Replacement of Hahn Lift Station

Preliminary Design Report

City of Modesto

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Prepared under the responsible charge of

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Chapter 1 - Background

Introduction

The existing Hahn Lift Station is located at the intersection of Honey Creek Road and Nightingale Drive. The station was constructed in 1975 and was rehabilitated in 1999. The drywell is located below grade beneath a manhole cover in the curb return/sidewalk on the southeast corner of the intersection at 3808 Honey Creek Road.

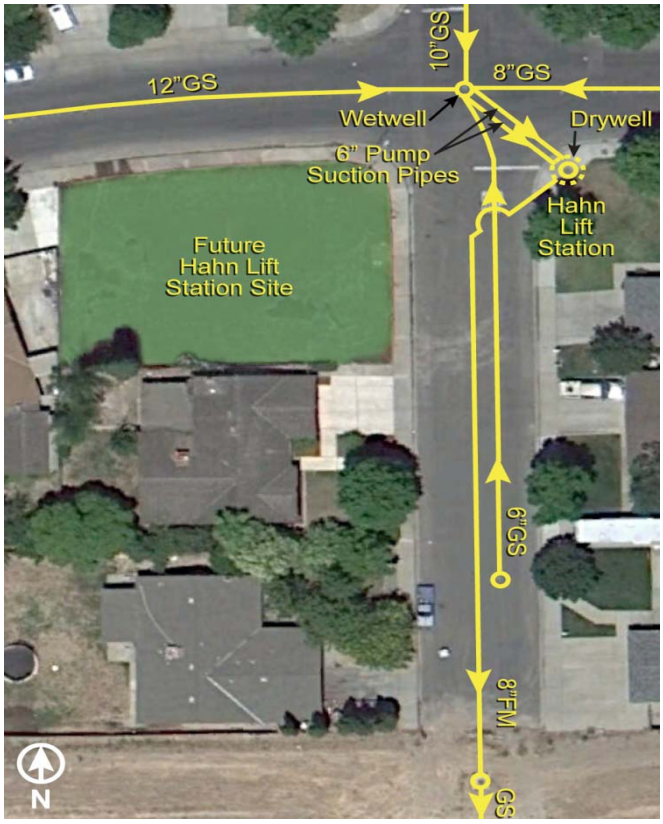


Figure 1. Existing Hahn Lift Station

The wetwell is located in the middle of the intersection. The wetwell receives flow from a 12-inch VCP gravity sewer from the west, a 10-inch VCP gravity sewer from the north, an 8-inch ACP gravity sewer from the east, and a 6-inch VCP gravity sewer from the south. The invert of the lowest incoming sewer line is approximately 25 feet below grade. The invert of the wetwell is approximately 30 feet below grade. An aerial view of the existing Hahn Lift Station is shown in Figure 1.

The drywell contains two 10 HP pumps which pull from the wetwell through 6-inch CIP suction lines. The pump discharge piping contains check and isolation valves before combining into a single 8-inch forcemain which runs south within Honey Creek Road and discharges to gravity at a manhole just south of the location where the road ends. The station contains a plug for a portable generator for standby power.

The Hahn Lift Station cannot currently pump the peak wet weather flow (PWWF) of 900 gallons per minute (gpm) reliably with one of the two pumps out of service.

Condition Assessment

A condition assessment of the Hahn Lift Station was conducted under the City of Modesto's 2007 Wastewater Collection System Master Plan. Based on the findings of the condition assessment, the Master Plan concluded that the Hahn Lift Station should be replaced. The City purchased the lot on the southwest corner of the Honey Creek Road and Nightingale Drive intersection at 3221 Nightingale Drive. The existing

Hahn Lift Station Drywell Access

house has been removed. City staff confirmed that all below grade features on the site were removed in their entirety, including a swimming pool.

The existing Hahn Lift Station currently has the following notable deficiencies:

Reliable Capacity

Both pumps at the lift station operate during PWWF events. The hydraulic capacity of the lift station is limited due to the existing long, small pump suction pipes.

Site Subject to Flooding

The lift station site is susceptible to flooding during storm events when the surrounding rockwell storm drains surcharge and flood the street. The original pumps were replaced with dry pit submersible units and the electrical equipment was moved above grade to increase the reliability of the lift station.

Hahn Lift Station Wetwell

Improper Ventilation and Heat Buildup

The ventilation system installed in the drywell is not adequate for the station and does not meet current codes. The pumps burn out approximately every two years due to improper ventilation and heat buildup.

Hahn Lift Station Drywell

O&M and Safety Concerns

The lift station drywell is deep and presents access and safety concerns for O&M including equipment removal and access to below grade pumps, motors, and valves. The lift station drywell is accessed through the use of a ladder.

Sandy Soils

Proper shoring will be essential when constructing the new station due to sandy soils at the site.

Chapter 2 - Design Criteria

The design criteria for the Hahn Lift Station include:

Flow

The Hahn Lift Station must be capable of pumping incoming lift station flows between minimum dry weather flow (MDWF) and PWWF. The PWWF for the Hahn Lift Station is defined as the required reliable/firm capacity (largest pump out of service) for the station as provided by the City of Modesto.

- PWWF = 900 gpm (1.3 mgd)

Reliability and Redundancy

Reliable pumping capacity is defined by the City as the ability to pump the station's PWWF with the largest pump out of service and without Modesto Irrigation District (MID) power. The station's reliability will also be improved in other areas as part of this project. Equipment reliability is required to reduce call-outs and unscheduled maintenance. Pumping units and all critical auxiliary equipment will meet reliability requirements. Reliability requirements include:

- Standby power to pump 900 gpm (1.3 mgd). No permanent standby power will be installed on the site. The City shall provide a portable generator for standby power to handle all station loads. A receptacle will be provided on the electrical panel for connection to the portable generator.
- Ability to pump 900 gpm (1.3 mgd) with the largest pump and motor out of service.
- Redundant pump and motor for each size pump.
- Solids handling wastewater pumps (Wemco with pre-rotation basins).
- Proven equipment.
- Structural and seismic design to meet codes. Provide structural elements and equipment bracing.

Reliability and redundancy minimizes the probability of wastewater overflows at the pumping station and within its service area.

Pumping Systems

Pumping system design criteria involves forcemain hydraulics, pump characteristics, pipeline sizing, wet well sizing, and operation and maintenance considerations. The pumping system will meet the following design criteria.

- Capable of pumping flows from MDWF to PWWF without starting any pump more than 10 starts per hour.
- Pump PWWF with the largest pump and motor out of service.

- Constant speed pumps.
- Pumps suitable for raw wastewater.
- Operate pumps with high efficiency range on pump curve and within manufacturer's recommended operating range.
- Provide premium efficiency motors.
- Provide sufficient NPSH.
- Fold floating material into the pumped flow for removal from the wet pit with pre-rotation basins.
- Prevent cavitation.
- Provide accessible isolation and check valves per City of Modesto Specifications.

Piping

Piping will be in accordance with the following design criteria.

- Piping will be ductile iron, pressure class 350, complying with ANSI/AWWAC151. Fittings will conform to ANSI/AWWA C110. Piping located in the wet well shall be flanged.
- Exposed piping will be adequately supported for dead and seismic loading. Hydraulic Institute Standard 9.6.6, “Rotodynamic Pumps for Pump Piping” shall be used.
- Pipe lining and coating will be suitable to protect the pipe from its environment. Lining will be ceramic epoxy, Protecto 401, or equal. Buried piping will be protected by polyethylene encasement complying with ANSI/AWWA C105.
- Lift station discharge forcemain to slope up towards discharge manhole.
- Sewage piping will be sized to meet the flow velocity design criteria outlined below.

Table 1. Flow Velocity Design Criteria

Pipe Segment	Discharge Pipe
Velocity	8 fps (maximum)

Flow Metering

No flow metering will be included in the Hahn Lift Station design.

Valves, Gates, and Actuators

Valve location will be selected for accessibility. Submersible pumps will have discharge valves located in a precast concrete valve vault. All installed valves will be constructed of material resistant to corrosion and suitable for wastewater service.

Pump Backflow Protection Valve

Each pump discharge will include a swing check valve to prevent backflow in the system from damaging the pump. Check valves will comply with AWWA C508. Bronze materials containing more than 16 percent zinc will be prohibited per AWWA C508.

Pump Discharge Isolation Valves

Each pump will be provided with its own discharge valve to isolate the pump from the system.

Isolation valves will be non-lubricated eccentric plug type valves and be manually operated. Valve will be lined with fusion bonded epoxy. Valves will be DeZurik Model No. PEC, diameter as indicated, F1, CI, T, CR*GS-6-HP8, SB, or equal.

Sewage Pump Suction Valves

There will be no pump suction valves for the submersible pumps.

Forcemain Isolation Valve

There will be no forcemain isolation valves on the system between the lift station and the discharge manhole.

Wetwell Isolation Gate

There will be no wetwell isolation gate on the lift station.

Wet Well

The lift station shall have a submersible configuration. The following design criteria have been developed for the wet well.

- The lift station will have a single rectangular wetwell.
- All equipment to be installed in the wet well will be suitable for submergence.
- All equipment to be installed in the wet well will be suitable for the atmosphere and its intended use and will meet the classification requirements of the wet well.
- Provide PVC T-Lock or HDPE GSE Stud Liner on all interior surfaces (except floor) of new wetwell.

Emergency Bypass Pumping

An emergency bypass piping connection will be provided. The emergency bypass pump discharge pipe connection will be provided downstream of lift station's check valves to prevent flow back into the wetwell and to bypass flows from the wetwell to the forcemain. Depending on the net positive suction head requirements of the emergency bypass pump and the suction lift requirements of the lift station, emergency bypass pumping may surcharge the existing sewer system.

Odor Control

No odor control will be provided in this design. Space will be provided on the outside of the site fence for a future soil bed system, if required in the future.

Standby Power

Emergency power provisions will include a standard HD receptacle for the rapid connection of a portable emergency generator, as is the case for numerous pumping stations within the City of Modesto.

Sound Attenuation

The pumps and motors will be installed below-grade and will not present a noise pollution issue.

Auxiliary Systems

Ventilation

A ventilation fan and intake will be provided for the valve vault for continuous operation at 6 air changes per hour. No ventilation will be provided in the wetwell.

