

# **APPENDIX “I”**

## **PLACER COUNTY LAND DEVELOPMENT MANUAL**

### **SECTION 6, SEWERAGE**

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**SECTION 6**

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**SEC. 6.01            DESIGN CRITERIA**

(1) General

(a) The design criteria set forth in this section shall be adhered to in the design of all sewer systems except where a local sewer district or a controlling agency has a higher standard, in which case their requirements shall take precedence.

(b) The sewer system shall be adequate to serve the area under consideration, and shall meet the requirements contained in this section regarding provisions for future extensions into the surrounding areas.

(2) Average Flow Determination. Flow determination shall be based upon the general plan buildout. The minimum population density used shall be equivalent to that of single family zoning at buildout of the general plan. This estimate shall be used as the basis for determining flow.

(a) Single Family and Duplex Units - Flow shall be based on four persons per residential unit, 100 gallons per person per day, and four lots per acre. However, if the number of units is known, and is greater than four per acre, the actual number shall be used.

(b) Single Family, Planned Unit Development - Flow per unit shall be the same as above and the actual number of units per acre shall be considered. However, in the absence of known data, the density shall be assumed to be 12 units per acre.

(c) Commercial and Multiple Residential - Flows shall be determined from the curves on Standard Drawing No. 1. However, if the type of planned improvements are known and estimated discharges are available, they shall be used in-lieu of Standard Drawing No. 1. Multiple residential is differentiated from planned unit developments in that the latter contain individually owned residences with the adjacent land owned in common and with maintenance performed by a homeowner's association. Multiple residential is designed to be owned by one party with the individual residences rented or leased. The average flow from single bedroom multiple residential units shall be 200 gallons per day per unit; from two-bedroom units, 300 gallons per day; and from three or more bedroom units, 400 gallons per day. Mobile home flow shall be 300 gallons per day per unit. Arrangements for the connection of facilities with a high discharge rate or with a type of discharge that could be detrimental to the public system shall be subject to the approval of the Engineer.

SEC. 6.01(2)        (Continued)

(d) Schools - The larger flow, as determined from one of the two following methods, shall be used:

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1. The entire school area shall be assumed to contribute an average flow equivalent to that of an equal area of single family, detached residential units; i.e., 1600 gallons per acre per day.

2. Average daily flow per school shall be based on the type of school as follows, with the indicated capita limits including ultimate student population plus administration, teaching and operating personnel:

Type of School	Avg. Daily Flow	Capital Limit
Elementary (K-5, K-6 or K-8)	0.025 MG	1,000
Upper Elementary (6-8), 7-8 or 7-9)		0.060 MG
High School (9-12 or 10-12)	0.080 MG	2,000

For enrollments and personnel in excess of that indicated, there shall be added 25 gallons per day per additional capita in elementary schools and 40 gallons per day per additional capita in upper elementary and high schools.

e. Industrial - Every attempt should be made to base flows on specific, known industrial development. In the absence of specific knowledge of type of development, the flow shall be determined from the curves on Standard Drawing No. 1. Special attention shall be given to any facilities with a magnitude or type of discharge that could be detrimental to the public system.

f. Infiltration - A normal amount of infiltration was considered in establishing the above discharge rates. However, in areas with high ground water, it may be necessary to increase these rates to reflect a greater amount of infiltration.

g. Design Flow - Average flow, as determined above, shall be multiplied by the peaking factor obtained from the curve on Standard Drawing No. 2 to obtain design flow.

SEC. 6.01 (Continued)

(3) Oversizing and Extra Depth

(a) All sewers which can logically serve upstream tributary areas shall be oversized and/or installed at extra depth to serve such tributary areas. See also Section 6.03(4) and Chapter 19.109.

(4) Velocity of Flow

(a) Sewers shall be designed to flow with a velocity

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of not less than 2 feet per second nor more than 10 feet per second when flowing full, whenever practicable. Manning's formula shall be used in determining flow conditions, with "n" = 0.013 for all pipe materials.

(5) Minimum Sewer Slopes

(a) Standard minimum acceptable slopes for sanitary sewers shall be as specified below:

Minimum Slope in Ft./Ft. (N=0.013)

<u>Diameter</u>	<u>2 Ft./Sec. Flow</u>
4" (house service only)	.0200
6"	.0050
8"	.0035
10"	.0025
12"	.0020
15"	.0015
18"	.0012

Building Sewers 1/4" per foot

(b) When the use of slopes less than the listed minimums are proposed to avoid pumping, such installations shall be subject to approval by the Engineer. Furthermore, the use of larger than needed pipe sizes in order to obtain flatter slopes is not allowed due to lack of self cleaning velocities.

(6) Minimum Sewer Lateral Size

A trunk sewer is defined as a public sewer having an inside diameter of 10 inches or more. A sewer lateral is defined as a public sewer of 6 inches or 8 inches inside diameter.

SEC. 6.01(6) (Continued)

The minimum size of any lateral sewer to serve a single family or duplex zoned area shall be 6 inches in diameter. Multiple family residential, schools, commercial, and industrial areas shall be served by lines not less than 8 inches in diameter.

Single commercial establishments which contribute negligible sewage flow, among single family or duplex development may be served by a 6 inch sewer, subject to specific approval of the engineer. It is understood that the listed sizes are minimum sizes and they shall be increased whenever anticipated flows dictate.

SEC. 6.03 LOCATION AND ALIGNMENT

(1) General

(a) All sanitary sewers shall be located within

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rights-of-way dedicated for public streets where possible, unless use of an easement is specifically approved by the Engineer.

(b) When any sanitary sewer or building sewer is located between 50 feet and 100 feet of a well, it shall be constructed of ductile iron pipe or C-900 PVC water pipe, with approved water-tight joints.

(c) Sanitary sewers and/or building sewers shall not be located less than 50 feet of a water well without the prior written approval of the County Health Department and the Engineer for each specific location. If approval is obtained, the sewer shall be constructed of ductile iron pipe or C-900 water pipe, with approved water tight joints, and shall be completely encased in concrete.

(2) Location

In all new subdivisions when the sewers are to be in the road right-of-way they should be located on the south or east side of the street. When sewers are to be constructed in existing streets, they shall be placed in the same location when practicable. However, traffic conditions, existing utilities and other physical features shall be considered. Under no circumstances shall the horizontal distance between parallel sewer and water lines be less than 10 feet without specific approval of the State Health Department and the Engineer. When water lines and sewer pipes cross, there must be at least 1.0 ft. vertical clearance between them. If the clearance is less than 1.0 ft. the appropriate water agency must give approval (see Plate 94).

SEC. 6.03 (Continued)

(3) Alignment

(a) Sewers shall be laid on a straight alignment and grade between manholes whenever practicable. When curved sewers are allowed, they shall be subject to the following requirements:

1. A 400 feet radius shall be maintained whenever possible. The minimum radius shall be 200 feet. When a radius is specified less than 400 feet, a note shall be placed on the plans informing the contractor that pipe lengths of 10 LF or less will be required in order to have sufficient joints to make up the curve.

2. No more than one horizontal and vertical curve shall be used between manholes, however, a length of tangent sewer may be used at either or both ends of the curve. A horizontal curve and a vertical curve may be used simultaneously on a section of pipe; however, the B.C. and E.C. must coincide with the B.V.C. and E.V.C. respectively.

3. Maximum deflection at any joint shall be as

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recommended by the pipe manufacturer, but in no case shall it be greater than three degrees.

4. All horizontal and vertical curves shall be staked on 25 foot intervals.

5. For vertical curves, the following formula for length of vertical curve shall apply:  $L \geq 400A$ , where;

L = vertical curve length (ft).

A = algebraic grade difference of vertical curve in the decimal form of percent.

However, the minimum length of vertical curves shall be 50 ft. All vertical curves shall be parabolas.

(4) Future Extensions

(a) Whenever an area outside a tract can be logically served by future extension of a tract sewer, the tract sewer shall extend as near as practicable to the tract boundary. See also Section 6.01(3).

SEC. 6.05 DEPTH OF SEWERS

(1) Gravity Service

(a) Sewers shall be installed at a depth which will provide gravity service from all properties to be served if at all possible. The private engineer shall verify the adequacy of the sewer depth to serve the intended parcel. The limits of gravity sewer service shall be clearly shown for all lots on the project improvement plans and the design must be approved by the Engineer.

(2) Non-Gravity Service

(a) Parcels requiring pumping service must be clearly indicated on project improvement plans.

(3) Minimum Depth

(a) Sanitary sewers shall have a minimum of 36 inches of cover unless lesser cover is approved by the Engineer. When it is allowed to have a sewer less than 36" but greater than 18" cover, ductile iron pipe shall be used. For cover of 18 inches or less, ductile iron pipe shall be used and it shall be capped with Class A concrete. A service line shall have a minimum of 30 inches of cover at the property line. When a public sewer is designed parallel to a domestic water line, the sewer shall be designed at a depth so that sewer services shall run under the water line by at least 1 foot. If the sewer service cannot be designed under the water main, with approval of the local water purveyor, the water line may be lowered to provide the appropriate vertical clearance.

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**SEC. 6.07 STRUCTURES**

(1) End of Sanitary Sewers

(a) All sanitary sewers shall terminate in a manhole except as provided below:

1. If the sanitary sewer is 200 feet or less in length and if the sewer cannot logically be extended to serve other areas, a flushing branch may be used. Longer runs may be reviewed for approval by the Engineer.

2. If the sanitary sewer is 200 feet or less in length and if the sewer can logically be extended, a flushing branch may be used if the future extension of the sewer will be on the same alignment and grade.

SEC. 6.07(1) (Continued)

3. Sanitary sewers installed for future extensions may terminate by capping or plugging provided there are no existing building sewers connected to it and there is no possibility of a building sewer being connected to it prior to the sewer being extended.

(2) Manholes

(a) Manholes shall be located at all junctions of sewer laterals and at all angular changes in grade or alignment that do not meet approved curve requirements as set forth in Section 6.03(3).

(b) Manholes on sanitary sewers shall be located at normal maximum spacing of 400 feet.

(c) An external or internal drop connection shall be constructed whenever any sewer enters a new or existing manhole greater than 2 feet above the flow line of the manhole. Drop connections cannot be used where force mains enter a manhole. No more than two inside drop connections can be used inside a single manhole. Drop connections cannot be used on 10 inch or larger pipe. In all areas where drop connections cannot be used, the pipe shall enter at the bottom of the manhole as detailed in Section 6.07(2)(h) (Ref: Plate 91 and 91A)

(d) Manholes constructed in a fill section shall extend to original ground or the engineered fill material under the manhole must be compacted to 95% relative compaction.

(e) Ram-Nek gaskets shall be installed between manhole sections, rings, and covers.

(f) In areas where snow conditions are present, all

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manhole covers shall be set 1/2 inch below finish pavement grade.

