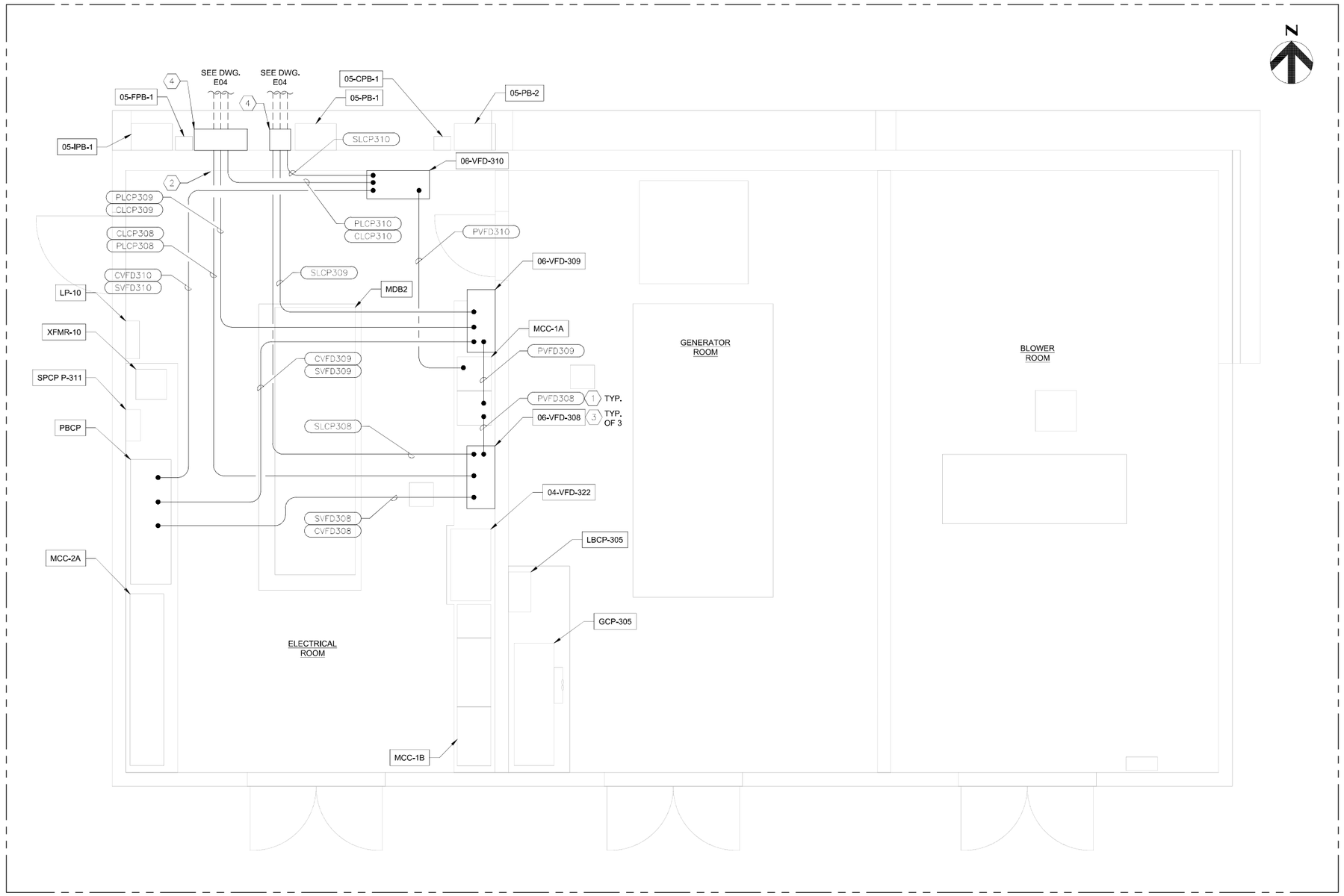
PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
CHECKED BY	R. GENATO
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
HDR PROJECT NO.	10292477

02/10/22

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

ELECTRICAL
EXISTING MCC 1A ONE LINE DIAGRAM - MODIFIED

FILENAME
SCALE NONE
SHEET E05



ELECTRICAL POWER BUILDING PLAN

3/8"=1'

GENERAL NOTES:

1. AREA CLASSIFICATION: INDOOR, DRY.

KEYNOTES:

1. ROUTE ALL CONDUITS INSIDE ELECTRICAL ROOM OVERHEAD.
2. CORE DRILL AND ROUTE CONDUITS TO PULL BOX OUTSIDE. CORE DRILL FOR SPARE CONDUITS AND CAP CONDUITS. SEAL GAP AROUND CONDUITS WITH NON-SHRINK GROUT. PAINT OUTSIDE AND INSIDE OF WALL TO MATCH EXISTING. TYPICAL FOR ALL CONDUITS.
3. WALL MOUNT VFD SUCH THAT CENTER OF VFD IS A MIN OF 48 IN ABOVE FINISHED FLOOR. WALL MOUNT VFD PER MANUFACTURER'S RECOMMENDATIONS. TYPICAL FOR 06-VFD-308, 309, AND 310.
4. INSTALL A 30"L X 30"W X 12"D PULLBOX FOR POWER AND CONTROLS AND A 12"L X 12"W X 12"D FOR SIGNAL. PULL BOXES SHALL BE NEMA 4X. INSTALL AT SAME HEIGHT OF EXISTING PULL BOXES. PULL BOXES SHALL HAVE REMOVABLE FRONT COVER.