Compressed Air System

No compressed air is required at the lift station.

Water System

Potable water is currently available at the site. A 1-inch water line will tap into the City water service and a reduced pressure backflow preventer will be installed within the site.

Hoist and Monorail Systems

No permanent hoist system is required. The City boom truck will be used to lift the pumps and any valves out of the lift station wet well or valve vault.

Operations and Maintenance

Operation and maintenance design criteria includes items and components necessary to provide safe and effective operation and maintenance of the lift station. The following items have been identified and will be incorporated into lift station improvements and upgrades.

- Site access
  - Wetwell towards northeast corner of the site. Maintain the control panel closer to wetwell at northeast corner of the site.
  - Space for equipment removal, vacuum truck, and parking.

- A single entrance and single exit for truck access will be provided in addition to a new man gate. Entrance and exit gates will have motorized gates with remote control operators.
- Top of structures will be 6-inch above grade. This allows the use of 300 LB heavy-duty access hatches as opposed to H20 traffic-rated. Pumps and hatches will be mounted closer to wetwell walls to allow easier access for staff and the vacuum trucks.
- Double-leaf aluminum access hatches.
- Concrete pavement

- Spare parts.
- No toilet or sink facilities will be provided at the station.
- Manual switch in the vault to allow the pumps to be operated.
- A sump pump for valve vault drainage is required. A gravity drain from valve vault to the wetwell is not allowed.

Architectural/Landscape

Architectural and Landscape design criteria include:

- A wrought iron fence will be installed on the north and east sides of the property. The fence will be set back from the two streets a total distance of 20 feet, including 8 inches for curb, 4 foot sidewalk, 5-feet 4-inch additional space to the property line, and an additional 10 feet beyond the property line for the public utility easement (PUE).
- The fence shall be of the same type as at Rose Celeste Lift Station.
- CMU sound walls shall be constructed on west and south sides near property line, leaving the existing neighbor fences in place.
- Bollards between electrical panel and fence.
- The entire area behind the curb to the north and east fences will be landscaped. The 10 foot PUE may be used in the future for an odor control soil bed if needed.

Electrical Power/Lighting

Existing service infrastructure from MID serves the existing station. The same utility infrastructure, consisting of below-grade transformers and primary switch located near the existing station, is to remain. The system will provide a 240 volt 3 phase open delta electrical service. The new electrical service and metering will be located within the new lift station connected to the existing utility infrastructure by a new underground service lateral.

This system will operate the proposed lift station general loads plus both the duty and standby pump at the lift station. Minimum site security lighting will be provided with the switched capability for increased operational/servicing lighting upon demand as may be required.

Emergency power provisions will include a standard HD receptacle for the rapid connection of a portable emergency generator.

Instrumentation and Control

The two new pumps will be operated in a lead-lag duplex fashion as per the City of Modesto Standards. The pumps will be controlled by constant speed drives which will operate in conjunction with the City Standard Siemens HydroRanger with a HSQ SCADA RTU for telemetry.

The HydroRanger will provide control input via ultrasonic transducer for a lead lag pump configuration. The HSQ SCADA RTU will only provide monitoring of the entire station, including system operation, water level, and power failure. The new lift station will be functionally tested including all SCADA.

Chapter 3 - Alternatives Analysis

One design alternative was identified for the replacement of the Hahn Lift Station during the kickoff/workshop no. 1 meeting on April 5, 2011. The design alternative includes the installation of a wetwell, valve vault, two submersible pumps (1 duty & 1 standby), electrical equipment and instrumentation controls with a reliable firm capacity of 900 gpm. The replacement lift station alternative will be located on the property purchased by the City of Modesto on the southwest corner of the intersection of Nightingale Drive and Honey Creek Road.

This design alternative has been developed into the selected design of the Hahn Lift Station. A description of the selected design, including figures of the site layout, wet well and valve vault plan, wet well and valve vault section, demolition plan and a hydraulic profile are included in the following chapter of this report.

Chapter 4 - Preferred Alternative

Project Description

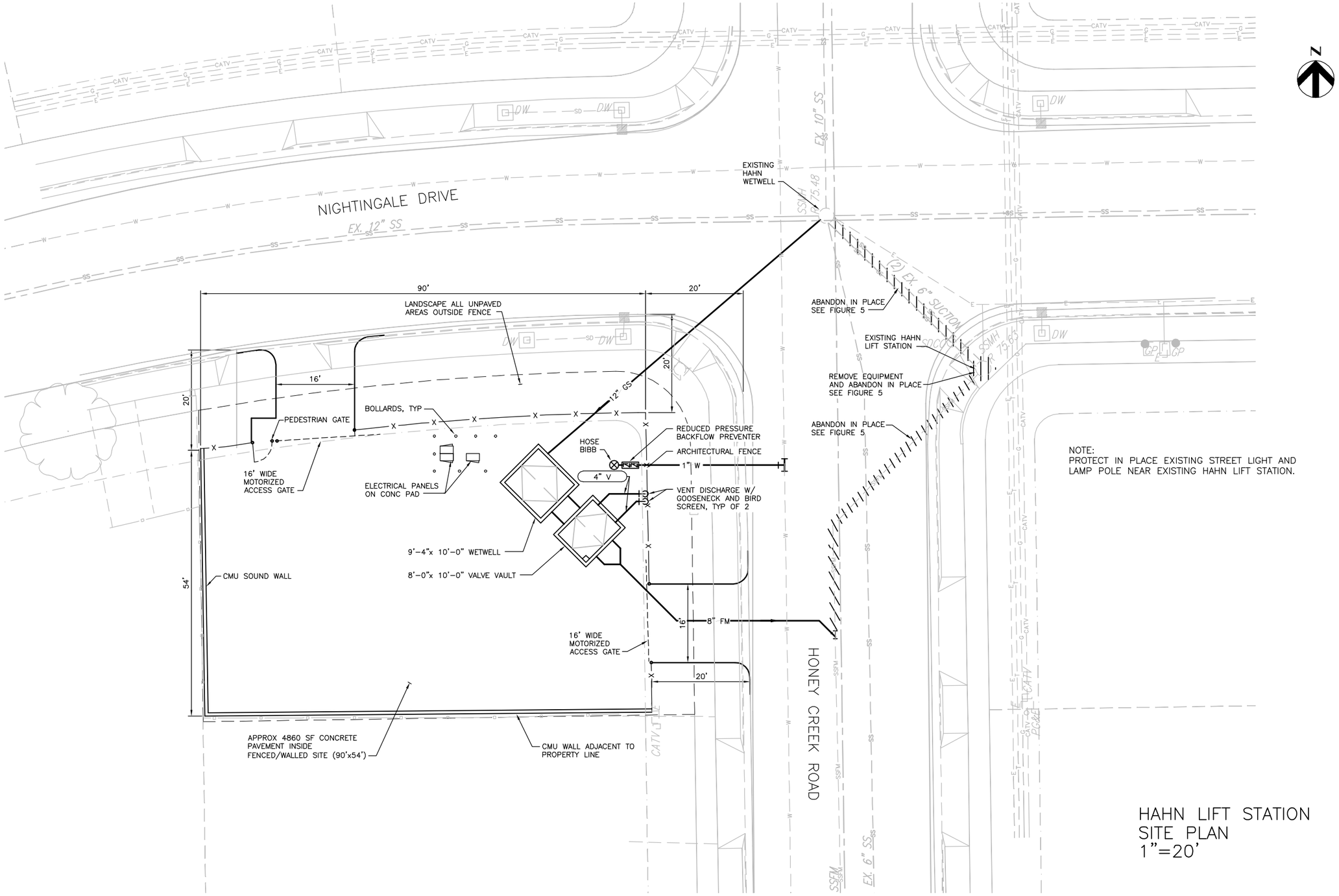
The preferred alternative includes the installation of a wet well, valve vault, two submersible pumps (1 duty & 1 standby), and electrical equipment and instrumentation controls with a reliable capacity of 900 gallons per minute (gpm). A rectangular wetwell with Wemco Pumps with pre-rotation basins similar to the Northgate Drive Lift Station will be provided. The design of the site will be modeled after the Rose Celeste Lift Station site.

The relocated Hahn Lift Station will receive sewage through a new 12-inch diameter gravity sewer from the existing Hahn Lift Station wetwell in the intersection of Nightingale Drive and Honey Creek Road. The relocated lift station will include 8-inch discharge piping which will tie into the existing 8-inch forcemain that ultimately discharges to a gravity manhole located in the undeveloped field south of the terminus of Honey Creek Road. Figure 2 shows the site plan for the relocated Hahn Lift Station.

The lift station wetwell will be 9-foot 4-inches by 10-foot with plastic liner on all interior walls and will contain two submersible pumps with pre-rotation basins. Valves, cross connection piping for back flushing, and an emergency bypass connection will be provided in an 8-foot by 10-foot valve vault adjacent to the wet well. Figure 3 shows a plan of the wet well and valve vault. Figure 4 shows a section of the wet well and valve vault.

The valve vault will also include a sump pump to transport water collected in the valve vault into the adjacent wetwell. The valve vault and wetwell will be elevated 6-inches from the surrounding concrete paving and covered with heavy duty, non-traffic rated, double-leaf, spring assisted aluminum hatches. Removable grating will be provided in the wet well approximately halfway between the ground surface and the invert of the wet well. No ladder will be provided to the removable grating in the wet well. When access is necessary personnel will be lowered to the removable grating using a boom trunk and harness system. An aluminum ladder will be provided to access the valve vault. Space will be provided adjacent to the wetwell and valve vault for parking the City's boom truck.

Two motorized 16' wide gates for vehicular traffic will be located to allow vehicles to enter and leave the site without the need to backup and turn around. A single pedestrian gate will be located adjacent to the north vehicular access gate. Architectural fencing will be provided on the north and east sides of the site and concrete masonry block walls will be provided on the south and west sides of the site, near the property line, adjacent to the neighboring fences. The north and east fences are set back 20 feet from the street; this includes the 10-foot public utility easement (PUE). If needed in the future, this area may be used for a soil bed odor control system. Electrical panels and pump control equipment are provided near the wet well on the north side of the site.