In aggregate base shoulders, the manhole covers shall be set 5 inches below finish grade or may be placed 1/2 inch below finish grade provided that an area 10 feet on each side of the manhole and for the full shoulder width is paved with 0.2 feet of asphalt concrete.

(g) Manholes located in off-road easements shall be minimum of 6" above the natural ground surface, and above anticipated high water levels. If they are in a 100-year floodplain they shall have sealed and bolt down lids. (Ref: Plate 86)

SEC. 6.07(2) (Continued)

(h) Grade Through Manholes

1. In all manholes with 6" and/or 8" sewer pipes, the invert of the exit pipes shall be at least 0.10' below that of the entrance pipes.

2. In manholes with a 10" or larger pipe flowing through, the invert elevation of all side connecting pipes, (4" services and laterals, 6" and 8" laterals) shall match the crown elevation of the larger pipe.

(i) Manholes shall be constructed with details shown on Plates 85 through 91.

(j) Where possible, all manholes should be designed to be in roadways accessible by large sewer cleaning equipment. If manholes are required to be constructed off a roadway, an all-weather road shall be constructed to every other manhole. All-weather roads shall be 10' wide with a double chip seal (or 2" AC) over 6" of compacted aggregate base rock. A through connector road shall be provided or a turnaround constructed.

(k) When designing manholes in new or existing sewer systems, due consideration should be given to the generation of Hydrogen Sulfide (H<sub>2</sub>S). Where H<sub>2</sub>S is expected, the inside concrete and metal surfaces of all manholes shall be coated with an approved acid resistant coating. H<sub>2</sub>S is typically encountered downstream of force main discharges, on trunk sewers where sewage is old, and at locations of turbulence.

(3) Flushing Branches

(a) Flushing Branches shall be constructed in accordance with details shown on Plate 93.

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(4) Strength Requirements

(a) All structures and pipes placed under roads shall be of sufficient strength to support, with an adequate factor of safety, the backfill, H-20 truck loading with impact, and any other anticipated loads. When a proposed sewer design has pipe depths greater than 20 feet, the designer shall provide to the Engineer for approval, a pipe strength and trench width analysis that is used to determine the type of pipe specified.

SEC. 6.07 (Continued)

(5) Detail Sheets

(a) The private engineer shall incorporate the standard sewer detail sheet, provided by the Engineer, into all sewer plans. All items of a special nature, such as a creek crossing, shallow or unusual manholes, etc., shall be shown in large scale on the project improvement plans.

SEC. 6.09 SERVICE AND BUILDING SEWERS

(1) Service Sewers

(a) In all new sewer work, the service sewer from the sanitary sewer to the property line shall be installed wherever it is known or wherever it can be reasonably assumed that a building sewer connection is or will be required. Each service sewer shall be shown on the improvement plans and referenced to the plan stationing. All sewer service elevations at the property or easement line shall be shown on the project improvement plans.

(b) The private engineer shall verify the adequacy of the normal service sewer depth to serve the intended parcel and shall show the limit of gravity service on the project improvement plans for all parcels of land within the project not fully served by gravity.

(c) Service sewers shall be a minimum of 4 inches in diameter. Multiple family housing (other than a duplex), schools, commercial (other than a single commercial establishment which contributes negligible sewage flow), and industrial facilities shall be served by a 6 inch or larger service sewer. A plan and profile of any service sewer shall be submitted upon request of the Engineer.

(d) A 6 inch service sewer shall enter a 6 inch lateral sewer at an existing or new manhole, but may enter an 8 inch lateral sewer by means of a factory "Y". Eight inch diameter and larger services shall be connected to the lateral sewer by use of an existing or new manhole. Service sewers shall not be connected to a sanitary sewer 10 inches in diameter or larger unless such connection is specifically approved by the

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Engineer in writing. Sewer services can be connected to 10 inch through 18 inch trunk sewers by means of a factory "Y" provided the "Y" is installed when the trunk sewer is constructed.

SEC. 6.09(1) (Continued)

(e) Unless requested otherwise by the property owner, service sewers shall be placed in the center of a typical subdivision lot or similar parcel, except that it shall be placed on the low side of a lot or parcel with two percent (2%) or greater gradient across the parcel or at the lowest point if needed to provide gravity service. Due consideration shall be given to trees, existing and future improvements, etc., to minimize interference when the building sewer is extended to serve the property.

(f) The location of sewer service lines shall be permanently indicated by imbedding the letter "S" in the curb, directly above the line. It shall be the developer's responsibility to so mark any curb which is poured after the installation of the service line. All sewer services shall be extended past the back of the joint trench or to the property line or road easement line whichever is furthest from the road centerline. The end of all sewer services shall be marked with a length of 1/2 inch rebar extending from the surface down to the flow line of the pipe. The bottom of the rebar shall have a 12 inch hook and the top, above the surface, shall have a plastic cap or be bent in a loop to eliminate sharp ends.

(g) When sewer services are connected to existing manholes, the invert of the service shall match the elevation of the manhole shelf. The shelf shall then be bush-hammered to create a channel.

(2) Building Sewers

(a) Building sewers, from the property line to any building, shall be constructed in accordance with the current edition of the Uniform Plumbing Code.

(b) Building sewers shall be of the same material and size as the connecting service sewer, except as specifically approved by Engineer. In no case will a building sewer be larger in diameter than the service sewer.

(c) Building sewers from laundromats, restaurants, and commercial and industrial establishments having waste of non-human origin may be required to provide a sampling well and or grease traps.

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SEC. 6.09(2) (Continued)

(d) Any building sewer serving service stations, maintenance shops, restaurants, auto wash racks, or other potential sources of oil, grease, or inert solids shall be equipped with an oil and waste separator and shall be approved by the engineer and the Health Department.

(e) In all industrial subdivisions, in lieu of the standard property line cleanout shown on Plate 92, a standard sewer manhole may be required (see Plate 86) at the property or easement line. The sewer service pipe shall extend through the manhole and be stub and plugged 3 feet outside the manhole.

SEC. 6.11 TYPE OF PIPE

(1) Gravity Sewers

(a) All gravity sewer lines up to and including 15 inches in diameter shall be Extra Strength Vitrified Clay, SDR 35 PVC, or Ductile Iron Class 50 pipe. However, all gravity sewer lines greater than 15 inches in diameter and up to and including 24 inches in diameter shall be extra strength Vitrified Clay or Ductile Iron Class 50 pipe. Sewer lines larger than 24 inches in diameter may be of the latter specified material or reinforced concrete pipe. Pipe of a material other than the above may be used only with the specific approval of the Engineer. When concrete pipe is proposed for use, due consideration to hydrogen sulfide generation shall be taken and the inside of the pipe shall be coated with a material approved by the Engineer.

(2) Force Mains

(a) Force mains shall be Polyvinyl Chloride (PVC) pressure pipe. Force mains 4" to 12" in diameter shall conform to AWWA C-900 standards. Force mains 14" to 36" diameter shall conform to AWWA C-905 standards. Design parameters shall be specified on the plans. Force mains shall terminate in manholes at an invert elevation 0.20 ft. higher than the manhole outlet flow line. No drop connections shall be allowed.

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(3) Fill Sections

(a) Sewers constructed in fill sections shall be ductile iron pipe, Class 50, or as approved by the Engineer.

SEC. 6.13 SEWAGE PUMPING STATIONS

(1) General

(a) Where design dictates that a substantial area cannot be sewerred by gravity, a sewage pumping station may be installed. However, no pumping facilities may be incorporated in sewerage improvement plans without prior approval of the Engineer. The following data shall be furnished with a request for approval to install a pump station:

(b) A contour map covering all areas tributary to the proposed pump station, including those outside the project, and the predicted flow from each area.

(c) The design computations for the pumps, including the pump curves, the peaking factor used, the type to be installed, and a plot plan showing the dimensions of the site, its access, and its location with respect to homes and/or other structures.

(d) The size, design head, and type of the force main to be used, and its tentative alignment.

(2) Design Requirements

(a) Pump stations, where approved, shall be of the submersible pump type in a wet well (unless specific authorization is given by the Engineer) and incorporating the following features:

(b) The minimum distance from any building to a sewer pumping station shall be 50 feet.

(c) Pumps shall be submersible type on vertical rails with a quick disconnect mounting at the bottom of the wet-well.

(d) A minimum of two pumps shall be installed. Each pump shall be capable of handling ultimate peak flow from the entire tributary area.

(e) The pump station wet-well shall be made of fiberglass. The shutoff valves and check valves for the pumps shall be housed in an separate adjacent or attached vault. Both the wet well and the valve box shall be accessible on the ground surface through approved, hinged, access hatches that are designed for a H-20 traffic loading.

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SEC. 6.13(2) (Continued)

(f) The controls for the pumps shall be housed in a NEMA 3 control panel, free standing, within 10 feet of the wet well. The control panel shall be mounted on a concrete pedestal above any flooding level. Controls for the pumps shall be Mercury Float type including low water, pump off, 1st pump on, 2nd pump on, alarm, and redundant. The high water alarm shall have a switch for "alarm check".

(g) An emergency overflow tank shall be provided for the pump station. The tank shall be a reinforced concrete pipe with pre-fabricated plug ends. The tank shall have an access manhole at either end and shall drain by gravity into the wet well. The gravity drain pipe shall enter the wet well a minimum of 0.5 feet above the high water alarm elevation. The volume of the emergency storage tank shall be equal to or greater than 24 hours of design flow for the pump station.

(h) The pump station site shall be enclosed in an eight foot high chainlink fence with three strands of barbed wire at the top. A ten foot gate will be provided. The surface inside of the fencing shall be paved with 3 inches of Asphalt Concrete over 8 inches of compacted base rock. The pump station site shall have a domestic water service and hose bib and back flow valve installed inside the fencing.

(i) Access to the pump station site shall be across a minimum 10 foot wide paved access road. The road shall have 3 inches of Asphalt Concrete over 8 inches of compacted base rock. If the pump station fence is further than 25 feet from a paved road wide enough for large trucks to turn around on, a truck turnaround at the pump station shall be provided as specified by the Engineer.

(j) The pump station shall be provided with a two-way radio monitor and control system, that is fully compliant with the FCC rules and regulations part 90.63 and the National Electrical Code, as specified by the Engineer. The two-way radio monitor and control system shall be interfaced to the pump station monitor and control equipment in accordance with the specifications. The two-way monitor and control system shall be housed inside the control panel for the pump station where possible. An antenna support structure of sufficient heights (radio frequency path dependent) shall be placed near the two-way radio monitor and control system. A 1 inch conduit shall be run from the antenna support structure to the two-way radio monitor and control system.

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**SEC. 6.15 TESTING**

(a) All sewer systems, including but not limited to pipes, structures, manholes, and pump installations shall be tested in accordance with the County General Specifications, Special Provisions, or as directed by the Engineer.