ISSUE	DATE	DESCRIPTION
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PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
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DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER — JEFFREY JOSEPH INFERRERA — No. E 22582 — Exp. 12-31-22 — ELECTRICAL — STATE OF CALIFORNIA — 02/10/22

CITY OF FOLSOM — DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

ELECTRICAL POWER BUILDING PLAN

0' 2' 4'

FILENAME

SCALE 3/8" = 1'

SHEET E06

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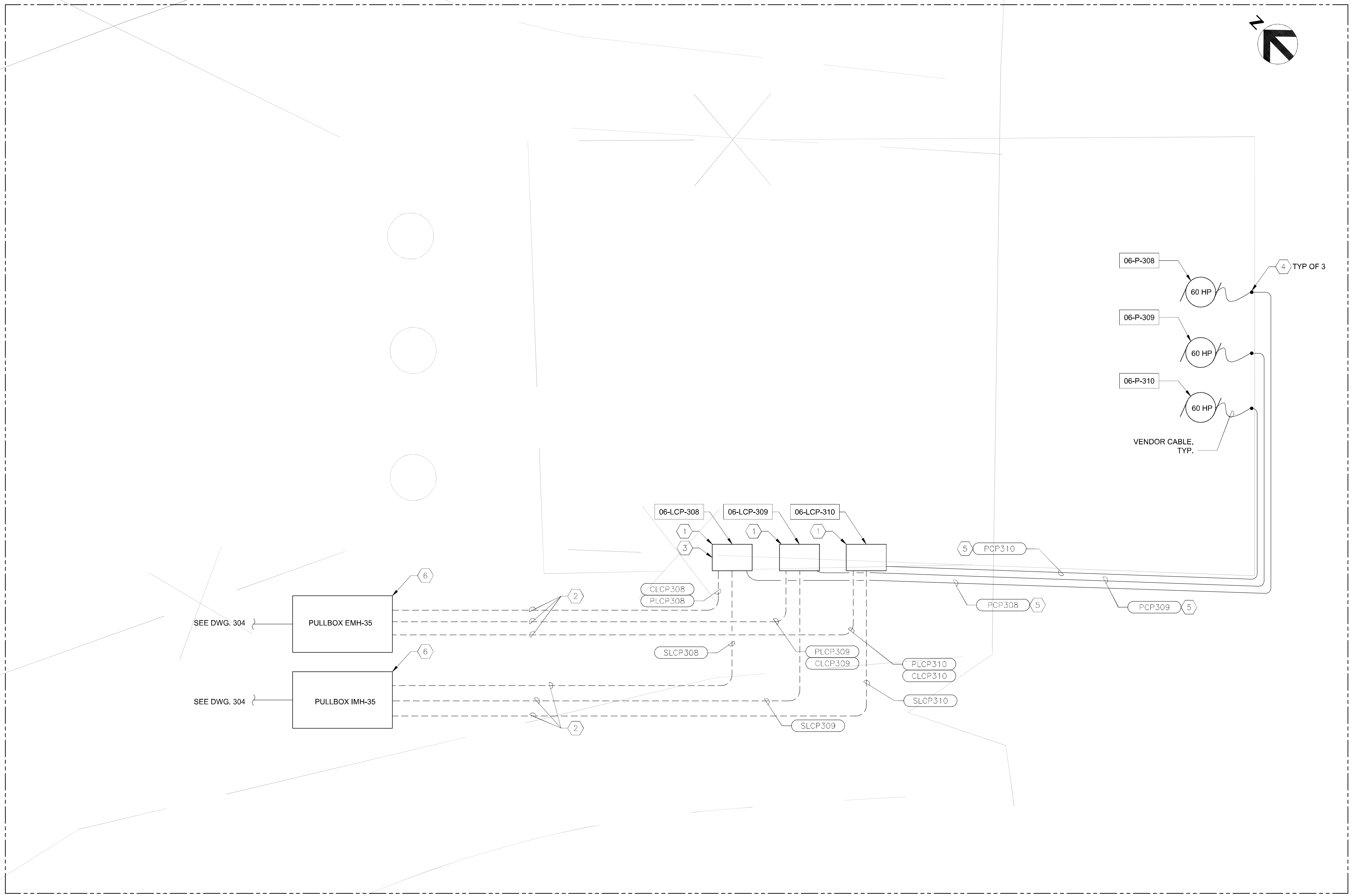

RECLAMATION PUMP STATION SITE PLAN

3/4" = 1'

GENERAL NOTES:

1. AREA CLASSIFICATION: OUTDOOR, WET.

KEYNOTES:

1. PROVIDE NEMA 4X, LOCAL CONTROL PANEL ENCLOSURE. INSTALL LOCAL CONTROL PANEL 06-LCP-308, 309 AND 310 ON MODULAR EQUIPMENT RACK PER DETAIL 3 ON DWG. E09.
2. ROUTE CONDUITS FROM PULL BOX TO EACH CONTROL PANEL PER DETAIL 1 ON DWG. E09. TYPICAL FOR ALL PUMPS.
3. TRANSITION CONDUITS FROM BELOW GRADE TO ABOVE GRADE PER DETAIL 4 ON DWG. E09.
4. TERMINATE CONDUIT 2" BELOW EXISTING GRATE, PROVIDE STAINLESS STEEL, STRAIN RELIEF, KELLEM GRIP WITH CABLE GLAND TO SUPPORT PUMP VENDOR CABLE.
5. MOUNT CONDUITS ON EXISTING RAILS AND ROUTE AROUND TO PUMPS.
6. INSTALL PULL BOX PER DETAIL 5 ON DWG. E09.