HAHN LIFT STATION
SITE PLAN
1"=20'

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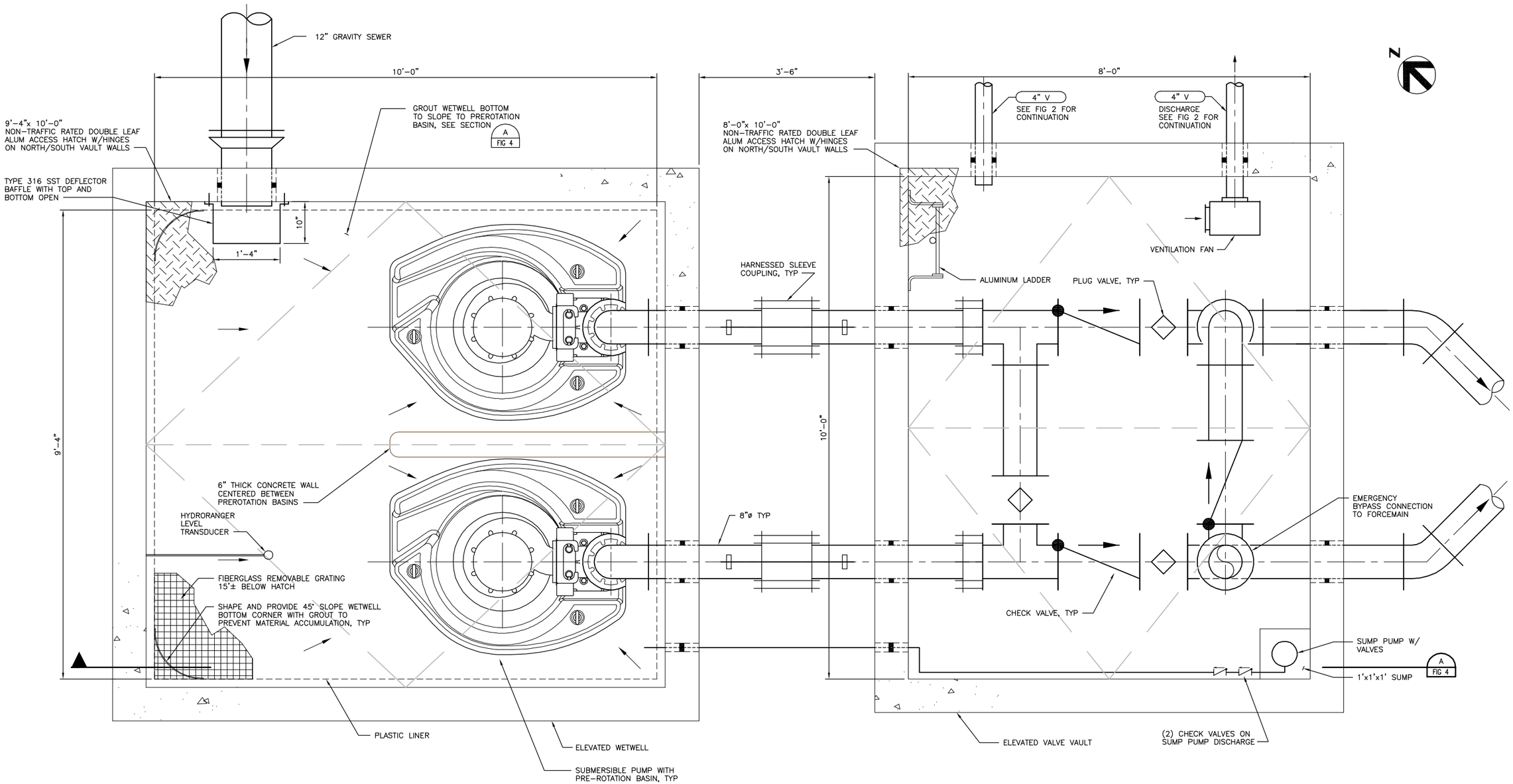
FIGURE 2



HAHN LIFT STATION
WETWELL AND VALVE VAULT PLAN
1/2"=1'-0"

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FIGURE 3

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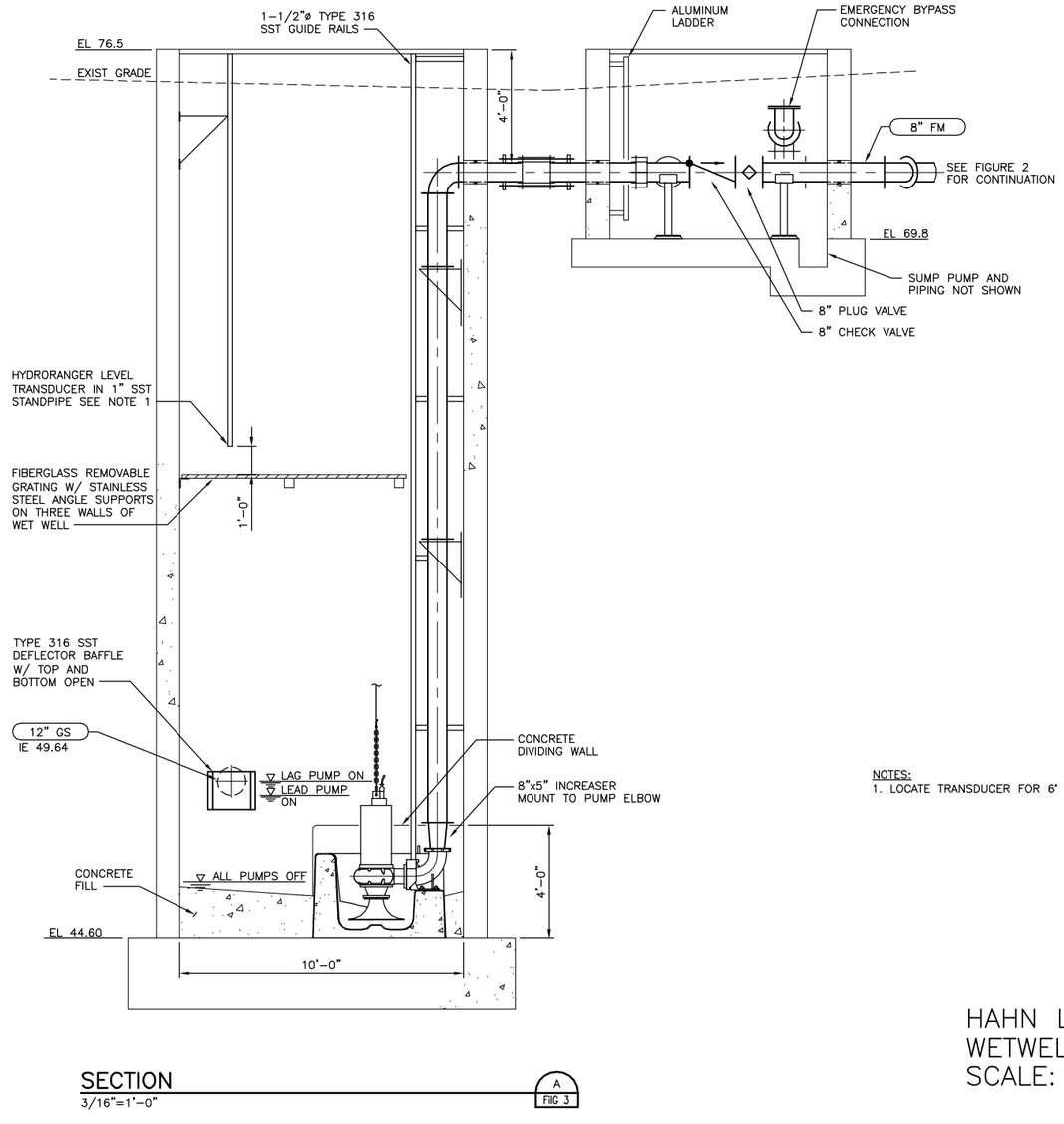

SECTION
3/16"=1'-0"

A
FIG 3

NOTES:
1. LOCATE TRANSDUCER FOR 6' (1:10) PROJECTION WITHOUT INTERFERENCE.

HAHN LIFT STATION
WETWELL & VALVE VAULT SECTION
SCALE: AS NOTED

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FIGURE 4

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The existing wetwell will be reused as a sewer manhole. The existing lift station dry pit may be converted to a rock well provided that the topography does not drain to another location. This issue will need to be addressed in the final design. The City will address storm drain issues as a part of a separate project. The demolition that will occur as a part of this project is shown on Figure 5.

Hydraulic Analysis

Inlet Gravity Sewer Sizing

The inlet gravity sewer pipe was sized to handle the PWWF of 900 gpm using Manning's Equation. Appendix A includes the hydraulic calculations for sizing the inlet sewer. Table 1 below summarizes the calculation inputs and results.

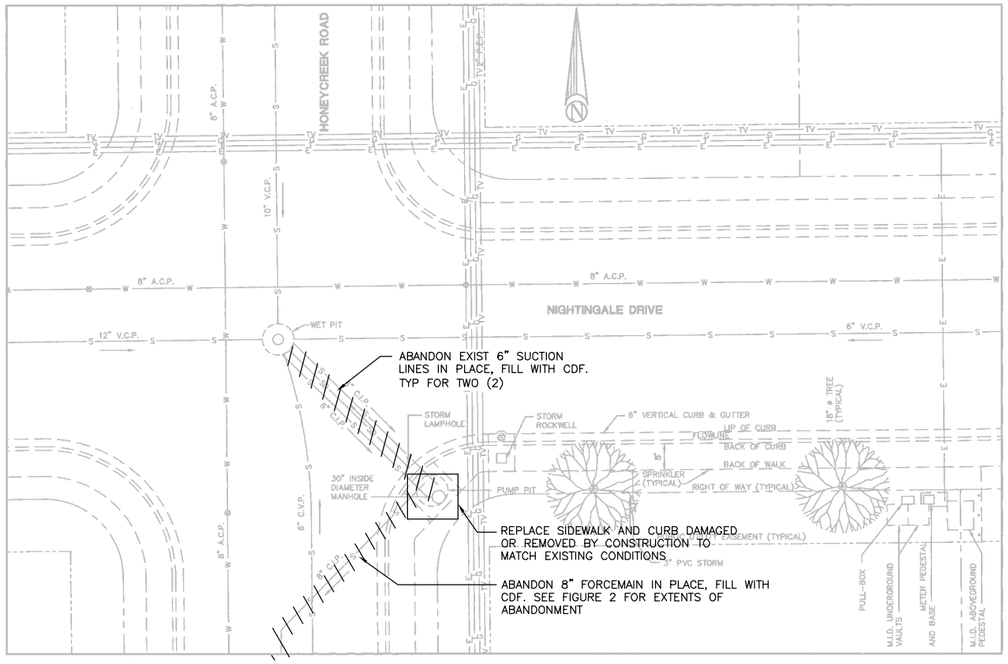
Manning's Equation: $Q = 1.49 / n * A * R^{2/3} * S^{1/2}$