**I LIFT STATION SPECIFICATIONS**

- A SINGLE SOURCE RESPONSIBILITY**  
 1. TO ENSURE COMPATIBILITY OF ALL COMPONENTS, THE PACKAGE SEWAGE LIFT STATION, ITS CONTROL SYSTEM, AND STANDBY POWER UNIT (IF SPECIFIED ON THESE PLANS) SHALL BE SUPPLIED BY ONE MANUFACTURER WITH SERVICE AND REPAIR FACILITIES IN NORTHERN CALIFORNIA.  
 2. ALL APPLICABLE COMPONENTS OF THE LIFT STATION MUST BE NEMA RATED AND UL LISTED.  
 3. DOCUMENTATION OF THIS SHALL BE SUPPLIED WITH THE REQUIRED SUBMITTAL.

- B EXPERIENCE**  
 1. THE STATION MANUFACTURER SHALL DEMONSTRATE A MINIMUM OF TEN (10) YEARS OF EXPERIENCE IN THIS SPECIFIC FIELD AND SHALL SUPPLY WITH THE REQUIRED SUBMITTALS TYPICAL INSTALLATIONS WITH REFERENCE TELEPHONE NUMBERS.  
 2. THE MANUFACTURING FACILITIES INCLUDING THE ELECTRICAL SHOP SHALL BE OPEN FOR INSPECTION BY THE COUNTY.

- C GENERAL REQUIREMENTS**  
 1. IN REGARDS TO THE LIFT STATION, THE TERMS COUNTY, DEPARTMENT, ENGINEER, DISTRICT SANITARY ENGINEER, AS USED IN THESE SPECIFICATIONS, PLANS, AND NOTES, REFER TO THE DIRECTOR OF THE PLACER COUNTY DEPARTMENT OF FACILITY SERVICES, OR AN AUTHORIZED AGENT APPOINTED BY THE DIRECTOR.  
 2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO BEGINNING CONSTRUCTION AND SHALL REPORT ANY VARIATIONS TO THE ENGINEER IMMEDIATELY.  
 3. ALL ELECTRICAL WIRE SHALL BE "RHW" OR "THW" COPPER CONDUCTOR, OR APPROVED EQUAL.  
 4. ALL NUTS, BOLTS, AND WASHERS SHALL BE GRADE 304 S.S. / 315 S.S. NO EXCEPTIONS.  
 5. ALL CONDUITS TO THE WET WELL SHALL HAVE EXPLOSION PROOF SEALS AT THE CONTROL PANEL.

6. ALL PRACTICES AND PROCEDURES, MATERIALS, AND PLACEMENT OF MATERIALS SHALL CONFORM IN EVERY RESPECT TO THE CURRENT EDITIONS OF THE PLACER COUNTY LAND DEVELOPMENT MANUAL, GENERAL SPECIFICATIONS, AND STANDARD PLATES.  
 7. INSTALLATION OF THE SYSTEM SHALL CONFORM TO SPECIFICATIONS AND INSTRUCTIONS OF THE APPLICABLE MANUFACTURER.  
 8. THE FORCE MAIN SHALL BE CONSTRUCTED WITH MATERIALS AND IN THE LOCATION AS SHOWN ON THE PLANS. ALL ANGLE POINTS IN THE FORCE MAIN SHALL HAVE THRUST BLOCKS CONSTRUCTED IN ACCORDANCE WITH PLACER COUNTY WATER AGENCYS STANDARD DRAWING NO. SA015-REV B (OR MOST CURRENT ONE) OR RESTRAINED JOINTS AS APPROVED BY THE ENGINEER.

- D WET WELL AND VALVE VAULT**  
 1. THE STATION WET WELL SHALL BE CLASSIFIED AS A CLASS 1, DIVISION 1 HAZARDOUS LOCATION OF THE "NATIONAL ELECTRICAL CODE." ALL EQUIPMENT INSIDE THE WET WELL AND ALL CONDUITS CONNECTED TO THE WET WELL SHALL BE APPROVED AND INSTALLED FOR THIS HAZARDOUS CLASSIFICATION AND SHALL BE INSTALLED WITH EXPLOSION PROOF SEAL AT THE OPENINGS INTO THE WET WELL.  
 2. THE STATION WET WELL SHALL BE MANUFACTURED OF A MINIMUM 3/8" THICK KOPPERS SPECIALTY POLYESTER RESINS (OR OTHER EQUIVALENT CHEMICAL RESISTANT FIBERGLASS RESIN MATERIAL APPROVED BY THE COUNTY) WITH A COMPRESSIVE STRENGTH OF 28,400 PSI AND FLEXURAL STRENGTH OF 31,400 PSI.  
 3. THE STATION SHALL INCORPORATE WALL REINFORCING RIBS TO DOUBLE AS ANCHORS INTO THE CONCRETE FOOTING WHEN INSTALLED. THE STATION WET WELL SHALL BE \_\_\_\_\_ INCH (60-INCH MIN) DIAMETER x \_\_\_\_\_ FEET DEEP.  
 4. STATION COVERS AND ACCESS DOORS SHALL BE OSHA COMPLIANT OF ALUMINUM NON-SKID DECK PLATE, REINFORCED TO SUPPORT H-20 LOADING WITH FALL PROTECTION GRATES. WET WELL ACCESS SHALL INCLUDE SAFETY GRATES. LIDS SHALL BE PROVIDED WITH A RECESSED LOCK BOX.  
 5. ALL HARDWARE AND MOUNTING BRACKETS IN THE WET WELL SHALL BE STAINLESS STEEL MINIMUM GRADE SHALL BE 305 OR 315.  
 6. WET WELL SUPPLIER SHALL SUBMIT CALCULATIONS AND INFORMATION PROVIDING DIMENSIONS, WEIGHTS, AND REINFORCED CONCRETE COLLAR / FOOTING DIMENSIONS REQUIRED SUCH THAT BUOYANT UPLIFT CAN BE PREVENTED. WEIGHT OF THE WET WELL PLUS THE SUBMERGED WEIGHT OF THE BACKFILL AND COLLAR / FOOTING MUST EQUAL 115% OF THE BUOYANT UPLIFT. NOTE THAT THE WEIGHT OF THE PUMPS CANNOT BE INCLUDED IN THE CALCULATIONS.  
 7. VALVE VAULT AND PIG LAUNCH CONCRETE VAULTS OR RESIN/FIBERGLASS VAULTS ARE ACCEPTABLE. IN EITHER CASE THEY SHALL BE DESIGNED FOR H-20 LOADINGS.  
 8. AN ANTI-HAMMER VALVE SHALL BE PROVIDED IN THE VALVE VAULT IF THE STATIC HEAD OF THE STATION IS GREATER THAN 15 PSI.

- E PUMPS AND MOTORS**  
 1. THE PUMP ASSEMBLY SHALL BE A DUPLEX SYSTEM WITH EACH PUMP SIZED TO BE CAPABLE OF INDEPENDENTLY PUMPING THE PEAK DESIGN FLOW AT THE SPECIFIED TOTAL DYNAMIC HEAD (TDH).  
 2. THE ENGINEER MAY REQUIRE VARIABLE FREQUENCY DRIVE (VFD) OR SOFT STARTS FOR THE PUMP SYSTEM.  
 3. SEWAGE PUMPS SHALL BE HEAVY DUTY NON-CLOG TYPE WITH MIX / FLUSH-VALVE (ONE-PUMP FOR WET WELLS < 6- FEET DIAMETER), CAPABLE OF HANDLING SEWAGE AND PASSING 3-INCH SOLIDS WITH A MINIMUM 4" DISCHARGE. GRINDER PUMPS MAY BE APPROVED BY THE ENGINEER.  
 4. PUMPS SHALL BE SUBMERSIBLE TYPE WITH STAINLESS STEEL SHAFTS.  
 5. THE PUMPS SHALL HAVE A MOISTURE AND THERMAL DETECTION SYSTEM WHEREBY THE PRESENCE OF MOISTURE IN THE SEAL CAVITY CAN BE DETECTED AND ALARMED.  
 6. THE PUMPS SHALL BE EQUIPPED WITH DOUBLE MECHANICAL SEALS WITH A LEAK SENSOR AT THE LOW POINT OF THE HOUSING.  
 7. THE PUMPS SHALL BE OF CAST IRON WITH ALL PARTS COATED WITH A TWO-PART EPOXY FUSION BONDED AND FINISHED WITH ENAMEL OR OTHER COATINGS AS SPECIFICALLY ACCEPTED BY THE DISTRICT SANITARY ENGINEER.  
 8. ALL EXPOSED HARDWARE SHALL BE STAINLESS STEEL MINIMUM GRADE SHALL BE 305 OR 315.  
 9. THE CONTROL AND PUMPS SHALL COMPRISE A PACKAGE THAT IS SUITABLE FOR A CLASS 1, DIVISION 1 HAZARDOUS LOCATION AS DEFINED BY THE STATE OF CALIFORNIA AS AN EXPLOSION PROOF PACKAGE.  
 10. ALL PUMPS AND MOTORS SHALL HAVE THE CAPABILITY OF RUNNING DRY FOR EXTENDED PERIODS WITHOUT DAMAGE TO MOTOR OR SEALS. PUMPS SHALL BE NON CONDUCTIVE, OIL FILLED.  
 11. THE DESIGN SHALL BE SUCH THAT THE PUMPING UNITS WILL HAVE A QUICK-DISCONNECT SEALING FLANGE THAT AUTOMATICALLY CONNECTS TO THE DISCHARGE PIPING BY POSITIVELY LOCKING THE VOLUITE INTO POSITION TO PREVENT ANY MOVEMENT WHEN LOWERED INTO PLACE AND SHALL BE COMPATIBLE WITH FLYGT PUMPS.

12. THE STATIONARY COUPLING SHALL HAVE AN INCLINED PLANE TO PROVIDE A CLOSING ACTION AND A SELF-CLEANING ARRANGEMENT.  
 13. THE PUMPS SHALL BE FITTED WITH STAINLESS STEEL CHAIN AND A FLYGT STAINLESS STEEL GRIP EYE LIFTING SYSTEM WITH ACCESSORIES INCLUDING TWO (2) MINI CAS SYSTEMS. THE CHAIN SHALL EXTEND TWO (2) FEET ABOVE HIGH WATER LEVEL AND WIRE ROPE USED FROM THE TO TOP.  
 14. A SEPARATE DEDICATED CONDUIT SHALL BE PROVIDED FROM THE CONTROL PANEL TO THE WET WELL FOR EACH PUMP WIRING. THE CONDUIT SIZE SHALL BE SPECIFIED IN THE REQUIRED SUBMITTAL.  
 15. THE PUMP GUIDE RAIL SYSTEM SHALL BE STAINLESS STEEL DUAL RAIL WITH ANY REQUIRED ADAPTERS TO BE COMPATIBLE WITH FLYGT PUMPS.  
 16. SLIDE RAIL SYSTEM SHALL BE COMPATIBLE WITH FLYGT PUMPS AND APPROPRIATE ADAPTERS PROVIDED IF OTHER THAN FLYGT PUMPS ARE APPROVED BY THE DISTRICT SANITARY ENGINEER. INTERMEDIATE RAIL SUPPORTS SHALL BE PROVIDED AS REQUIRED.