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HDR

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
CHECKED BY	R. GENATO
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER JEFFREY JOSEPH INFERRERA No. E 22582 Exp. 12-31-22 ELECTRICAL STATE OF CALIFORNIA

02/10/22

CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

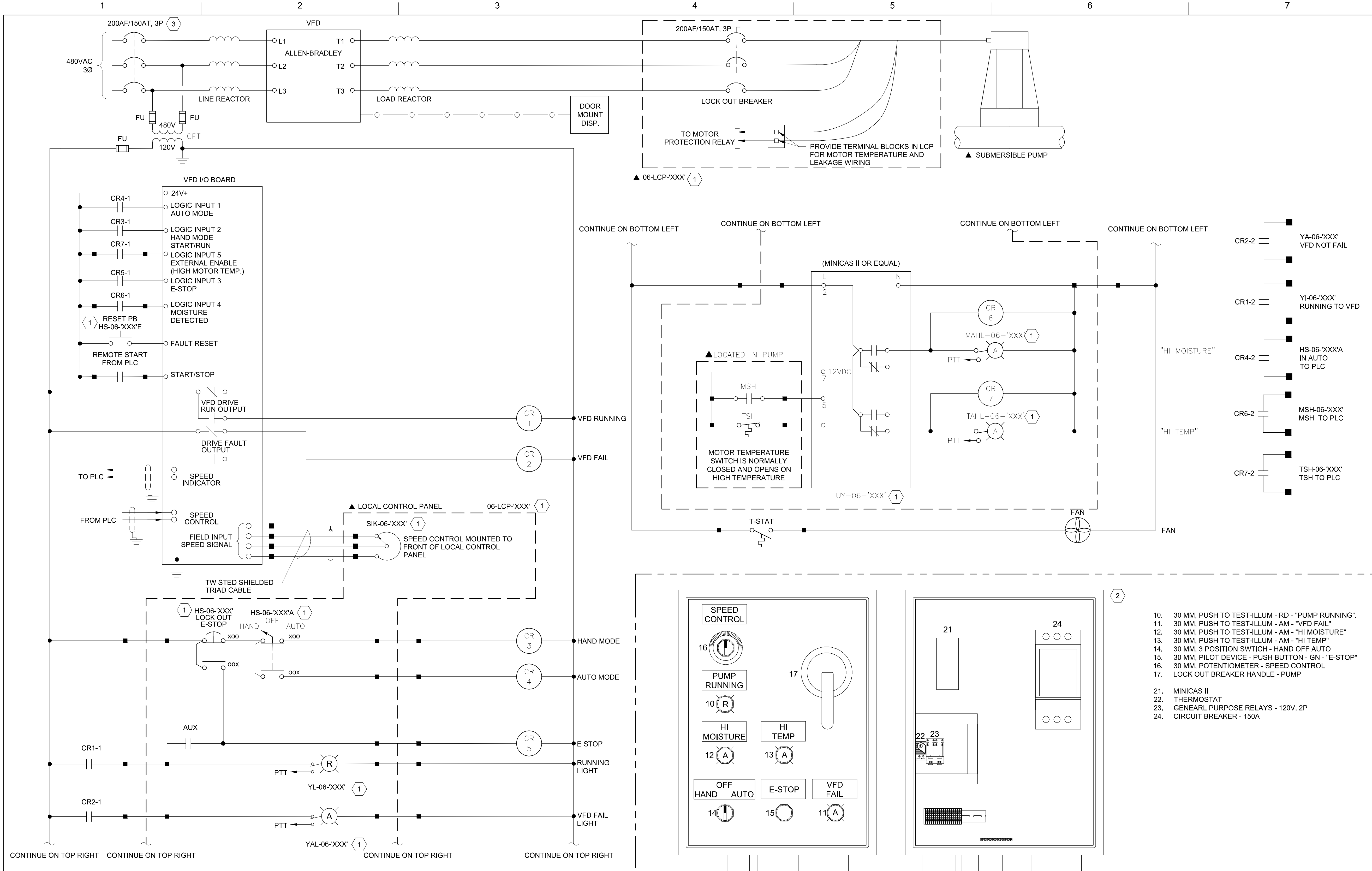
ELECTRICAL
RECLAMATION PUMP STATION

0' 1' 2'

FILENAME

SCALE 3/4" = 1'

SHEET E07



RECLAMATION BACKWASH PUMPS
VFD CONTROL DIAGRAM, TYP.
NONE

LOCAL CONTROL PANEL, TYP.
NTS

GENERAL NOTES

1. PROVIDE ALL COMPONENTS/INTERLOCKS NECESSARY FOR A COMPLETE AND FUNCTIONING SYSTEM.
2. ALL EQUIPMENT SHALL BE INSTALLED TO THEIR MANUFACTURER'S LITERATURE AND DATA SHEETS AND THEIR RECOMMENDATIONS SHALL BE ADHERED TO.
3. CONTACTS SHOWN IN DE-ENERGIZED STATE.
4. ALL CONTROL CIRCUIT EQUIPMENT WITHIN THE LOCAL CONTROL PANEL SHALL BE DIN RAIL MOUNTED.
5. THE CONTROL EQUIPMENT IS BASED ON ALLEN BRADLEY EQUIPMENT. MODIFY CONTROL CIRCUITS TO SUIT FINAL SELECTION OF EQUIPMENT.