Where:
Q = Flow Rate (in cubic feet per second (cfs))
n = Manning's Roughness Coefficient (unitless)
d = Pipe Diameter
A = Cross-Sectional Area of pipe (in ft^2)
R = Hydraulic Radius (in ft)
S = Slope of pipe (ft/ft)
D= Flow Depth

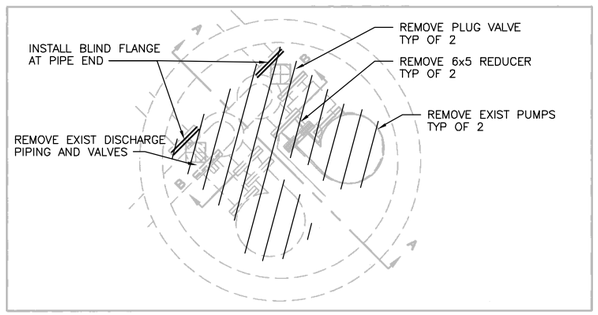
Table 2. Inlet Sewer Sizing Calculation Summary

Inputs	Value	Note
Diameter (D)	12 inches	Inside Pipe Diameter
Manning's Roughness Coefficient (n)	.013	Typical for Ductile Iron Pipe
Slope (S)	0.004 FT/FT	Slope set to obtain capacity for PWWF
Calculated Values	**Value**	**Note**
Cross Sectional Area (A) – flowing full	0.785 FT^2	$A = pi * (D/2)^2$
Hydraulic Radius (R) – flowing full	0.263 FT	R = D/4
Results	**Value**	**Note**
Maximum Flow Rate (Q) per Manning's Equation with the inputs listed above	1,088 gpm	Converted from cfs to gpm

The deepest inlet line delivering flow to the existing sewer manhole in the intersection of Nightingale Drive and Honey Creek Road has an invert of 49.94 feet. The invert of the 12-inch inlet sewer exiting the existing wetwell to the replacement Hahn Lift Station wet well will match this invert of 49.94 feet. Over the approximate 73-foot distance between the existing manhole and wet well the inlet line will drop 0.30 feet and have an invert elevation of 49.64 feet in the new lift station wet well.

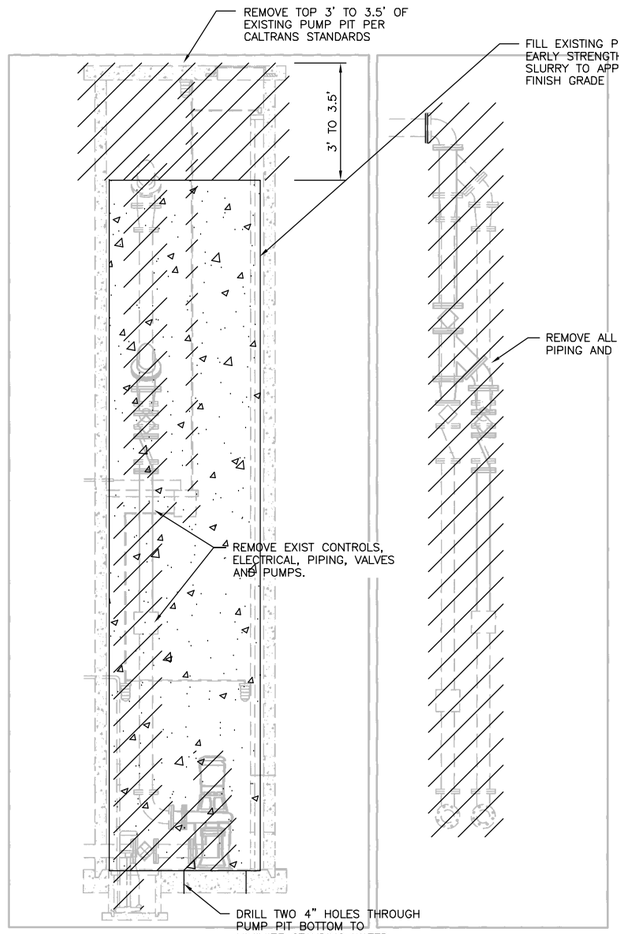


SITE PLAN
SCALE 1"=10'



PUMP PIT
PLAN VIEW
SCALE 3/4"=1'

NOTE:
SEE CONSTRUCTION SEQUENCING FOR ABANDONMENT OF EXIST PUMPING STATION.



PUMP PIT
SECTION A-A
SCALE 1/2"=1'

DISCHARGE PIPE
PARTIAL SECTION B-B
SCALE 1/2"=1'

NOTE:
PROTECT IN PLACE EXISTING STORM LAMPHOLE, STREET LIGHT AND UTILITIES ADJACENT TO PUMP PIT.

HAHN LIFT STATION
DEMOLITION PLANS AND SECTIONS
NTS

HDR

FIGURE 5

Pump Sizing Hydraulics

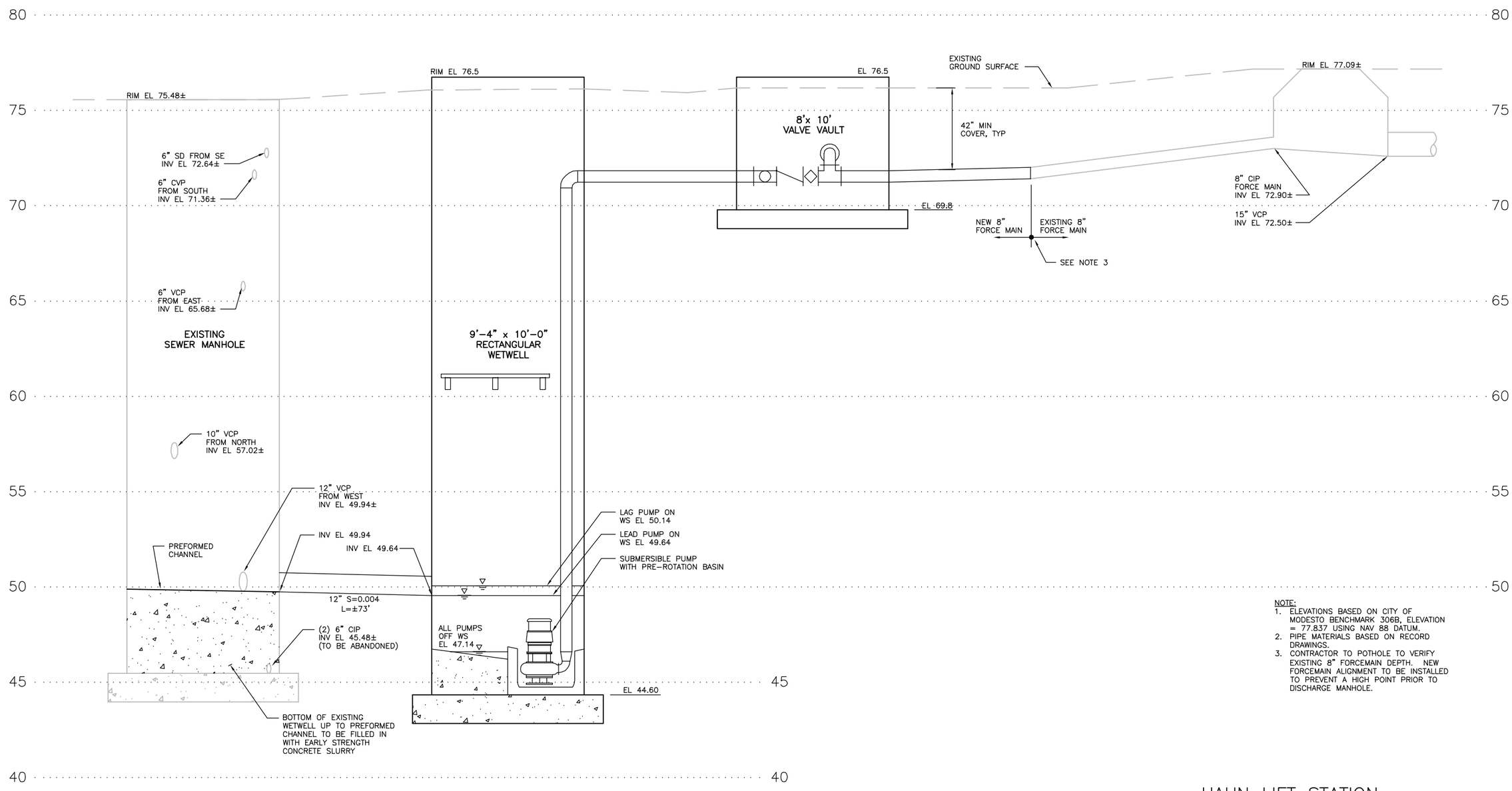
A duty and standby pump each capable of delivering 900 gpm at the lead pump ON minimum and maximum water surface elevations was selected for the Hahn Lift Station.

Figure 6 shows a hydraulic profile schematic of the new Hahn Lift Station and includes pipeline, manhole, and vault invert elevations that were used in hydraulic calculations to size the relocated Hahn Lift Station pumps. The hydraulic calculations that were used to size the Hahn Lift Station pumps are included in Appendix A of this report. Table 3 summarizes the preliminary design pump selection.

Table 3. Preliminary Pump Selection

Criteria	Value
Manufacturer	Wemco
Model	EK5-LS
Firm Capacity	900 gpm
Pump Capacity, each (1 Duty + 1 Standby)	900 gpm at 38.1 feet TDH
Pump Suction Flange	6 in
Pump Discharge Flange	5 in
Motor Size	20 HP (each)
Pump Speed	1800 RPM
Drive Type	Constant Speed
Pump Weight	785 lbs
Unseating Pump Weight	1570 lbs

Figure 7 shows the pump curve of the selected Wemco pump compared to the Hahn Lift Station system curves at the minimum and maximum control point elevations with one pump operating.