- F PUMP SPECIFICATIONS**  
 TYPE: FLYGT \_\_\_\_\_ INCH MODEL \_\_\_\_\_  
 MOTOR: \_\_\_\_\_ HP / \_\_\_\_\_ RPM / 3-PHASE / 60 CYCLE / \_\_\_\_\_ VOLTS  
 IMPELLER: \_\_\_\_\_

- G VALVES AND PIPING**  
 1. THE CHECK VALVES SHALL BE STAINLESS STEEL KEYSTONE FLAPPER VALVE WAFER TYPE FITTED WITH AN EXTERNAL LEVER AND SPRING OR LEVER AND WEIGHT DESIGNED TO HANDLE RAW SEWAGE.  
 2. THE GATE VALVES SHALL BE FLANGED AND OF RESILIENT SEAT TYPE WITH A 2" (TWO-INCH) OPERATOR NUT, CAPABLE OF ISOLATING EITHER ONE OF THE TWO PUMPS OR BOTH.  
 3. VALVES AND INTERNAL PIPING SHALL BE OF THE SAME SIZE AS THE PUMP DISCHARGE OR LARGER.  
 4. VALVES SHALL BE LOCATED IN A SEPARATE VALVE VAULT ADJACENT OR ATTACHED TO THE WET WELL, WITH PROVISIONS TO DRAIN ANY SEEPAGE TO THE WET WELL. THE DRAIN SHALL ALSO HAVE A CHECK VALVE IN THE EVENT OF HIGH WATER.

- H CONTROL SYSTEM**  
 1. THE CONTROL SYSTEM SHALL BE IN A FREESTANDING WEATHERPROOF NEMA 3 AND UL LISTED ENCLOSURE, EQUIPPED WITH A LOCKABLE, VANDAL-PROOF, OUTER DOOR.  
 2. THE PUMP CONTROLLER SHALL PERFORM THE FOLLOWING FUNCTIONS:  
 A. TURN ALL PUMPS OFF AT SET ADJUSTABLE LEVEL.  
 B. TURN LEAD PUMP ON AT HIGH LEVEL, ALTERNATING PUMPS EACH CYCLE.  
 C. IF WATER CONTINUES TO RISE, TURN ON LAG PUMP AT 3rd LEVEL.  
 D. IF WATER REACHES HIGH LEVEL, AN ALARM LIGHT WILL BE TURNED ON AND TRANSMITTER ACTIVATES TO SIGNAL AN ALARM.  
 3. THE CONTROL PANEL SHALL HAVE NEMA-RATED FULL SIZE CIRCUIT BREAKERS, MAGNETIC STARTERS WITH ADJUSTABLE OVERLOAD PROTECTION, HAND-OFF- AUTOMATIC SWITCHES, ALTERNATOR, RUN LIGHTS, ELAPSED TIME METERS, HIGH LEVEL ALARM LIGHT, PUMP MOISTURE-SENSING RELAYS AND WARNING LIGHTS, AND ALL NECESSARY RELAYS TO PERFORM ABOVE FUNCTIONS. IT SHALL HAVE TERMINAL BLOCKS CLEARLY LABELED FOR THE CONNECTION OF THE TRANSDUCER, MERCURY SWITCHES, TRANSMITTER, AND OTHER ACCESSORIES.  
 4. CONTROL WILL FEATURE AN ISCO 4501 PUMP STATION MONITOR WITH PCMCIA MEMORY CARD INTERFACE AND ANALOG INPUTS (MODEL 68-4500-001).  
 5. LEVEL SENSING SHALL BE ACCOMPLISHED BY A DATA FLOW PROGRAMMABLE LOGIC CONTROLLER (PLC), BLUE RIBBON BIRD CAGE DIAPHRAGM PROTECTOR SUBMERSIBLE PRESSURE TRANSDUCER. A DEDICATED 1/2-INCH CONDUIT SHALL BE PROVIDED FROM THE CONTROL PANEL TO THE WET WELL FOR THE TRANSDUCER.  
 6. THREE (3) REDUNDANT SEALED MERCURY FLOAT SWITCHES FOR BACK UP, EQUIPPED WITH INTRINSICALLY SAFE RELAYS, SHALL BE INCLUDED IN THE EVENT THE CONTROLLER FAILS TO OPERATE. ONE FLOAT FOR ON, ONE FLOAT FOR OFF, AND ONE FLOAT FOR HIGH WATER ALARM (WHICH MUST ACTIVATE THE RADIO SIGNAL). ALARM FLOATS SHALL BE "DRY CONTACTS." A DEDICATED 2-INCH CONDUIT SHALL BE PROVIDED FROM THE CONTROL PANEL TO THE WET WELL FOR THE MERCURY FLOATS. THE HIGH WATER ALARM FLOAT SHALL BE WIRED TO AND GET ITS POWER DIRECTLY FROM THE ALARM PANEL, NOT THE CONTROL PANEL. A LINE DIAGRAM SHOWING THE CONTROLS AND ALARMS SHALL BE SUBMITTED WITH SHOP DRAWINGS.  
 7. THE PLC SHALL BE DATA FLOW MODEL TCU001 COMPLETE WITH OPERATOR INTERFACE MODEL RIO032 AND ALL OTHER ACCESSORIES AS REQUIRED FOR COMPLETE OPERATION OF THE PLC. ALL PROGRAMMING SHALL BE DONE BY THE PANEL BUILDER AND APPROVED BY THE COUNTY OF PLACER DEPARTMENT OF FACILITY SERVICES SPECIAL DISTRICTS DIVISION.

- I STANDBY POWER**  
 (INCLUDE WHEN A STANDBY GENERATOR IS REQUIRED)  
 1. THE STANDBY POWER UNIT, IF SPECIFIED ON THESE PLANS, IS TO BE SIZED, TESTED, AND SUPPLIED AS A PART OF THE TOTAL PACKAGE. IT SHALL BE A GENERAC MODEL OR APPROVED EQUIVALENT AND SHALL MEET ALL APPLICABLE AIR QUALITY AND NOISE LIMITATION REGULATIONS.  
 2. THE AUTOMATIC TRANSFER SWITCH (ATS) OF THE STANDBY POWER UNIT SHALL BE AN INTEGRAL PART OF THE STATION CONTROLLER.

- J GENERATOR INLET**  
 (INCLUDE WHEN A STANDBY GENERATOR IS NOT REQUIRED)  
 1. A GENERATOR INLET SHALL BE INCORPORATED IN THE CONTROL CENTER WITH A DOUBLE THROW SAFETY SWITCH OR MECHANICALLY ISOLATED BREAKERS. THE GENERATOR INLET SHALL BE A 6-PRONG BURTON EL SEGUNDO P/N 513 WEATHER TIGHT PORTABLE GENERATOR HOOK-UP RECEPTACLE OR OTHER APPROVED RECEPTACLE CONFORMING TO THOSE USED BY THE COUNTY.  
 2. THE TELEMETRY SYSTEM  
 1. RTU EQUIPMENT SPECIFICATIONS.  
 THE RTU SHALL BE MOTOROLA ACE3800 TYPE CONSISTING OF THE FOLLOWING EQUIPMENT.

- K TELEMETRY SYSTEM**  
 1. RTU EQUIPMENT SPECIFICATIONS.  
 THE RTU SHALL BE MOTOROLA ACE3800 TYPE CONSISTING OF THE FOLLOWING EQUIPMENT.

- L SUGGESTED MOTOROLA MOSCAD EQUIPMENT & ANTENNA EQUIPMENT SUPPLIERS**  
**1. MOTOROLA RTU DEALERS**  
**THUNDERBIRD COMMUNICATIONS**  
 1664 AUBURN RAIVINE ROAD  
 AUBURN, CA 95603  
 PHONE: (630) 888-8100  
 FAX: (530) 888-8185  
**ACCOUNT REPRESENTATIVES:**  
 TOM SWICK  
 ROSE SWICK  
**2. ANTENNA EQUIPMENT DEALERS**  
**TESSCO INCORPORATED**  
 GLOBAL LOGISTICS CENTER  
 11126 McCormick RD.  
 HUNT VALLEY, MD 21031-1494  
 800-472-7373  
**ACCOUNT REPRESENTATIVES:**  
 JOHN HUNT  
**GLOBAL DATA SPECIALISTS**  
 3707 E. BROADWAY ROAD  
 SUITE 2  
 PHOENIX, AZ 85040  
 800-451-3464  
 FAX: (602) 437-1858  
**ACCOUNT REPRESENTATIVES:**  
 JIM SHARP  
 WILLIE FENDERSEN  
**TALLEY COMMUNICATIONS**  
 11288 PYRITES WAY  
 GOLD RIVER, CA 95670  
 800-949-7079

- M POLE MOUNTED LIGHT FIXTURE**  
 1. CONTRACTOR SHALL PROVIDE AND INSTALL ONE 200-WATT HOLOPHANE HIGH PRESSURE SODIUM LIGHT IN A COBRA HEAD FIXTURE ON A 3-FOOT MINIMUM MAST ARM MOUNTED TO A 20' ANODIZED STEEL POLE.  
 2. THE COBRA HEAD SHALL BE INSTALLED WITH A FLAT BOTTOM LENS.  
 3. THE POLE WILL BE MOUNTED TO A CONCRETE FOUNDATION AS SHOWN ON THE PLANS.  
 4. A SWITCH SHALL BE PROVIDED FOR THE LIGHT IN AN ALL WEATHER BOX MOUNTED EITHER ON THE POLE OR ON THE CONTROL PANEL AND SHALL BE APPROPRIATELY LABELED.  
 5. THE LOCATION OF THE LIGHT SHALL PROVIDE THE BEST POSSIBLE ILLUMINATION OF THE BOTTOM OF THE WET WELL AND THE CONTROL PANELS FOR NIGHT WORK. THE LOCATION SHALL BE APPROVED BY THE COUNTY IN THE FIELD.  
**N EMERGENCY OVERFLOW STORAGE TANK**  
 1. EMERGENCY OVERFLOW STORAGE TANK(S) SHALL BE CONSTRUCTED WATER TIGHT WITH PREFABRICATED END PLUGS.  
 2. THE TANKS SHALL BE VACUUM TESTED PRIOR TO BACK FILL AND ACCEPTANCE.  
 3. ACCESS MANHOLES RISERS FROM THE OVERFLOW TANKS SHALL BE PRECAST WITH THE APPLICABLE TANK SECTION.  
 4. ACCESS MANHOLES SHALL BE 48-INCH DIAMETER WITH A 24-INCH ACCESS COVER AND CONFORM TO ALL APPLICABLE PLACER COUNTY STANDARDS FOR SANITARY SEWER MANHOLES.