SHEET KEYNOTES

1. 'XXX' REPRESENTS THE RECLAMATION BACKWASH PUMP NUMBER: 308, 309, 310
2. PROVIDE A MINIMUM 16"Hx12"Hx"8"D, NEMA 4X, CONTROL PANEL ENCLOSURE.
3. CIRCUIT BREAKER LOCATED AT MCC.

LEGEND

- ▲ INDICATES EQUIPMENT LOCATED IN FIELD.
- ■ INDICATES TERMINAL CONNECTION FOR FIELD CONDUCTORS.
- • INDICATES WIRING CONNECTION WITHIN CONTROL PANEL.
- ∘ INDICATES EQUIPMENT/COMPONENT TERMINAL POINTS.

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

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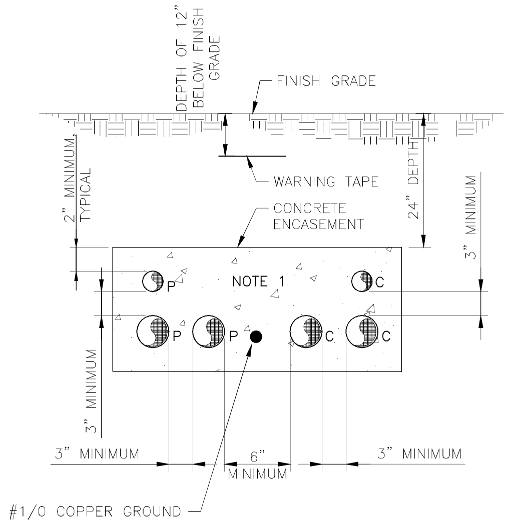
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER JEFFREY JOSEPH INFERRERA No. E 22582 Exp. 12-31-22 ELECTRICAL STATE OF CALIFORNIA 02/10/22

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

ELECTRICAL - VFD CONTROL DIAGRAM
RECLAMATION BACKWASH PUMPS

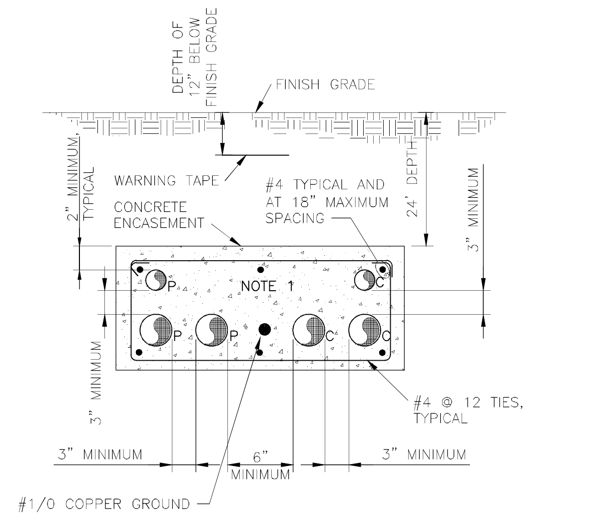
FILENAME
SCALE NONE
SHEET E08



NOTES:

1. NUMBER OF CONDUITS AS REQUIRED FOR THE APPLICATION.
2. P SUBSCRIPT ELECTRICAL POWER OR CONTROL CONDUIT.
3. C SUBSCRIPT COMMUNICATION (TELEPHONE, DATA, INSTRUMENTATION) CONDUIT.
4. REFER TO SPECIFICATION 26 05 43 FOR DUCTBANK REQUIREMENTS.

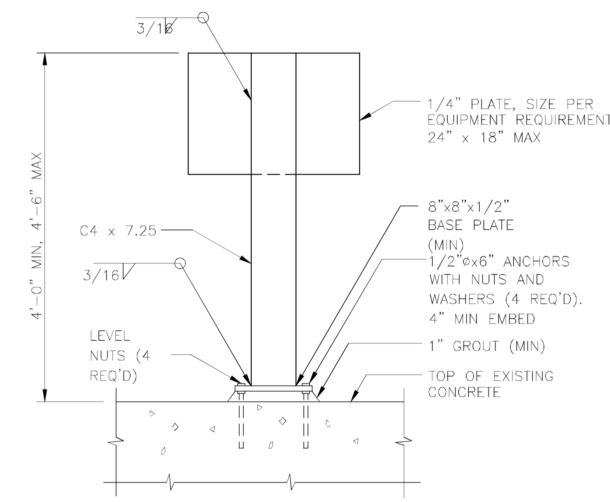
1 CONCRETE ENCASED DUCTBANK SECTION
NTS



NOTES:

1. NUMBER OF CONDUITS AS REQUIRED FOR THE APPLICATION.
2. P SUBSCRIPT ELECTRICAL POWER OR CONTROL CONDUIT.
3. C SUBSCRIPT COMMUNICATION (TELEPHONE, DATA, INSTRUMENTATION) CONDUIT.
4. REFER TO SPECIFICATION 26 05 43 FOR DUCTBANK REQUIREMENTS.