NOTE:
1. ELEVATIONS BASED ON CITY OF MODESTO BENCHMARK 306B, ELEVATION = 77.837 USING NAV 88 DATUM.
2. PIPE MATERIALS BASED ON RECORD DRAWINGS.
3. CONTRACTOR TO POTHOLE TO VERIFY EXISTING 8" FORCEMAIN DEPTH. NEW FORCEMAIN ALIGNMENT TO BE INSTALLED TO PREVENT A HIGH POINT PRIOR TO DISCHARGE MANHOLE.

HAHN LIFT STATION
HYDRAULIC PROFILE
SCALE:
VERT: 1"=5' HORIZ: NONE

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FIGURE 6

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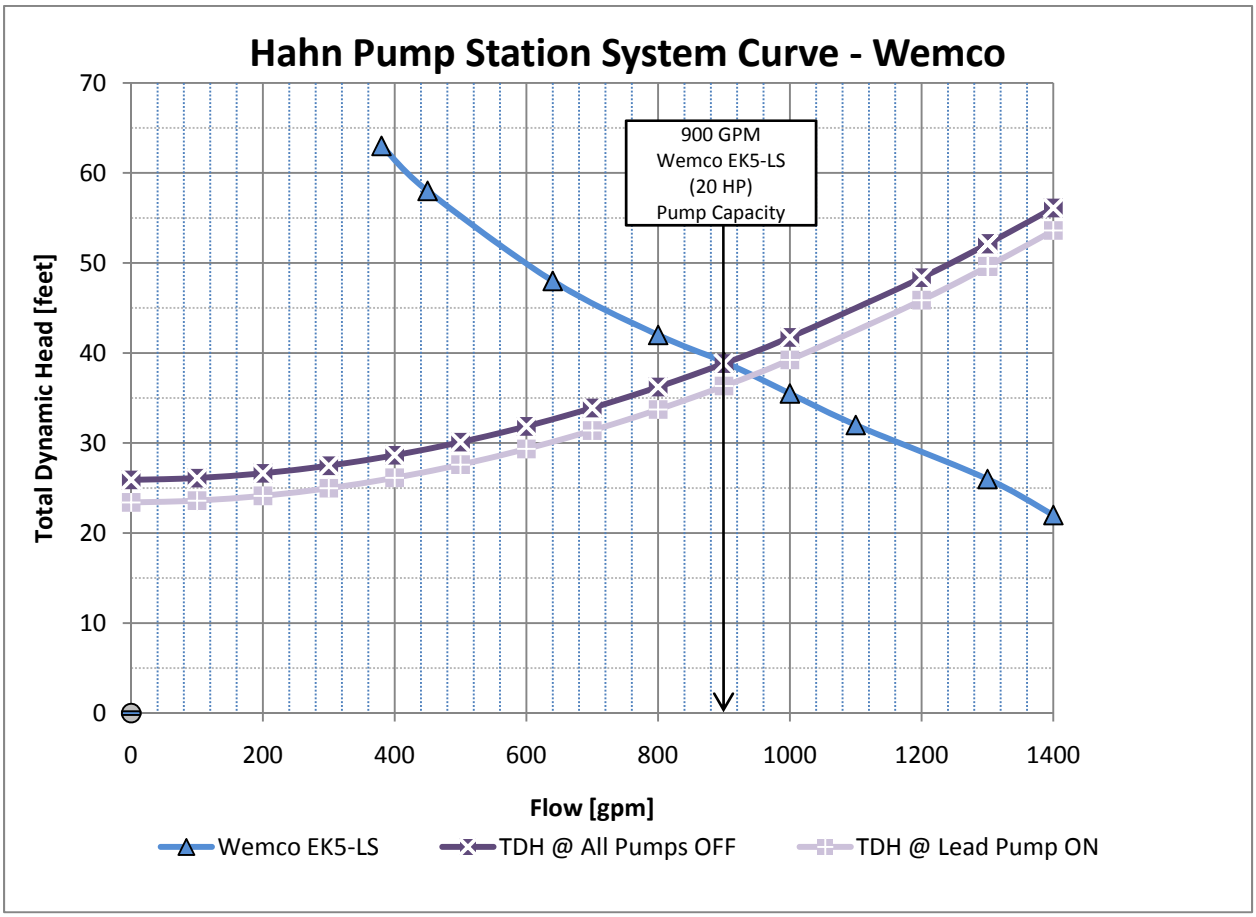
Figure 7. Hahn Lift Station System Curve and Pump Curve Comparison



Control Set Points

As stated in the design criteria, the wet well operating volume was sized for a maximum of 10 starts per hour as recommended by the pump manufacturer. Based on this assumption, the following set points were determined.

Table 4. Pump Control Set Points

Control Operation	Elevation Description	Water Surface Elevation
Lead Pump ON	12-inch Inlet Sewer Invert	49.64'
Lag Pump ON	6-inch above 12-inch Inlet Sewer Invert	50.14'
All Pumps OFF	Top of Pump Volute	47.14'

Electrical Power/Lighting/Emergency Power

The existing utility infrastructure located near the original lift station is to remain. This consists of a high voltage switch and two underground transformers connected to provide a 240- volt, 3-phase open delta electrical service. The existing lift station service will remain energized until the new lift station is fully tested and placed into service.

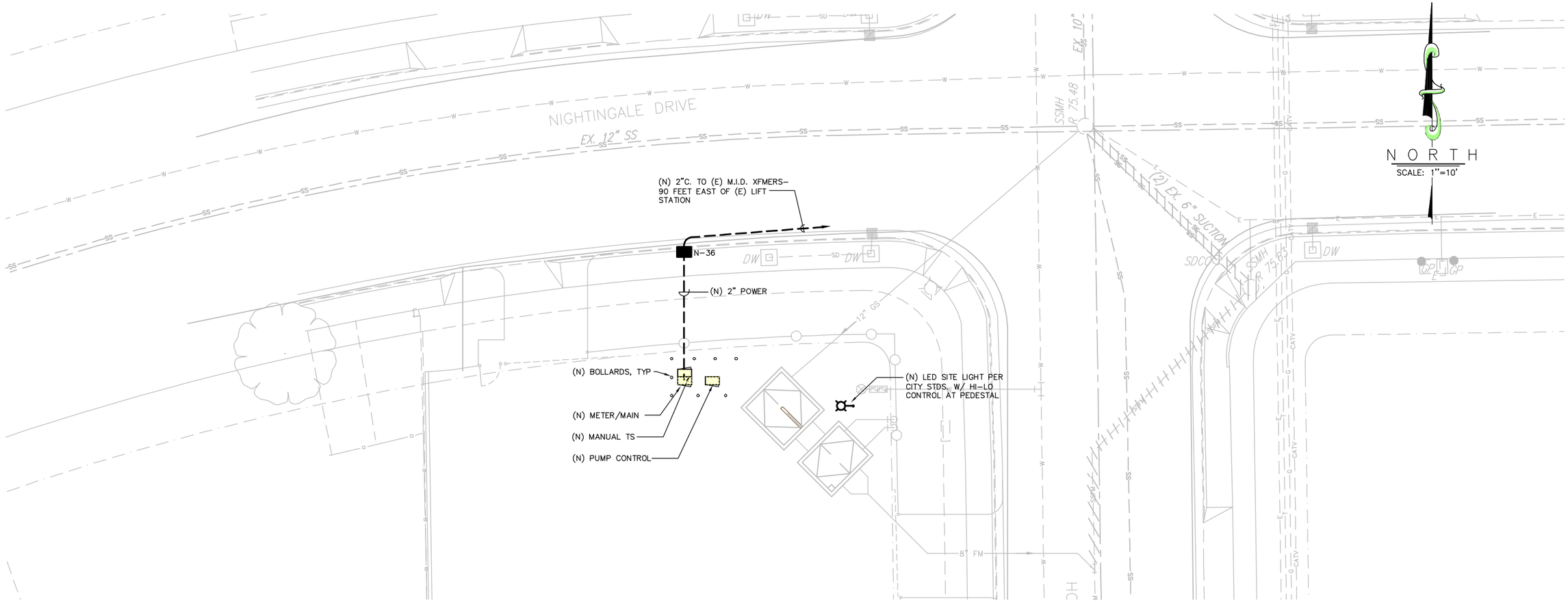
The new lift station will consist of a fenced open utility area in which a new electrical service will be established complete with utility metering distribution, and pump controls. This panel will be manufactured by Tesco which is the City Standard. A new electrical service lateral will be routed east down Nightingale drive, across the Honey Creek Intersection to the existing utility infrastructure. The new service rating will be 200-amp, 3-phase, 4-wire. Figure 8 shows the Hahn Lift Station electrical site plan. Figure 9 shows the Hahn Lift Station electrical details.

Temporary emergency power provisions will be provided to operate the station in the event of a power outage. The City has elected to provide this emergency power via a portable generator which will be connected via a receptacle and switch board enclosed MTS. A 50 KVA portable generator will be required to operation all station loads including the standby pump. General site lighting will be provided to fully illuminate the service yard, which will be manually switched when needed.

Instrumentation and Control

The two new pumps will be operated in a lead-lag duplex fashion as per the City of Modesto Standards. The pumps will be controlled by constant speed drives which will operate in conjunction with the City Standard Siemens HydroRanger with a HSQ SCADA RTU for telemetry. Figure 10 shows the Hahn Lift Station P&ID diagram.

The HydroRanger will provide control input via ultrasonic transducer for a lead lag pump configuration. The HSQ SCADA RTU will only provide monitoring of the entire station, including system operation, water level, and power failure. The new lift station will be functionally tested including all SCADA.