- O SUBMITTALS**  
 1. EQUIPMENT COMPONENT SHOP DRAWINGS, ELECTRICAL DIAGRAMS, AND CUT SHEETS SHALL BE SUBMITTED TO THE DISTRICT SANITARY ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION OF THE SEWAGE LIFT STATION. THE SUBMITTAL SHALL INCLUDE SPECIFICATION SHEETS AND SUPPORTING DATA / CALCULATIONS, BUT NOT BE LIMITED TO, THE FOLLOWING:  
 \* WET WELL INCLUDING VALVE VAULT, ACCESS DOORS, SAFETY GRATES, COVER - BOTH SPEC SHEETS & STRUCTURAL CALCULATIONS  
 \* PUMPS, MIX / FLUSH VALVE, AND MOTORS WITH APPLICABLE PUMP CURVES  
 \* CONTROL SYSTEM  
 \* GENERATOR - SOUND REDUCTION CABINET  
 \* GENERATOR RECEPTACLE  
 \* RTU EQUIPMENT AND ANTENNA  
 \* LIGHT POLE AND LIGHT  
 \* OVERFLOW TANKS & END PLUGS  
 \* FACTORY TEST RESULTS FOR ALL PUMPS  
 \* STARTUP AND TESTING PROCEDURES  
 \* EYE WASH STATION  
 \* VALVES  
 \* CONTROL WIRING  
 2. THE CONTRACTOR SHALL PROVIDE FOUR (4) COPIES OF THE SUBMITTAL PACKAGES TO THE DISTRICT SANITARY ENGINEER FOR REVIEW AND ACCEPTANCE.  
 3. THE CONTRACTOR SHALL SUPPLY THE ENGINEER WITH THREE (3) COPIES OF THE FINAL ACCEPTED SUBMITTAL WITH ALL REQUIRED MODIFICATIONS INCLUDED.  
 4. THE CONTRACTOR SHALL SUPPLY THE COUNTY WITH THREE (3) COPIES OF A COMPLETE OPERATIONS AND MAINTENANCE MANUAL FOR THE STATION.  
**CONTINUED ON LIFT STATION DETAILS SHEET 2 OF 3**

- 2. RTU ANTENNA SPECIFICATIONS**  
 THE RTU ANTENNA AND CABLE SHALL CONSIST OF THE FOLLOWING EQUIPMENT.  
**MODEL DESCRIPTION**  
 ANT150Y7 TELEWAVE 5 DB GAIN DIRECTIONAL YAGI ANTENNA.  
 LMR400 50 FT. OF TIMES MICROWAVE TYPE LMR400 CABLE. (LENGTH WILL VARY DEPENDING ON LOCATION OF RTU AND ANTENNA)  
 TC-400-NMC TIMES MICROWAVE N MALE CONNECTOR (QTY. 2).  
**3. RTU EQUIPMENT SCOPE OF WORK**  
 A. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL THE RTU AND ANTENNA SYSTEM AS DESCRIBED BELOW.

MOUNT THE RTU TO THE CONTROL PANEL AND CONNECT 117 VAC POWER. THE 117 VAC SUPPLY LINE FOR THE RTU SHALL BE RUN IN A DEDICATED 1" UNDERGROUND CONDUIT (IF NECESSARY) AND HAVE A DEDICATED 15 A CIRCUIT BREAKER.

MOUNT THE ANTENNA AND COAX CABLES ON THE ANTENNA POLE AND POINT THE ANTENNA IN THE DIRECTION OF THE DEWITT CENTER IN AUBURN LOCATED AT LATITUDE 38° 56' 17.2" N LONGITUDE 121° 8' 31.5" W. THE COAX CABLE SHALL BE ROUTED DOWN THROUGH THE INSIDE OF THE POLE AND THEN ON TO THE RTU VIA A DEDICATED 1.5" UNDERGROUND CONDUIT (IF NECESSARY). THE ANTENNA POLE SHALL BE SEALED TO PREVENT WATER/RAINWATER FROM ENTERING INTO THE POLE AND/OR CONDUIT.

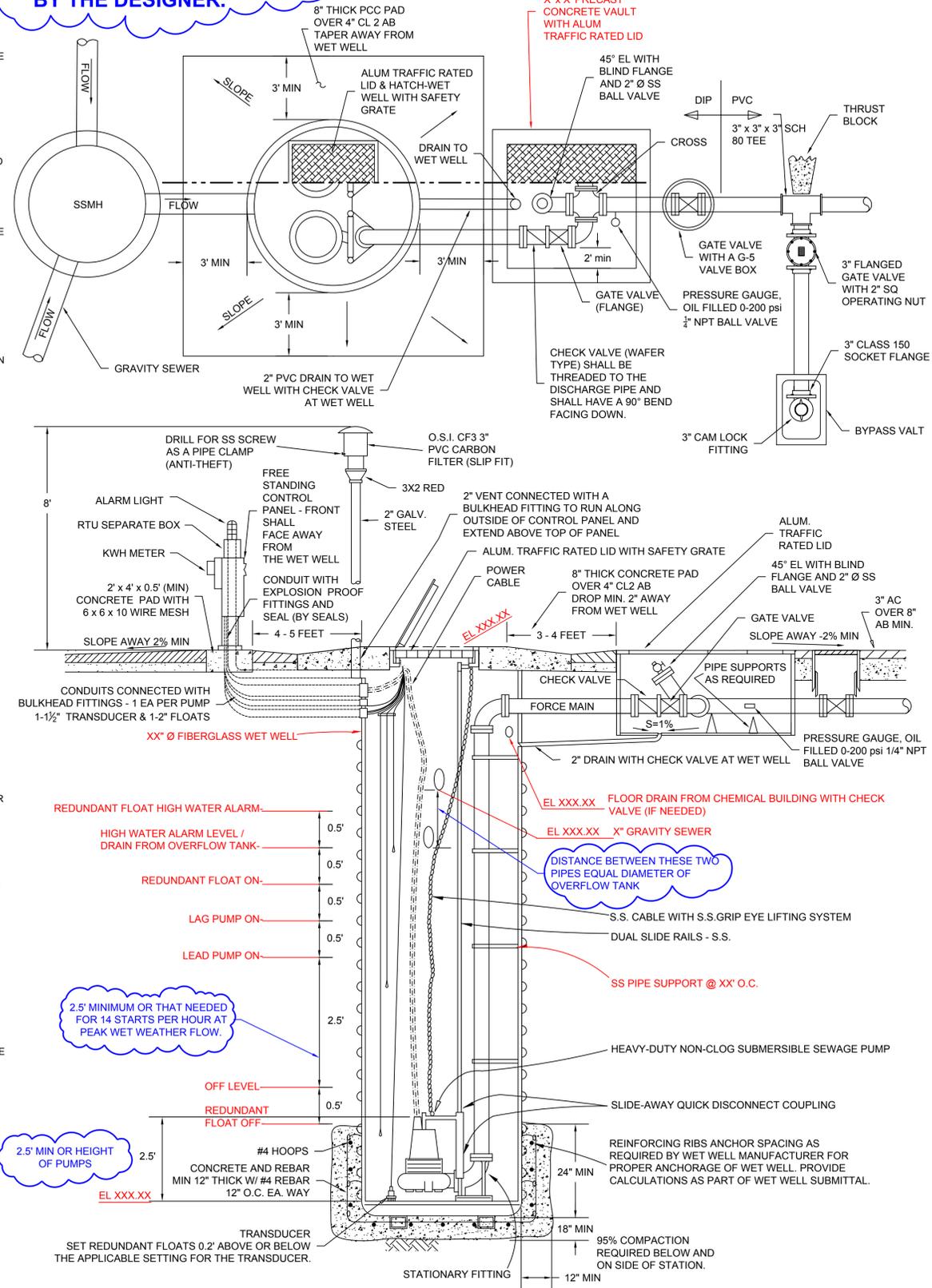
SUPPLY A SWITCHED CONTACT TO THE RTU TO INDICATE A HIGH WATER LEVEL CONDITION. THE CONTACT MUST BE OF NORMALLY OPEN TYPE THAT CLOSSES TO INDICATE HIGH WATER. THE WIRING FOR THIS CONTACT SHALL BE ROUTED TO THE RTU VIA A 1.5" UNDERGROUND CONDUIT DEDICATED FOR THE USE OF COMMUNICATIONS AND SIGNALING CABLE.

PROVIDE A DEDICATED PATH FROM THE PUMP CONTROLLER TO THE RTU HOUSING FOR THE PURPOSE OF SERIAL BASED COMMUNICATIONS BETWEEN THE TWO. THE PATH MAY BE SHARED WITH OTHER SIGNALING CABLE IF REQUIRED. A PULL STRING SHALL BE INSTALLED FOR LATER USE.

SEAL ALL EXTERNAL ACCESS HOLES OF RTU HOUSING TO PREVENT MOISTURE USING RUBBER HOLE PLUGS AND SILICONE BASED CAULK. WHEN OUTSIDE OF DEDICATED CONDUITS, ALL COMMUNICATIONS AND SIGNALING CABLES AND ANTENNA CABLE TO THE RTU MUST REMAIN SEPARATED FROM ALL HIGH VOLTAGE POWER CABLES.

- B. CONTRACTOR SHALL DELIVER THE PURCHASED RTU SYSTEM, INCLUDING THE ANTENNA AND COAX CABLE, TO THE PLACER COUNTY TELECOMMUNICATIONS DIVISION FOR PROGRAMMING AND INSPECTION PRIOR TO INSTALLATION AT THE PROJECT SITE. ONCE THE PLACER COUNTY TELECOMMUNICATIONS DIVISION HAS COMPLETED SUCH PROGRAMMING AND INSPECTION, THEY WILL RETURN THE RTU SYSTEM TO THE CONTRACTOR FOR INSTALLATION. ONCE THE CONTRACTOR HAS COMPLETED THE INSTALLATION OF THE RTU, ANTENNA AND HIGH WATER SWITCH, THE COUNTY TELECOMMUNICATIONS DIVISION PERSONNEL WILL TEST THE RTU SYSTEM AND HIGH WATER ALARM.**

**CLOUDED NOTES ARE DIRECTED TO THE DESIGN ENGINEER AND ARE TO BE REMOVED FROM THE FINAL DRAFT. RED LETTERING TO BE COMPLETED BY THE DESIGNER.**