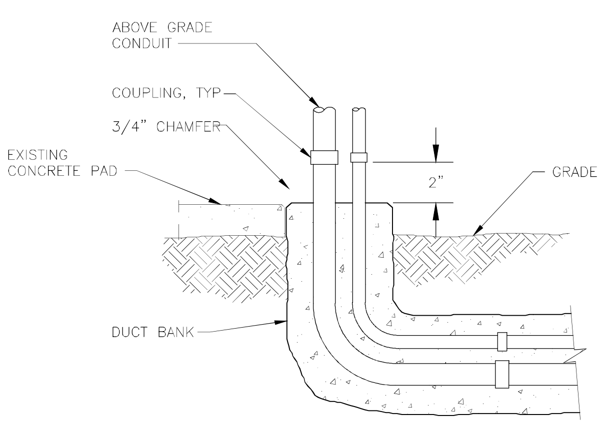
2 REINFORCED CONCRETE ENCASED DUCTBANK SECTION
NTS



NOTES:

1. ADAPT TO SPECIFIC REQUIREMENTS.
2. USE FOR LARGER DEVICES SUCH AS MOTOR STARTERS, DISCONNECTS, AND CONTROL PANELS.
3. SEE SECTION 26 05 00 FOR MATERIALS OF CONSTRUCTION.

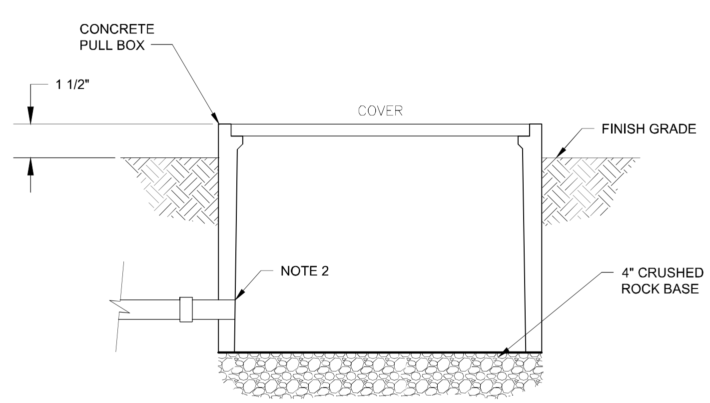
3 MOUNTING STAND DETAIL
NTS



NOTE:

1. SEE DUCT BANK SECTION DETAIL FOR ADDITIONAL REQUIREMENTS.

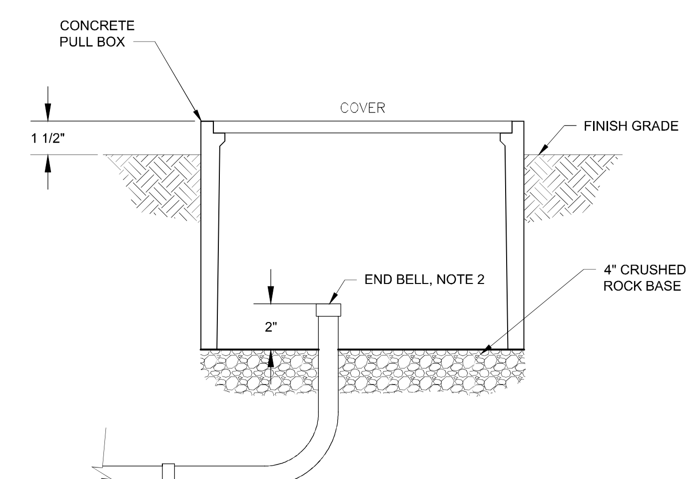
4 CONDUIT TRANSITION TO ABOVE GRADE (EXTERIOR)
NTS



NOTES:

1. PULLBOX COVER TO HAVE "ELECTRICAL" LOGO, UNLESS OTHERWISE NOTED.
2. SEAL OFF CONDUITS WITH CONDUIT SEALING CLAY.

5 PULLBOX INSTALLATION DETAIL 1
NTS



NOTES:

1. PULLBOX COVER TO HAVE "ELECTRICAL" LOGO, UNLESS OTHERWISE NOTED.
2. SEAL OFF CONDUITS WITH CONDUIT SEALING CLAY.

6 PULLBOX INSTALLATION DETAIL 2
NTS

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12/1/2021 3:20 PM, LARI, STEVEN

HDR

ISSUE	DATE	DESCRIPTION
01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
CHECKED BY	R. GENATO
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER JEFFREY JOSEPH INFERRERA No. E 22582 Exp. 12-31-22 ELECTRICAL STATE OF CALIFORNIA
02/10/22

CITY OF FOLSOM DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

ELECTRICAL DETAILS

0 1" 2"