ELECTRICAL SITE PLAN

SCALE: 1"=10'

GENERAL ELECTRICAL LEGEND:

- CONCRETE PULL BOX –SIZE AS NOTED – LIDS AS NOTED 'P' POWER, 'S' SIGNAL, 'F' FIRE ALARM & 'D' DATA; '–T' DENOTES TRAFFIC LID
- CONDUIT –SURFACE MOUNTED OR ABOVE CEILING –EMT WITH COMPRESSION FITTING UNLESS NOTED ON PLANS
- CONDUIT –CONCEALED BELOW FLOOR IN EMT OR UNDERGROUND IN PVC SCH 40 WITH IMC ELBOWS
- HOMERUN TO PERSPECTIVE PANEL OR CABINET –BRANCH CIRCUIT WITH OUT FURTHER DESIGNATION IS A #12 WIRE CIRCUIT
- FLEX (GROUND WIRE SIZE; NEUTRAL; CKT. WIRE)
- TERMINAL CABINET
- PANEL BOARD –SEE SCHEDULE
- MOTOR/EXHAUST FAN –N.I.E.S. –CONNECT AS REQUIRED
- DUPLEX RECEPTACLE +18" A.F.F. U.O.N. – GFCI WHERE NOTED
- QUADPLEX RECEPTACLE +18" A.F.F. U.O.N. – GFCI WHERE NOTED
- FLOOR POWER RECEPTACLE –WALKER OR EQUAL
- 30A. –4 WIRE GROUND RECEPTACLE +18" A.F.F. – HUBBELL, BRYANT, OR EQUAL
- 50A. –4 WIRE GROUND RECEPTACLE +18" A.F.F. – HUBBELL, BRYANT, OR EQUAL
- JUNCTION BOX –4 11/16" x 2 1/8" SQUARE OR SMALL
- JUNCTION BOX –LARGER THAN 4 11/16" x 2 1/8" SQUARE
- FLOOR JUNCTION BOX –WALKER OR EQUAL
- FUSED DISCONNECT SWITCH –SIZE AS NOTED –30A. SHOWN
- FULL VOLTAGE STARTER –SIZE AS NOTED –SIZE 3 SHOWN
- COMBINATION STARTER –SIZE AS NOTED –SIZE 3 SHOWN

N.I.E.S.	ABBREV. FOR NOT IN ELECTRICAL SECTION OF THESE PLANS OR SPEC'S
NL	ABBREV. FOR NIGHT LIGHT
EL	ABBREV. FOR EMERGENCY LIGHT
WP	ABBREV. FORWEATHERPROOF
MT	ABBREV. FOR EMPTY CONDUIT WITH 1 #12 COPPER PULL WIRE
EP	ABBREV. FOR EXPLOSION PROOF
(E)	DENOTES EXISTING
(N)	DENOTES NEW
(P)	DENOTES PROPOSED
(F)	DENOTES FUTURE

NOTE:
VERIFY ALL (N) & (E) EQUIPMENT, UTILITIES AND TOPOGRAPHY IN THIS AREA – THIS PLAN SHOWS APPROXIMATE INFORMATION ONLY– VERIFY IN THE FIELD & WITH CITY OF MODESTO FOR EXACT LAY–OUT OF NEW & FUTURE EQUIPMENT PRIOR TO CONSTRUCTION – TYPICAL

NOTE:

VERIFY EXACT CONNECTION POINTS FOR POWER PRIOR TO CONSTRUCTION. APPROXIMATE ONLY LOCATIONS INDICATED FOR TRANSFORMER LOCATION, ETC. COMPLY WITH ALL UTILITY COMPANY REQUIREMENTS. PROVIDE ALL RELATED CONDUITS, PULL BOXES AND RISERS.

DIGALERT
DIAL TOLL FREE
1–800–227–2600
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF NORTHERN CALIFORNIA

HAHN LIFT STATION
ELECTRICAL SITE PLAN
SCALE: AS NOTED

MILLER, PEZZONI AND ASSOCIATES, INC.
HDR

FIGURE 8

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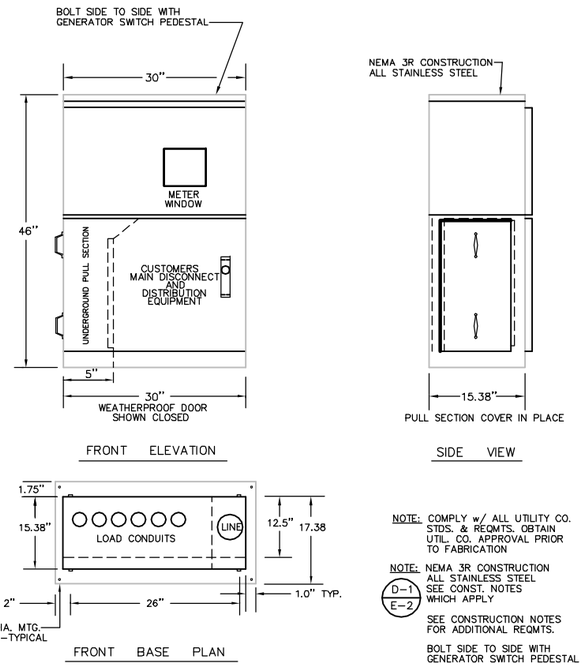
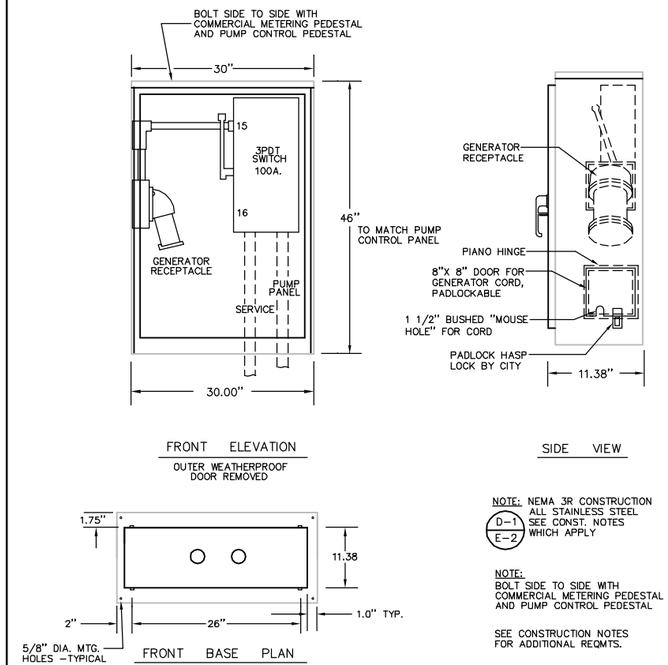