**PROFILE VIEW**  
**SEWAGE LIFT STATION**  
 NO SCALE

REGISTERED CIVIL ENGINEER  
 No. \_\_\_\_\_ Exp. \_\_\_\_\_  
 CIVIL  
 STATE OF CALIFORNIA  
 DATE \_\_\_\_\_



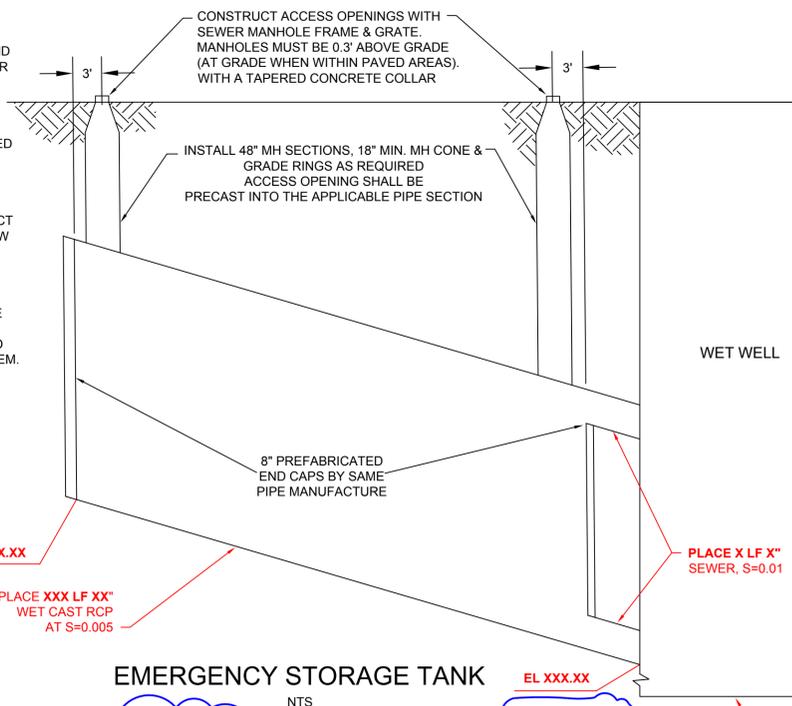
DESIGNED: WARREN TELLEFSON  
 DRAWN: LORI HAMMETT  
 CHECKED: \_\_\_\_\_  
 REC DWG: \_\_\_\_\_  
 PROJECT NO. \_\_\_\_\_

DEPARTMENT OF FACILITY SERVICES  
 COUNTY OF PLACER  
**PROJECT NAME**  
 LIFT STATION DETAILS SHEET 1 OF 3  
 SHEET NO. **1** / **3**

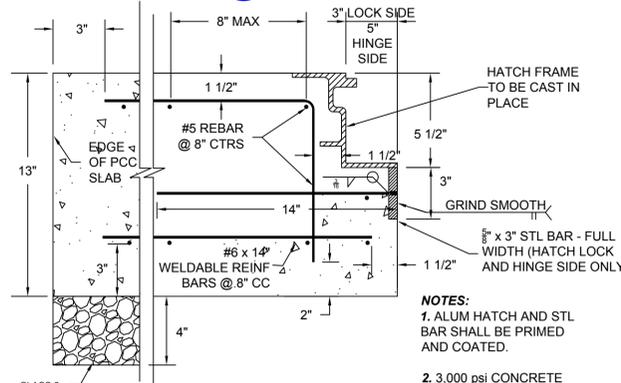
**NOTES:**

- EMERGENCY STORAGE TANK AND MANHOLES SHALL BE CONSTRUCTED WATER TIGHT AND SHALL BE VACUUM TESTED PRIOR TO BACKFILL.
- CONCRETE "KICKERS" OR OTHER APPROVED ANCHOR SYSTEM SHALL BE CONSTRUCTED TO ENSURE END CAPS ARE ANCHORED TO THE TANK.
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE DISTRICT SANITARY ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING THE MATERIALS FOR THE OVERFLOW TANKS. THESE DRAWINGS SHALL INCLUDE ALL APPLICABLE DETAILS FOR THESE TANK STRUCTURES, INCLUDING SIZE OF "KICKERS" OR PROPOSED ALTERNATIVE ANCHORING SYSTEM.

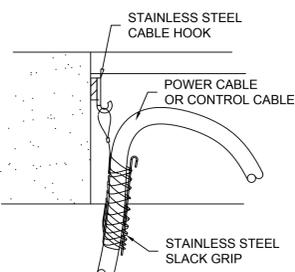
BUOYANCY CALCULATORS PREPARED BY A PROFESSIONAL ENGINEER SHALL BE SUBMITTED FOR THE OVERFLOW TANKS FOR ACCEPTANCE BY THE DISTRICT SANITARY ENGINEER.



**CLOUDED NOTES ARE DIRECTED TO THE DESIGN ENGINEER AND ARE TO BE REMOVED FROM THE FINAL DRAFT. RED LETTERING TO BE COMPLETED BY THE DESIGNER.**



**REBAR PROFILE (TYP) & BEARING PLATE DESIGN (FOR WETWELL / VALVE BOX)**



**DESIGN FLOW FOR LIFTSTATION**

SUB AREA	# OF EDU's	UNIT FLOW	AVERAGE FLOW	PEAKING FACTOR	PEAK DESIGN FLOW	PEAK DESIGN FLOW
see note 1	see note 2	gpd	gpd		gpd	gpm
X	X	X	X	X	X	X
<b>TOTAL DESIGN FLOW</b>						<b>gpm</b>

**TOTAL DYNAMIC HEAD TDH**

ELEV OF BOTTOM OF WET WELL	ELEV OF FM AT HIGH POINT	ELEV OF FM AT DISCHARGE	STATIC HEAD
ft (1)	ft (2)	ft (2)	ft (2)-(1)
X	X		X

PIPE SIZE	PIPE LENGTH	EQUIV PIPE LENGTH	TOTAL PIPE LENGTH	C-VALUE	FRICTION LOSS
in	ft	see note 3 ft	ft		ft HW eq <sup>1</sup>
X	X	X	X	X	X
<b>TOTAL FRICTION LOSS</b>					<b>ft</b>
<b>TDH = STATIC HEAD + FRICTION HEAD ft</b>					

- NOTES:**
- MAP OF SUB AREAS IS PROVIDED IN THE LIFT STATION DESIGN REPORT PREPARED BY: \_\_\_\_\_ AND DATED: \_\_\_\_\_
  - DETAILED CALCULATIONS FOR THE EQUIVALENT DWELLING UNIT SUBTOTALS ARE PROVIDED IN THE DESIGN REPORT.
  - EQUIVALENT PIPE LENGTH FOR ALL FITTINGS ARE PROVIDED IN THE DESIGN REPORT.

**AS-BUILT PUMP SPECIFICATIONS**

TYPE:	BRAND	-INCH	MODEL
MOTOR:	HP /	RPM / 3-PHASE / 60 CYCLE	VOLTS
IMPELLER:			
POWER CONSUMPTION:	KW	FLA	LRA

**LIFT STATION SPECIFICATIONS**  
CONTINUED FROM LIFT STATION DETAILS SHEET 1 OF 3

**PERMITS**

- THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS AT NO COST TO THE COUNTY. THIS INCLUDES AN ELECTRICAL PERMIT FROM THE PLACER COUNTY BUILDING DEPARTMENT PRIOR TO PERFORMING ANY ELECTRICAL WORK AND COORDINATING WITH THE APPLICABLE ELECTRICAL UTILITY FOR INSPECTION AND APPROVAL.
- CONTRACTOR SHALL COORDINATE POWER TO THE SEWER LIFT STATION WITH THE UTILITY COMPANY.

**FINAL LAYOUT OF PANELS**

- FINAL LAYOUT OF PANELS, EQUIPMENT, LIGHT, ETC. SHALL BE APPROVED BY THE DISTRICT SANITARY ENGINEER IN THE FIELD PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL MAKE AN APPOINTMENT WITH THE DISTRICT SANITARY ENGINEER TO REVIEW SUCH LOCATIONS AND SHALL NOT COMMENCE CONSTRUCTION UNTIL THE LOCATIONS HAVE BEEN APPROVED. SUCH REQUEST SHALL BE SUBMITTED THROUGH THE COUNTY INSPECTOR A MINIMUM OF THREE (3) WORKING DAYS BEFORE THE REVIEW IS REQUIRED.

**TESTING**

**A GENERAL**

- A REPRESENTATIVE FROM THE DISTRICT SANITARY ENGINEER MUST BE PRESENT FOR ALL TESTING.
- CONTRACTOR SHALL PROVIDE A MINIMUM OF THREE (3) WORKING DAYS NOTIFICATION.
- ANY REMEDIAL ACTION DUE TO TESTING FAILURE AND RE-TESTING SHALL BE AT THE CONTRACTOR'S EXPENSE

**LIFT STATION OPERATION**

- A MANUFACTURER'S REPRESENTATIVE SHALL BE PRESENT FOR THE START-UP AND TESTING OF THE EQUIPMENT AS PART OF THE PURCHASE CONTRACT.

**LOCATOR WIRE TESTING**

- CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, AND MATERIALS REQUIRED TO PERFORM A CONTINUITY TEST OF THE LOCATOR WIRE AT EACH VALVE, AVRV, AND OTHER LOCATIONS WHERE THE LOCATOR WIRE IS ACCESSIBLE.

**CLEANING & FLUSHING OF THE FORCE MAINS**

THE CONTRACTOR SHALL CLEAN AND FLUSH THE FORCE MAINS IN THE FOLLOWING MANNER:

- THE CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT AND MATERIALS REQUIRED TO CLEAN AND FLUSH THE FORCE MAINS TO THE SATISFACTION OF THE COUNTY.
- THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW THE EQUIPMENT THEY PLAN TO USE THAT IS CAPABLE OF PERFORMING THE REQUIRED CLEANING PRIOR TO THE START OF CLEANING.
- THE CONTRACTOR WILL INSERT A FLEXIBLE POLYURETHANE FOAM "SWAB" (2# PER CU/FT DENSITY) COMPLETE WITH REAR POLYURETHANE DRIVE SEAL, INTO THE FIRST SECTION OF PIPE. PIGS SHALL BE MANUFACTURED OF AN OPEN-CELL POLYURETHANE FOAM BODY. PIGS SHALL BE ABLE TO PASS THROUGH REDUCTIONS OF UP TO 60% OF THEIR ACTUAL DIAMETER AND BE ABLE TO RETURN TO NORMAL SIZE WHEN SPACE ALLOWS. PIGS SHALL BE ABLE TO TRAVERSE STANDARD PIPING CONFIGURATIONS SUCH AS 90 DEGREE ELBOWS, T'S, Y'S, GATE VALVES, AND BALL VALVES.
- CLEANING AND FLUSHING SHALL BE ACCOMPLISHED BY PROPELLING THE "SWAB" DOWN THE PIPELINE TO THE EXIT POINT WITH POTABLE WATER OR RECYCLED WATER. SURFACE WATER IS NOT ACCEPTABLE FOR THIS USE. THE CLEANING PROCEDURE SHALL BE SUBMITTED AS A SHOP DRAWING.
- THE CONTRACTOR SHALL CONTINUE TO SEND PIGS THROUGH THE PIPELINE AND FLUSH THE SYSTEM UNTIL THE WATER IS COMPLETELY CLEAR.
- A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE START OF THE CLEANING AND FLUSHING WORK, THE CONTRACTOR SHALL SUBMIT EVIDENCE OF QUALIFICATIONS TO DO THIS WORK TO THE COUNTY FOR ACCEPTANCE. THIS EVIDENCE SHALL INCLUDE, AT A MINIMUM, A LIST OF ALL PROJECTS OF EQUAL OR GREATER SCOPE WHICH HAVE BEEN COMPLETED WITHIN THE LAST THREE YEARS. SPECIFIC INFORMATION FOR EACH PROJECT SHALL INCLUDE THE DATES OF THE PROJECT, THE TOTAL LENGTH OF PIPE CLEANED, THE DIAMETER(S) OF THE PIPES, THE PIPE MATERIAL, THE PROJECT COST, THE PROJECT LOCATION, AND A CONTACT PERSON WITH TELEPHONE NUMBER.