FILENAME
SCALE NONE

SHEET **E09**

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

INSTRUMENT SYMBOLOGY

- LOCALLY MOUNTED FIELD INSTRUMENTATION
- MOUNTED ON PANEL FRONT
- MOUNTED INSIDE PANEL
- FRONT PANEL MOUNTED ON AUXILIARY PANEL (SUBSCRIPT INDICATES PANEL)
- MOUNTED INSIDE AUXILIARY PANEL
- PILOT LIGHT
- INSTRUMENT FUNCTIONS SHARING COMMON HOUSING
- I — COMPLEX INTERLOCK AS DEFINED IN CONTROL DIAGRAM OR IN SPECIFICATIONS
- SHARED DISPLAY, SHARED CONTROL, FIELD MOUNTED
- SHARED DISPLAY, SHARED CONTROL AT PRIMARY LOCATION - NORMALLY ACCESSIBLE TO OPERATOR (SCADA WORKSTATION)
- SHARED DISPLAY, SHARED CONTROL AT AUXILLIARY LOCATION - NORMALLY ACCESSIBLE TO OPERATOR (IPC, HMI)
- PROGRAMMABLE LOGIC CONTROL, PRIMARY LOCATION - NORMALLY INACCESSIBLE TO OPERATOR

PRIMARY ELEMENT SYMBOLOGY

- M — MAGNETIC FLOWMETER
- FLUME
- TE — TEMPERATURE ELEMENT WITH THERMOWELL
- FG — SIGHT FLOW GLASS
- CHEMICAL SEAL
- SUBMERSIBLE PUMP
- PROGRESSIVE CAVITY PUMP
- CENTRIFUGAL PUMP
- VERTICAL TURBINE PUMP
- METERING PUMP
- GATE

INSTRUMENT IDENTIFICATION LETTERS

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION				
C				CONTROL	CLOSED
D		DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G			GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME; RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M		MOMENTARY			MIDDLE, INTERMEDIATE
N					
O			ORIFICE, RESTRICTION		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECH. ANALYSIS			VALVE DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X		X-AXIS			
Y	EVENT, STATE OR PRESENCE	Y-AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z-AXIS		DRIVER, ACTUATOR UNCLASSIFIED FINAL CONTROL ELEMENT	

ACTUATOR SYMBOLOGY

- X — OPERATOR ABBREVIATIONS:
  - M = MOTOR
  - P = PNEUMATIC
  - S = SOLENOID
- FLOAT OPERATOR
- SPRING-OPPOSED SINGLE-ACTING PNEUMATIC CYLINDER
- DOUBLE-ACTING PNEUMATIC CYLINDER
- PNEUMATIC DIAPHRAGM
- PNEUMATIC DIAPHRAGM WITH POSITIONER

TYPES OF POWER SUPPLY

A	PLANT COMPRESSED AIR
IA	INSTRUMENT AIR
ES	ELECTRICAL SUPPLY
NG	NATURAL GAS
HYD	HYDRAULIC
AC	120VAC POWER
480	480VAC POWER
DC	24VDC POWER

PLC INTERFACES

- ANALOG INPUT (4-20mA DC)
- ANALOG OUTPUT (4-20mA DC)
- DISCRETE INPUT (24VDC)
- DISCRETE OUTPUT (DRY CONTACT 120VAC)

CONTROL SWITCH NOTATION ABBREVIATIONS

XXX

ACK	ACKNOWLEDGE
ESTOP	EMERGENCY STOP
FAIL	FAILURE
FOR	FORWARD-OFF-REVERSE
FR	FORWARD-REVERSE
FS	FAST-SLOW
HA	HAND-AUTO
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HSE	EMERGENCY STOP
LL	LEAD-LAG
LLS	LEAD-LAG-STANDBY
LOR	LOCAL-OFF-REMOTE
LR	LOCAL-REMOTE
LS	LEAD-STANDBY
MA	MANUAL-AUTO
OAC	OPEN-AUTO-CLOSE
OC	OPEN-CLOSE
OO	ON-OFF
OSC	OPEN-STOP-CLOSE
RJ	RUN-JOG
RJR	RUN-JOG-REVERSE
SIL	SILENCE

VALVE AND GATE SYMBOLOGY

- X — AIR-RELEASE VACUUM VALVE: ARV = AIR RELEASE VALVE, VAC = VACUUM
- BV - BALL VALVE
- BFV - BUTTERFLY VALVE
- CNV - CONE VALVE
- CV - CHECK VALVE
- DDCV - DOUBLE-DISK CHECK VALVE
- BCV - BALL CHECK VALVE
- DV - DIAPHRAGM VALVE
- GV - GATE VALVE
- GLV - GLOBE VALVE
- KGV - KNIFE GATE VALVE
- NV - NEEDLE VALVE
- PNV - PINCH VALVE
- PV - PLUG VALVE
- PRV - PRESSURE-REDUCING VALVE
- PRV - PRESSURE-REGULATING VALVE
- OR — PRV - PRESSURE-RELIEF VALVE
- TWCV - THREE-WAY CONTROL VALVE
- Y-STRAINER
- FLEX COUPLING
- D — DRAIN
- S — SOLENOID VALVE
- ROTAMETER WITH BALL INDICATOR AND FLOW ADJUSTMENT