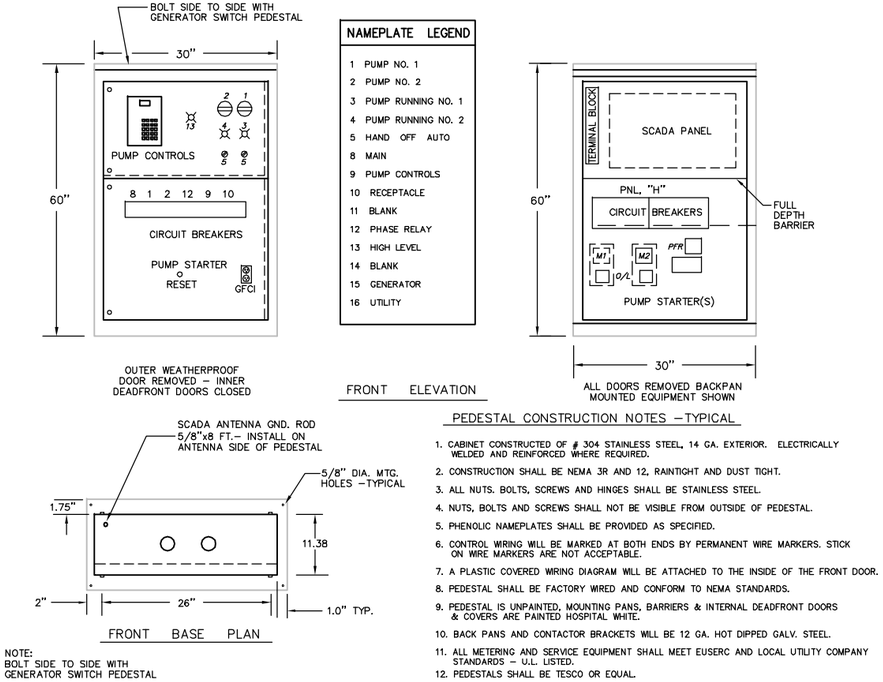
D-3 E-2 COMMERCIAL METERING PEDESTAL

NO SCALE



D-2 E-2 GENERATOR SWITCH PEDESTAL

NO SCALE

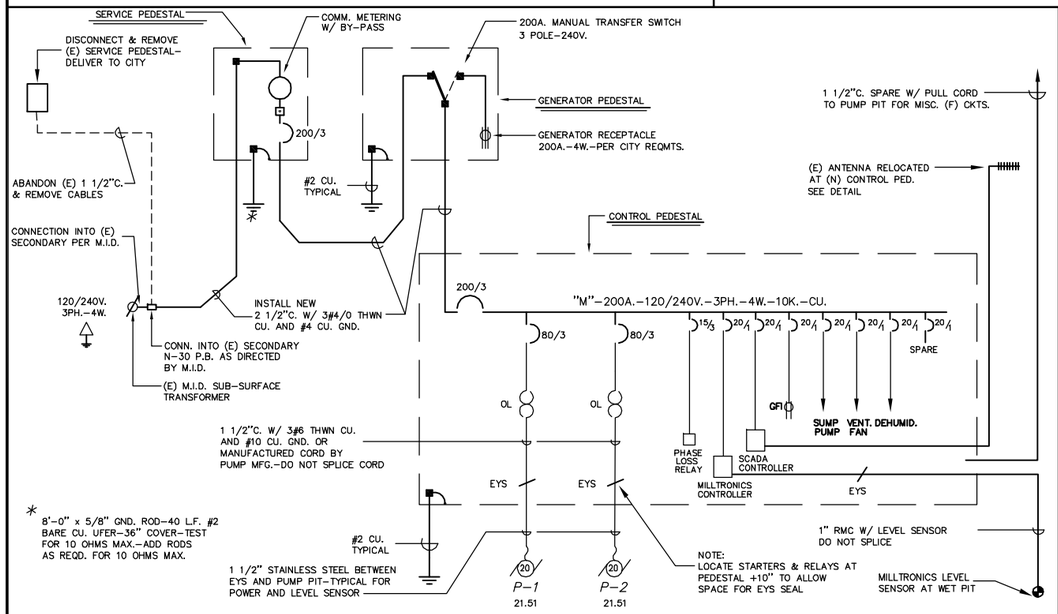


PEDESTAL CONSTRUCTION NOTES -TYPICAL

1. CABINET CONSTRUCTED OF # 304 STAINLESS STEEL, 14 GA. EXTERIOR. ELECTRICALLY WELDED AND REINFORCED WHERE REQUIRED.
2. CONSTRUCTION SHALL BE NEMA 3R AND 12, RAINTIGHT AND DUST TIGHT.
3. ALL NUTS, BOLTS, SCREWS AND HINGES SHALL BE STAINLESS STEEL.
4. NUTS, BOLTS AND SCREWS SHALL NOT BE VISIBLE FROM OUTSIDE OF PEDESTAL.
5. PHENOLIC NAMEPLATES SHALL BE PROVIDED AS SPECIFIED.
6. CONTROL WIRING WILL BE MARKED AT BOTH ENDS BY PERMANENT WIRE MARKERS. STICK ON WIRE MARKERS ARE NOT ACCEPTABLE.
7. A PLASTIC COVERED WIRING DIAGRAM WILL BE ATTACHED TO THE INSIDE OF THE FRONT DOOR.
8. PEDESTAL SHALL BE FACTORY WIRED AND CONFORM TO NEMA STANDARDS.
9. PEDESTAL IS UNPAINTED. MOUNTING PANS, BARRIERS & INTERNAL DEADFRONT DOORS & COVERS ARE PAINTED HOSPITAL WHITE.
10. BACK PANS AND CONTACTOR BRACKETS WILL BE 12 GA. HOT DIPPED GALV. STEEL.
11. ALL METERING AND SERVICE EQUIPMENT SHALL MEET EUSERC AND LOCAL UTILITY COMPANY STANDARDS - U.L. LISTED.
12. PEDESTALS SHALL BE TESCO OR EQUAL.

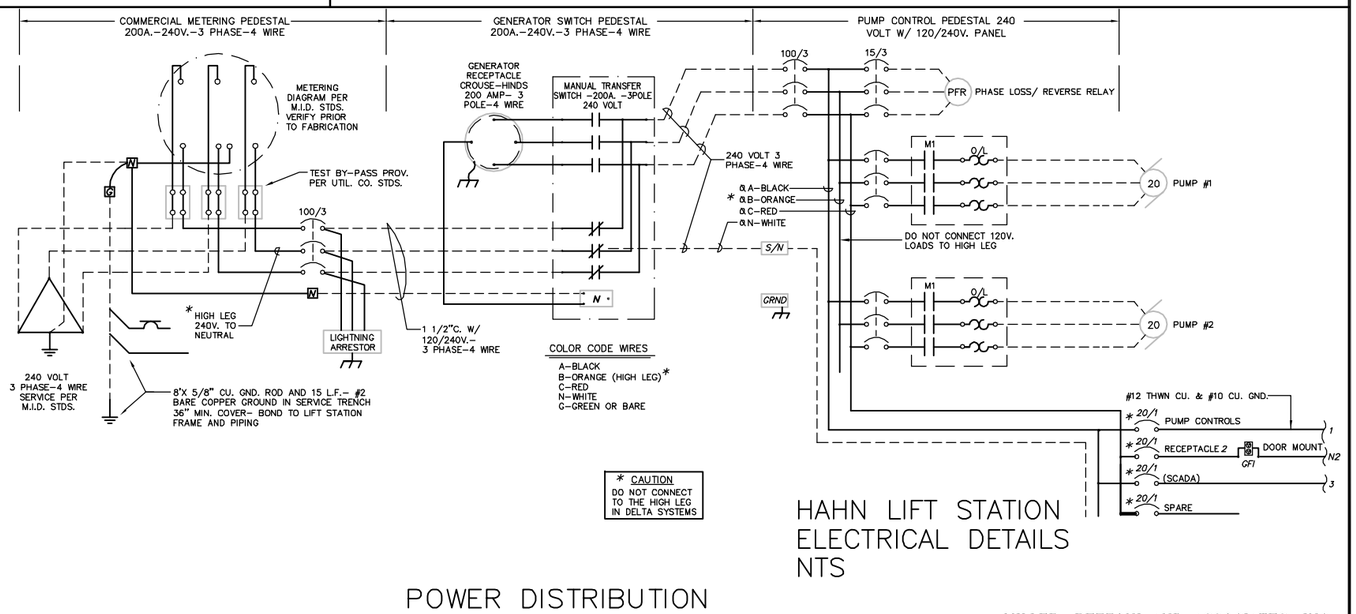
D-1 E-2 PUMP CONTROL PEDESTAL

NO SCALE



D-5 E-2 BLOCK POWER DIAGRAM

NO SCALE



* CAUTION
DO NOT CONNECT TO THE HIGH LEG IN DELTA SYSTEMS

HAHN LIFT STATION
ELECTRICAL DETAILS
NTS

D-4 E-2 POWER DISTRIBUTION SINGLE LINE DIAGRAM

NO SCALE

MILLER, PEZZONI AND ASSOCIATES, INC.

HDR

FIGURE 9

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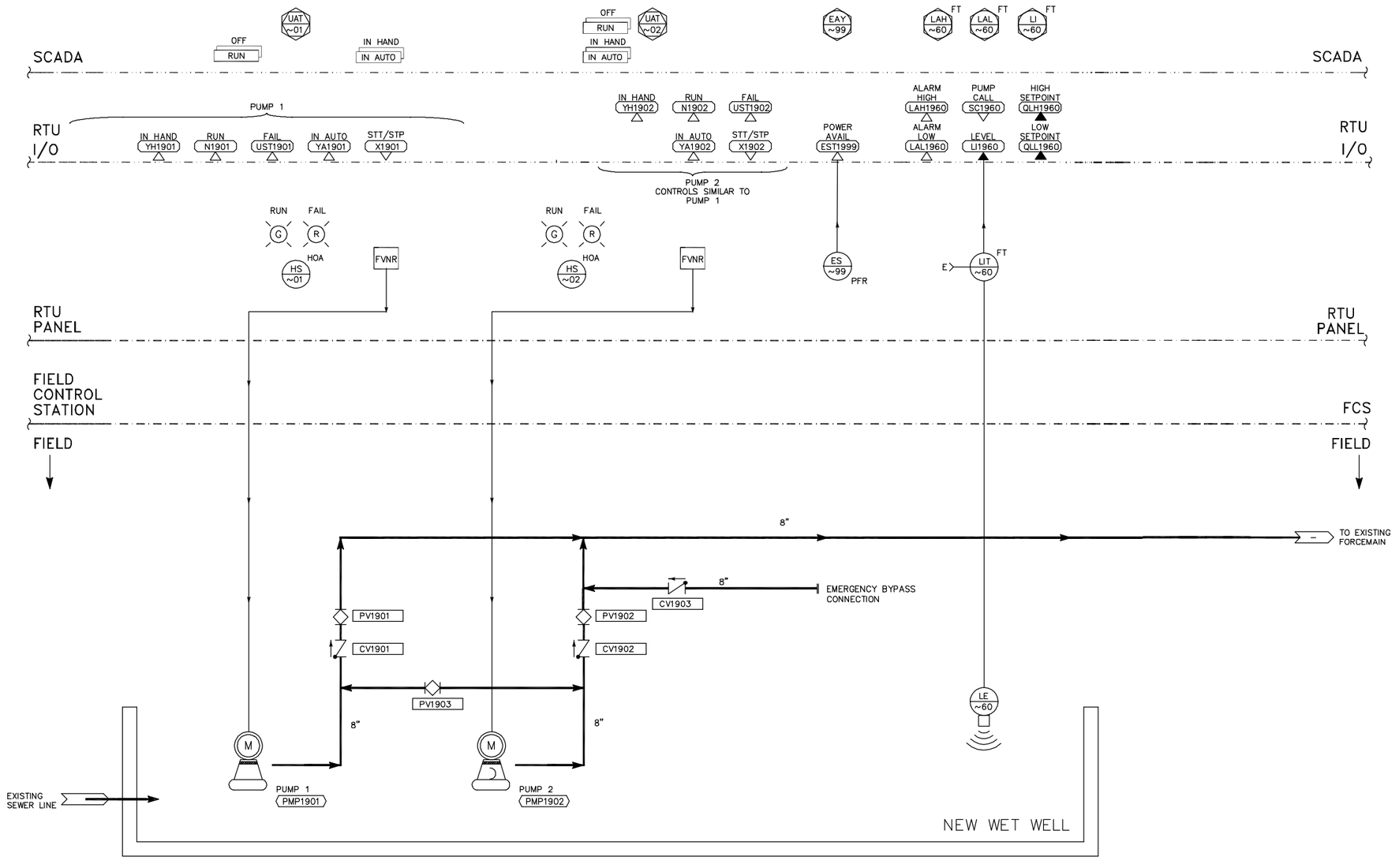

HAHN PUMP STATION DIAGRAM

MODESTO IRRIGATION DISTRICT
P.O. BOX 4060
1231 ELEVENTH STREET
MODESTO , CALIFORNIA 95352
ATTENTION: ELECTRICAL ENGINEERING
PHONE (209) 526-7436 OR 526-7435
FAX (209) 526-7575

DATE: JULY 15, 2011

PROJECT: HAHN SEWER LIFT STATION
LOCATION: (STREET) NIGHTINGALE & HONEYCREEK
OWNER: (NAME) CITY OF MODESTO
(ADDRESS) _____ (TELEPHONE) _____
ENGINEER (NAME) GREGG E. MILLER & ASSOC.
(ADDRESS) 909 15TH ST. SUITE 7, MODESTO, CA. (TELEPHONE) (209) 575-0312
ESTIMATED DATE READY FOR SERVICE: _____ BID DATE: _____

GENERAL INFORMATION

APPROXIMATE SQUARE FOOTAGE N/A
TYPE OF BUSINESS PUMPING LIFT STATION (2 EA.-20 HP PUMP MAX.)