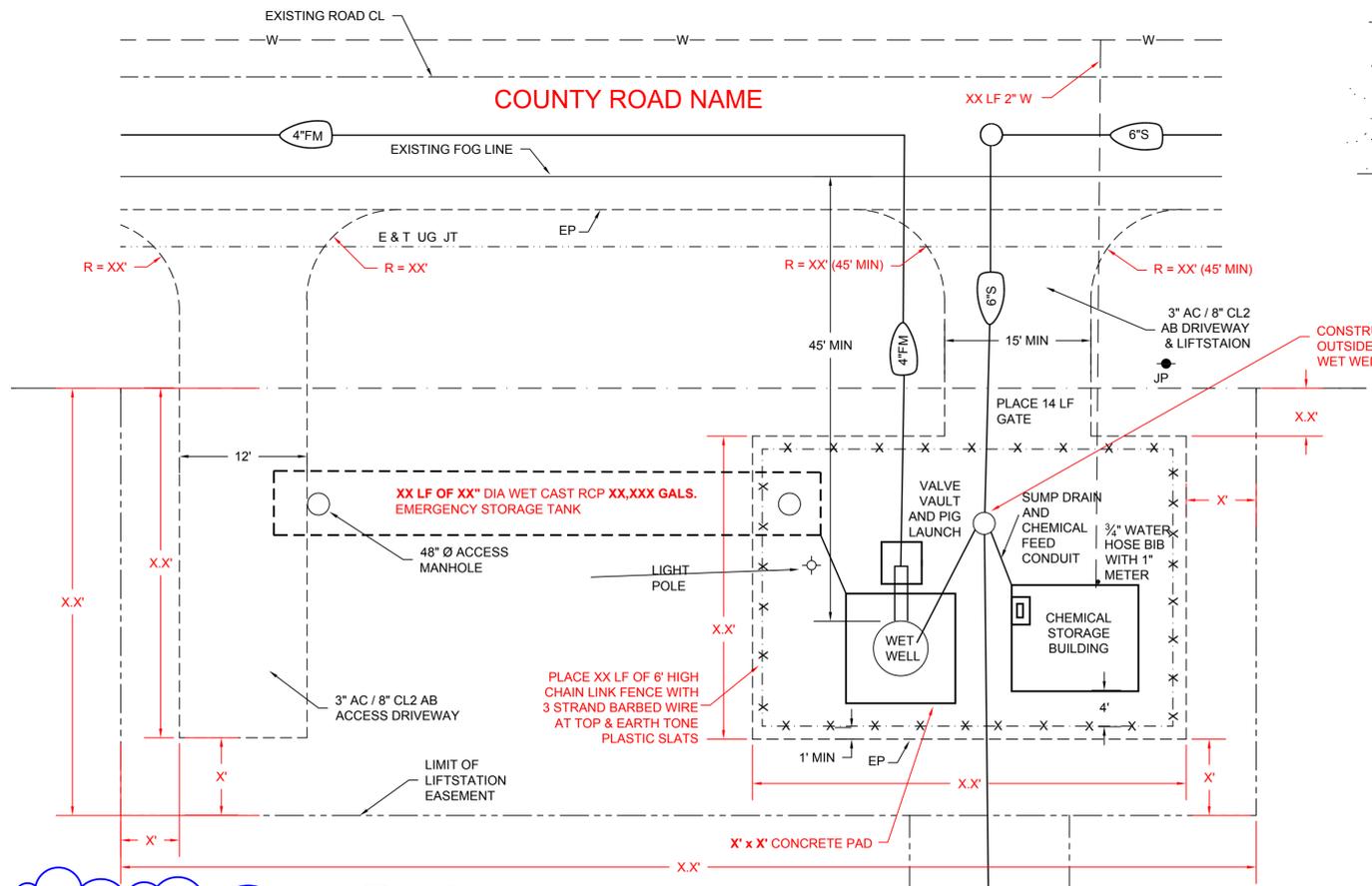
**OVERFLOW TANK VACUUM TEST**

OVERFLOW TANKS SHALL PASS A VACUUM TEST CONSISTING OF THE FOLLOWING CRITERIA AND PROCEDURES:

- THE TEST SHALL BE PERFORMED AFTER ASSEMBLY OF THE OVERFLOW TANK AND ACCESS MANHOLES, BUT PRIOR TO BACKFILLING. THE CONTRACTOR SHALL PERFORM THE TEST AND SUPPLY ALL TEST EQUIPMENT.
- LIFT HOLES SHALL BE FILLED WITH NON-SHRINK GROUT PRIOR TO TESTING.
- PIPE ENTERING AND EXITING THE OVERFLOW TANK SHALL BE PLUGGED. SECURELY BRACE THE PLUGS TO PREVENT THEM FROM BEING DRAWN INTO THE OVERFLOW TANK.
- A VACUUM OF 10 INCHES OF MERCURY SHALL BE DRAWN TO START THE TEST. THE AMOUNT OF TIME REQUIRED FOR THE VACUUM TO DROP TO 9 INCHES SHALL BE MEASURED. THE OVERFLOW TANK WILL PASS THE TEST IF THE AMOUNT OF ELAPSED TIME IS GREATER THAN THAT LISTED BELOW FOR THE OVERFLOW TANK DIAMETER:

MAIN OVERFLOW TANK DIAMETER (INCHES)	48	60	72	84	96
TIME > TO DROP 1 INCH MERCURY (SECONDS)	60	75	90	105	120

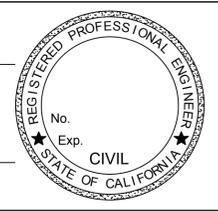
- IF THE OVERFLOW TANK FAILS THE INITIAL TEST, NECESSARY REPAIRS SHALL BE MADE WITH A NON-SHRINK GROUT WHILE THE VACUUM IS STILL BEING DRAWN. RETESTING SHALL PROCEED UNTIL THE ELAPSED TIMES ARE SATISFACTORY.
- AFTER PASSING THE VACUUM TEST, ALL JOINTS SHALL THEN BE MORTARED, INSIDE AND OUT. OUTSIDE MORTARED JOINTS SHALL BE ALLOWED TO DRY BEFORE BACKFILLING.



**LIFTSTATION PLAN VIEW**

THIS IS AN EXAMPLE ACTUAL LAYOUT TO BE DETERMINED BY THE SITE CONDITIONS.

- NOTES TO DESIGNER:**
- THE SEWAGE LIFTSTATION SITE, DRIVEWAY, AND MANHOLE ACCESS ROAD SHALL BE CONSTRUCTED WITH A STRUCTURAL SECTION OF 3-INCHES AC OVER 8-INCHES CLASS 2 AB.
  - ALL SSMH'S MUST BE ACCESSIBLE BY SEWER MAINTENANCE VEHICLES.
  - REFERENCE THE GRADING PLAN FOR ALL GRADING ASSOCIATED WITH THE LIFTSTATION.
  - DRIVEWAY ENTRANCES TO BE DESIGNED TO MEET THE APPLICABLE PLACER COUNTY PLATE R-18.



REGISTERED CIVIL ENGINEER

DATE

DATE: 2008

DESIGNED: WARREN TELLEFSON

DRAWN: LORI HAMMETT

CHECKED:

RECDWG:

PROJECT NO.

DEPARTMENT OF FACILITY SERVICES

**PROJECT NAME**

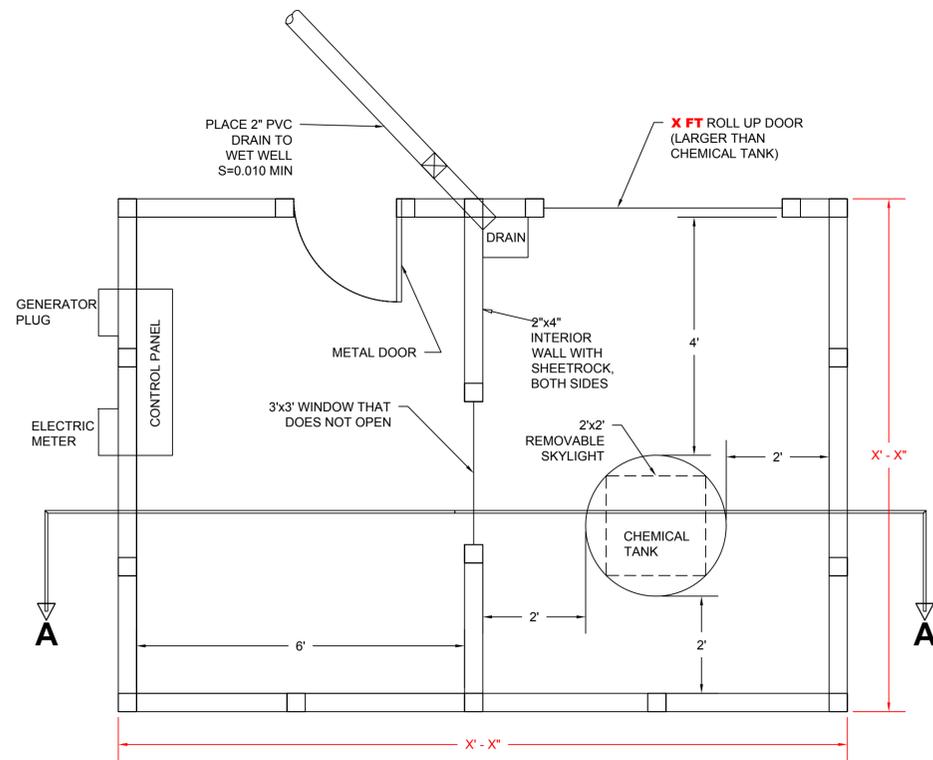
LIFT STATION DETAILS SHEET 2 of 3

COUNTY OF PLACER

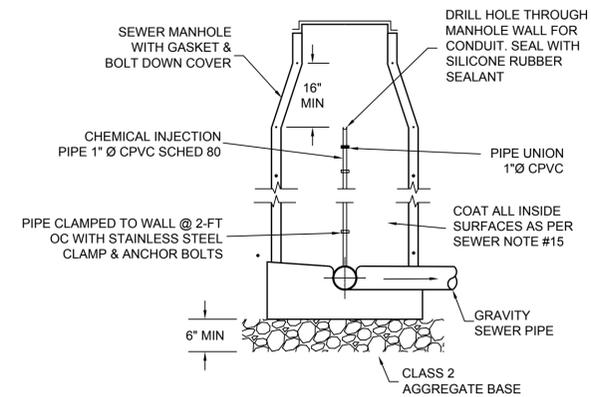
SHEET NO.