PROCESS AND INSTRUMENTATION ABBREVIATIONS

3W	CHLORINATED PLANT WATER
4W	NON-CHLORINATED PLANT WATER
ABI	AERATION BASIN INFLUENT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
BNR	BIOLOGICAL NITROGEN REMOVAL
BSCR	BANDSCREEN
BYP	BYPASS
CA	COMPRESSED AIR
CHEMD	CHEMICAL DRAIN
CL2	CHLORINE (ANALYZER MODIFIER)
CLS	CHLORINE SOLUTION
CMP	COMPACTOR
CND	CONDENSER
COND	CONDUCTIVITY (ANALYZER MODIFIER)
CS	CONTACT STABILIZATION
CSL	CAUSTIC SOLUTION
CW	CITY WATER
D	DRAIN
DEN	DENSITY
DG	DIGESTER GAS
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
DO	DISSOLVED OXYGEN (ANALYZER MODIFIER)
DS	DIGESTED SLUDGE
E/P	VOLTAGE TO PNEUMATIC
FA	FOUL AIR
FD	FLOOR DRAIN
FE	FILTER EFFLUENT
FF	FILTER FEED
FO	FUEL OIL
FW	FEED WATER
GR	GRIT
GTSL	GRAVITY THICKENED SLUDGE
HPA	HIGH PRESSURE AIR
HW	HOT WATER
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
I/O	INPUT/OUTPUT
I/P	CURRENT TO PNEUMATIC
IA	INSTRUMENT AIR
LCP	LOCAL CONTROL PANEL
LO	LUBE OIL
LOX	LIQUID OXYGEN
LPA	LOW PRESSURE AIR
LPDG	LOW PRESSURE DIGESTER AIR
LSG	LOW PRESSURE SLUDGE GAS
MA	MURIATIC ACID
ML	MIXED LIQUOR
MXR	MIXER
N2	NITROGEN GAS
NC	NORMALLY CLOSE
NG	NATURAL GAS
NO	NORMALLY OPEN
OF	OVERFLOW
OF	OVERFLOW
OG	OFF GAS
OI	OPERATOR INTERFACE
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
PD	PLANT DRAIN
PE	PRIMARY EFFLUENT
PERM	PERMEATE
PI	PRIMARY INFLUENT
PSC	PRIMARY SCUM
PMP	PUMP
POL	POLYMER
POTW	POTABLE WATER
PS	PRIMARY SLUDGE
PW	PLANT WATER
RAS	RETURN ACTIVATED SLUDGE
REC	RECIRCULATION
RS	RAW SEWAGE
RW	RECLAIMED WATER
SAM	SAMPLE
SBS	SODIUM BISULFATE
SC	SCUM
SCR	SCREENINGS
SD	SANITARY DRAIN
SE	SECONDARY EFFLUENT
SEW	SEWER
SHC	SODIUM HYPOCHLORITE
SI	SECONDARY INFLUENT
SLG	SLIDE GATE, SLUICE GATE
SN	SUPERNATANT
SO	SLOPE OIL
SOD	SLOPE OIL DRAIN
SS	SUSPENDED SOLIDS (ANALYZER MODIFIER)
SWR	SOFTENED WATER
T	TANK
TS	THICKENED SLUDGE
TURB	TURBIDITY (ANALYZER MODIFIER)
TWAS	THICKENED WASTE ACTIVATED SLUDGE
V	VENT
VCP	VENDOR CONTROL PANEL
WAS	WASTE ACTIVATED SLUDGE
WW	WASH WATER

LINE TYPES

- MAIN PROCESS LINE
- SECONDARY PROCESS LINE
- AUXILIARY PROCESS LINE
- DIRECTION OF FLOW
- PNEUMATIC SIGNAL
- ELECTRICAL SIGNAL
- P — 480V POWER
- L — HYDRAULIC SIGNAL
- SOFTWARE OR DATA LINK
- SIGNAL CONNECTION
- CROSSOVER - NO CONNECTION
- X — CAPILLARY
- MECHANICAL LINK
- E — E — ETHERNET I/O DATA LINK
- D — D — DEVICENET DATA LINK
- S — S — SERIAL RS232 LINK
- FO — FO — FIBER OPTIC

CROSS REFERENCE SYMBOLOGY

- SEQUENCE NUMBER — A P1 — CONTINUATION FROM DRAWING XXIXXX
- SEQUENCE NUMBER — P1 A — CONTINUATION TO DRAWING XXIXXX

GENERAL NOTES

1. THIS IS A STANDARD INSTRUMENTATION SYMBOLOGY AND ABBREVIATIONS SHEET. LISTING OF SYMBOLS AND ABBREVIATIONS DOES NOT IMPLY ALL SYMBOLS AND ABBREVIATIONS HAVE BEEN USED ON THIS PROJECT.
2. SEE PROCESS, MECHANICAL AND PLUMBING LEGEND DRAWINGS FOR MISCELLANEOUS PIPING SYMBOLS.
3. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH DRAWING FOR USAGE.
4. VALVE SYMBOLS SHOWN HERE ARE APPLICABLE ONLY TO INSTRUMENTATION DIAGRAMS. SEE PROCESS, MECHANICAL AND PLUMBING LEGEND SHEET FOR VALVE SYMBOLS USED ELSEWHERE ON THE DRAWINGS.