**2**

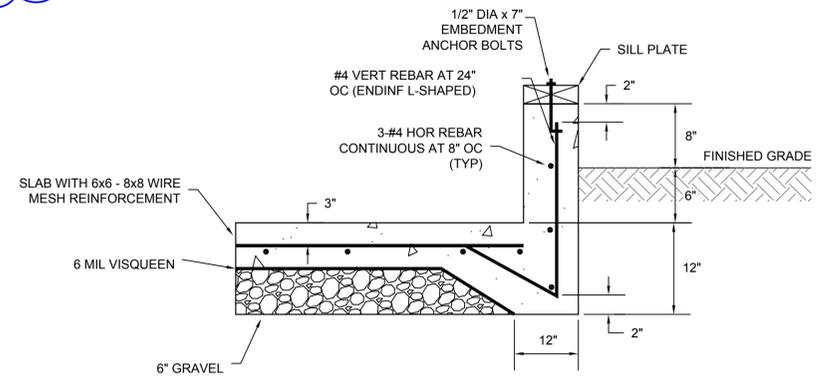
**3**



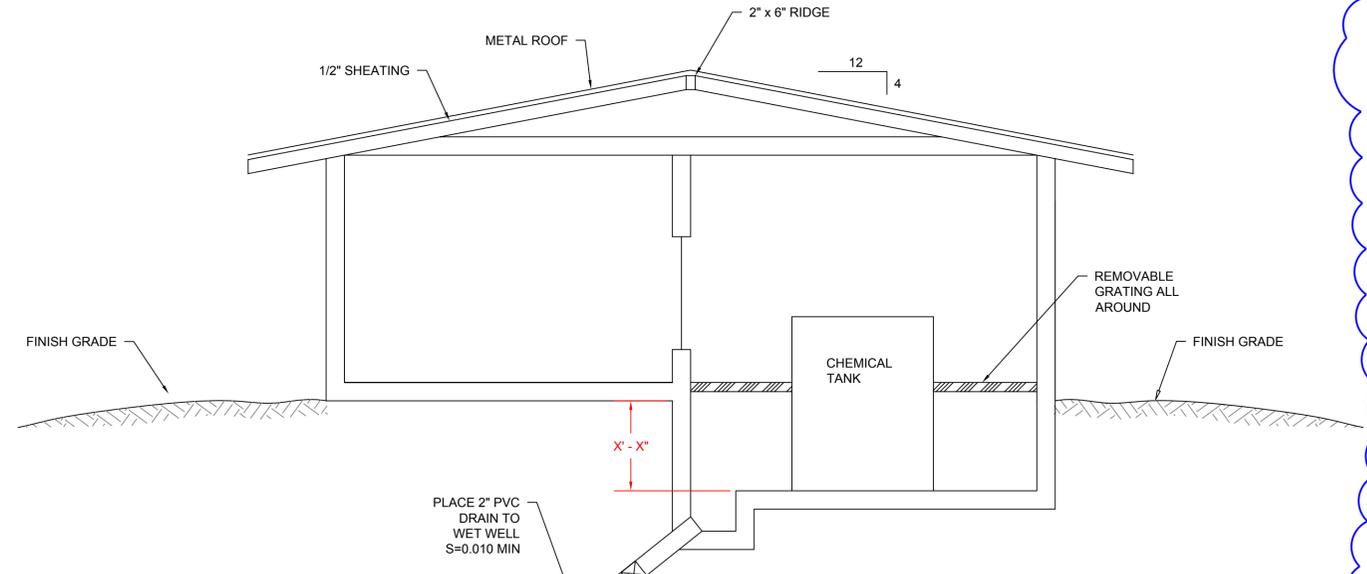
**PLAN ELEVATION**



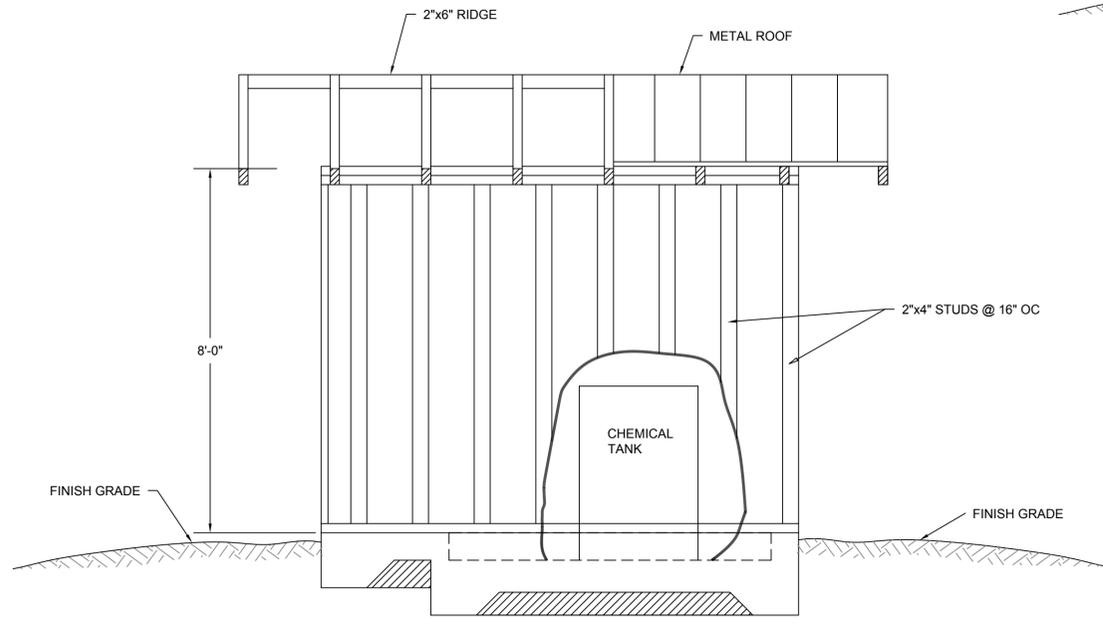
**CHEMICAL FEED SYSTEM MANHOLE CONNECTION**



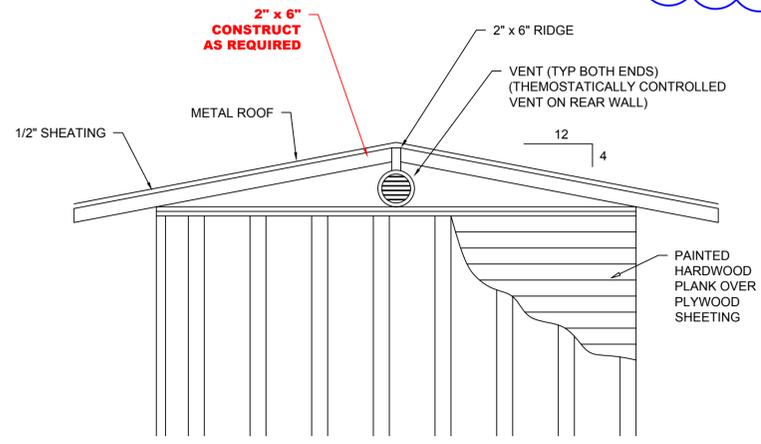
**FOUNDATION SECTION**



**SECTION A - A PROFILE ELEVATION**



**OUTSIDE ELEVATION**



**REAR ELEVATION**

**CLOUDED NOTES ARE DIRECTED TO THE DESIGN ENGINEER AND ARE TO BE REMOVED FROM THE FINAL DRAFT.**  
**RED LETTERING TO BE COMPLETED BY THE DESIGNER.**

REGISTERED CIVIL ENGINEER

DATE

No. \_\_\_\_\_ Exp. \_\_\_\_\_

CIVIL

STATE OF CALIFORNIA

DATE: WARREN TELLEFSON 2007 11-08

DESIGNED: WARREN TELLEFSON

DRAWN: LORI HAMMETT

CHECKED: \_\_\_\_\_

REC'DWG: \_\_\_\_\_

PROJECT NO. \_\_\_\_\_

DEPARTMENT OF FACILITY SERVICES

COUNTY OF PLACER

**PROJECT NAME**

LIFT STATION DETAILS SHEET 3 of 3

**WET WELL ACCESS**  
 BUILDING, MANHOLES, LIGHT POLE, AND WET WELL TO BE LOCATED ON THE SITE SO THAT THEY ARE ALL ACCESSIBLE BY MAINTENANCE VEHICLES WITHOUT DRIVING OVER THE WET WELL.

**FENCING**  
 WITH THE CONSTRUCTION OF A BUILDING THAT HOUSES ALL OF THE CONTROLS AND CHEMICAL FEED, FENCING IS NOT NECESSARY AROUND THE LIFTSTATION SITE UNLESS IT IS IN A REMOTE LOCATION THAT COULD BE PRONE TO VANDALISM. CONTACT COUNTY ENGINEER PRIOR TO REMOVAL OF FENCE.

**BUILDING**  
 DESIGNER TO SIZE THE DIMENSIONS OF THE BUILDING TO FIT THE PROPOSED CONTROL PANEL AND CHEMICAL FEED TANKS SIZES. DESIGNER TO SPECIFY THE TYPE OF ROLL UP DOOR.

THE STYLE OF BUILDING SHOWN, WOOD CONSTRUCTION WITH PLYWOOD EXTERIOR, IS THE MINIMUM REQUIRED BY PLACER COUNTY. DESIGNER SHOULD CHECK WITH THE DEVELOPER/OWNER TO DETERMINE IF ANOTHER STYLE OF BUILDING (BLOCK ETC.) IS DESIRED DUE TO ESTHETICS OF THE PROPOSED DEVELOPMENT.

**CHEMICAL STORAGE BUILDING**  
 A CHEMICAL STORAGE BUILDING SHALL BE SIZED TO CONTAIN THE CHEMICAL TANK AND OTHER ACCESSORY EQUIPMENT, SHALL PROVIDE A CONTAINMENT SUMP TO PROVIDE 120% OF THE CHEMICAL TANK CAPACITY, AND BE APPROVED BY THE SEWER MAINTENANCE DISTRICT. ELECTRICITY AND POTABLE WATER SHALL BE SUPPLIED. AN EYE WASH SHALL BE INSTALLED ON THE OUTSIDE OF THE BUILDING. A 2" (TWO-INCH) CONDUIT AND A 2" (TWO-INCH) DRAIN SHALL BE PROVIDED FROM THE BUILDING TO THE WET WELL. THE DRAIN SHALL HAVE A CHECK VALVE SIMILAR TO THE VAULT DRAIN.

SHEET NO.

**3**

**3**