D | C | B | A

HDR

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01	02/10/22	ISSUED FOR BIDS

PROJECT MANAGER	A. SINGH
DESIGNED BY	G. INIGUEZ
DESIGNED BY	
CHECKED BY	R. GENATO
DRAWN BY	G. INIGUEZ
DATE	NOV 2021
HDR PROJECT NO.	10292477

LICENSED PROFESSIONAL ENGINEER — JEFFREY JOSEPH INFERRERA — No. E 22582 — Exp. 12-31-22 — ELECTRICAL — STATE OF CALIFORNIA

02/10/22

CITY OF FOLSOM — DISTINCTIVE BY NATURE

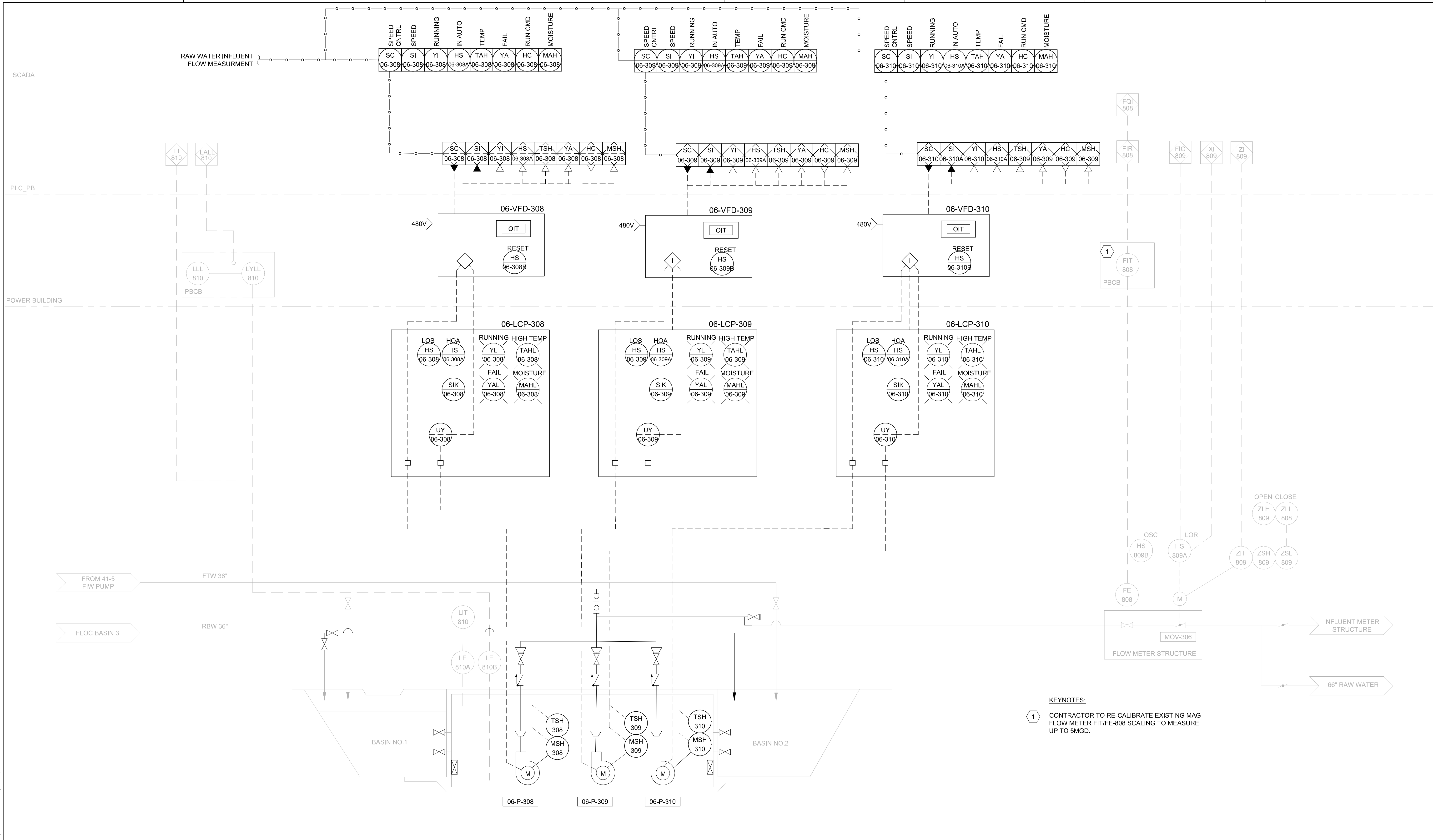
City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

INSTRUMENTATION

LEGEND, SYMBOLS, AND ABBREVIATIONS

0 1" 2"

FILENAME I01.dwg
SCALE NONE
SHEET I01



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HDR

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02/10/22

CITY OF FOLSOM
DISTINCTIVE BY NATURE

City of Folsom
Water Treatment Plant
BACKWASH AND RECYCLED WATER CAPACITY PROJECT

INSTRUMENTATION

DECANT PUMP STATION P&ID

0 1" 2"

FILENAME I02.dwg
SCALE NONE
SHEET I02