ELECTRIC LOAD INFORMATION (PER UNIT)

LIGHTING	____	KW	KW	RECEPTACLES	0.380	KW	0.380	KW
WATER HEATING	____	KW	KW	DUCT AIR HEATERS	____	KW	____	KW
UNIT AIR HEATERS	____	KW	KW	1 PHASE AIR COND	____	HP/TON	____	HP/TON
COOKING UNITS	____	KW	KW	3 PHASE AIR COND	____	HP/TON	____	HP/TON
X-RAY (input)[1]	____	KW	KW	1 PHASE HEAT PUMPS	____	HP/TON	____	HP/TON
AUX. STRIP HEATERS	____	KW	KW	3 PHASE HEAT PUMPS	____	HP/TON	____	HP/TON
WELDERS (input)[1]	____	KW	KW	1 PHASE MISC. MOTORS.	____	HP	____	HP
3 Ø MOTORS	40	HP	HP	LARGEST 3 Ø MOTOR	20	HP	20	HP

TOTAL CONNECTED ELECTRICAL LOAD _____ KW SIZE MAIN FUSED SWITCH 200A.
TYPE OF SERVICE DESIRED: PHASE: 3 VOLTAGE: 120/240 DELTA WIRES: 4 ESTIMATED DEMAND: 46.02 KVA

OVERHEAD ( ) UNDERGROUND (X)

[1] ADDITIONAL LOAD INFORMATION MAY BE REQUIRED IF VOLTAGE FLICKER PROBLEMS ARE ANTICIPATED.

SITE PLAN ( ) ONE SITE PLAN IN DXF OR AUTOCAD FORMAT ON 3.5" OR 5.25" FLOPPY DISKETTE.
( ) ONE SEPIA OR TWO REPRODUCIBLE HARD COPIES OF THE SITE PLAN; SCALED.

_____
SIGNATURE OF APPLICANT-AGENT

OFFICE ONLY

APPLICATION COMPLETE ☐ YES CHECKED BY: _____ DATE: _____
☐ NO IF NO, EXPLAIN _____

HAHN LIFT STATION
P&ID DIAGRAM
NTS

MILLER, PEZZONI AND ASSOCIATES, INC.
HDR

FIGURE 10

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Chapter 5 - Project Implementation

Construction Sequencing

The replacement Hahn Lift Station can be constructed while the existing lift station remains in service by following the construction sequencing plan below.

- Construct new submersible lift station, 12-inch gravity sewer, and 8-inch forcemain.
- Connect new lift station to existing forcemain (both lift stations to be connected to the forcemain).
- Install preformed liner into existing Hahn wetwell/manhole. Liner to be placed at invert of new 12-inch sewer to the new lift station. Liner to serve as form for bottom of existing wetwell for the conversion of the existing wetwell to a collection system manhole. Preformed liner shall intercept all incoming flows to the manhole but shall allow space for sewage to backup and spill over the liner into the existing wetwell below upon failure of the new station during testing.
- Test new lift station with existing lift station serving as backup.
- Permanently disconnect the existing lift station from the forcemain.
- Permanently modify existing wetwell to new manhole by filling area below preformed liner with controlled density fill and abandon the existing drywell in place removing all equipment.

Project Schedule

The preliminary project schedule for design and construction is shown in the table below. The notice-to-proceed for design, bidding, and construction of the project is unknown at the time of this report and the schedule shown below outlines the anticipated duration.

Table 5. Project Schedule

Milestone	Calendar Days	Working Days
50 Percent Design		
50 Percent Submittal	45	30
50 Percent Submittal City Review	14	10
95 Percent Design		
95 Percent Submittal	60	40
95 Percent Submittal City Review	14	10
Final Design		
Final Design Submittal	14	10
TOTAL DESIGN DURATION	**147**	**100**
Bid Period		
Bid Period	45	30
Bid Review and Award Contract	30	20
Bonds, Insurance, and NTP	30	20
Pre-Construction, Mobilization, and Submittals	45	30
Field Construction[1]	180	120

Milestone	Calendar Days	Working Days
Construction Punchlist Items and Project Closeout	30	20
TOTAL CONSTRUCTION DURATION	**360**	**240**

1. Assumes dry weather construction of the new wetwell and includes excavation. If project NTP places the work in the wet season, then a longer duration will result.

Drawings and Specifications

Table 6. Proposed List of Drawings

No.	Sheet No.	Sheet Title
General		
1	G01	Title Sheet, Location Map, and Sheet Index
2	G02	Vicinity Map and Key Index
3	G03	Abbreviations and Symbols, Pothole Table, Easements
4	G04	Hydraulic Profile
Demolition		
5	D01	Site Demolition
6	D02	Existing Lift Station Demolition Plans
7	D03	Existing Lift Station Demolition Sections and Details
Civil		
8	C01	Site Grading and Paving
9	C02	Site Piping
10	C03	Site Piping Profiles
11	C07	Erosion Control Plan
12	C08	Civil Details 1
13	C09	Civil Details 2
14	C10	City of Modesto Standard Details 1
15	C11	City of Modesto Standard Details 2
Structural		
16	S01	General Structural Notes
17	S02	Structural Details
18	S03	Wetwell and Valve Vault Plan
19	S04	Wetwell and Valve Vault Sections
20	S05	Wetwell and Valve Vault Details
Process		
21	P01	Process Details
22	P02	Lift Station Ground Level Plan
23	P03	Lift Station Lower Plan
24	P04	Lift Station Sections
25	P05	Valve Vault Plan
26	P06	Valve Vault Sections
Electrical		
27	E01	Electrical Symbols and Abbreviations
28	E02	Electrical One-Line Diagram
29	E03	Electrical Site Plan

No.	Sheet No.	Sheet Title
30	E04	Lift Station Electrical Plan
31	E07	Conduit Schedules
32	E08	Electrical Schedules and Panel Elevations
33	E09	Electrical Control Diagrams
34	E10	Electrical Details 1
35	E11	Electrical Details 2
Instrumentation		
36	I01	Instrumentation Symbols
37	I02	SCADA Block Diagram
38	I03	Process and Instrumentation Diagram
39	I04	Instrumentation Details

Table 7. Proposed List of Specifications

Section	Section Title
Division 2 – Site Work	
02072	DEMOLITION, CUTTING AND PATCHING
02110	SITE CLEARING
02200	EARTHWORK
02221	TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES
02227	SHAFT EXCAVATION AND SUPPORT
02260	TOPSOILING AND FINISHED GRADING
02502	CONCRETE PAVEMENT
02515	PRECAST CONCRETE MANHOLE STRUCTURES
02930	SEEDING, SODDING AND LANDSCAPING
Division 3 – Concrete	
03002	CONCRETE
03208	REINFORCEMENT
03348	CONCRETE FINISHING AND REPAIR OF SURFACE DEFECTS
03431	PRECAST AND PRESTRESSED CONCRETE
Division 4 – Concrete Masonry	
04110	CEMENT AND LIME MORTARS
04220	CONCRETE MASONRY
Division 5 - Metals	
05505	METAL FABRICATIONS
Division 6 – Wood and Plastics	
06610	FIBERGLASS REINFORCED PLASTIC FABRICATIONS
Division 7 – Thermal and Moisture Protection	
07101	PVC SHEET LINER
Division 9 – Finishes	
09905	PAINTING AND PROTECTIVE COATINGS
Division 10 - Specialties	
10400	IDENTIFICATION DEVICES
Division 11 - Equipment	

Section	Section Title
11005	EQUIPMENT: BASIC REQUIREMENTS
11060	PUMPING EQUIPMENT: BASIC REQUIREMENTS
11065	PUMPING EQUIPMENT: SUMP
11076	PUMPING EQUIPMENT: SUBMERSIBLE NON-CLOG
Division 13 – Special Construction	
13442	PRIMARY ELEMENTS AND TRANSMITTERS
13448	CONTROL PANELS AND ENCLOSURES
Division 15 - Mechanical	
15060	PIPE AND PIPE FITTINGS: BASIC REQUIREMENTS
15062	PIPE - DUCTILE
15064	PIPE - PLASTIC
15090	PIPE SUPPORT SYSTEMS
15100	VALVES - BASIC REQUIREMENTS
15101	GATE VALVES
15102	PLUG VALVES
15106	CHECK VALVES
15114	MISCELLANEOUS VALVES
15440	PLUMBING FIXTURES
15605	HVAC: EQUIPMENT
Division 16 - Electrical	
16010	ELECTRICAL: BASIC REQUIREMENTS
16060	GROUNDING
16120	WIRE AND CABLE - 600 VOLT AND BELOW
16135	ELECTRICAL - EXTERIOR UNDERGROUND
16220	MOTORS
16460	DRY-TYPE TRANSFORMERS
16500	STREET LIGHTING ELECTRICAL WORK

Construction Cost Estimate

The estimated cost is for the new Hahn lift station is $1,421,000. An itemized breakdown of this cost is presented on the following pages:

Table 8. Preliminary Design Cost Estimate

HAHN PUMPING STATION	QUANTITY	UNITS	UNIT COST	TOTAL COST
Mobilization/Demobilization/Bonds	5%	LS	$40,687	$40,687
Sod/Tree Removal and re-grading	6500	SF	$2	$13,000
Landscaping	1	LS	$10,000	$10,000
Dewatering	1	LS	$25,000	$25,000
Demolition/Abandonment of Existing Facilities	1	LS	$15,000	$15,000
Prefabricated Manhole Channel	1	LS	$10,000	$10,000
Asphalt Pavement Repair	1	LS	$10,000	$10,000
Aggregate Base	90	CY	$40	$3,600

HAHN PUMPING STATION	QUANTITY	UNITS	UNIT COST	TOTAL COST
Concrete Paving and Driveways (6" thick)	90	CY	$700	$63,000
CMU Sound Wall (10' high)	1350	SF	$15	$20,250
Architectural Fence	135	LF	$90	$12,150
16' Wide Motorized Access Gate	2	EA	$5,000	$10,000
Pedestrian Gate	1	EA	$1,000	$1,000
Valve Vault Excavation/Backfill	25	CY	$90	$2,250
Wet Well Excavation/Backfill	350	CY	$90	$31,500
Wet Well Shoring	1300	SF	$50	$65,000
Pipe Trench Excavation/Backfill	650	CY	$80	$52,000
Pipe Trench Shoring	4800	SF	$50	$240,000
Bollards	8	EA	$700	$5,600
Wet Well	1	LS	$30,000	$30,000
Submersible Pumps with Pre-rotation Basins	2	EA	$25,000	$50,000
Wet Well Plastic Liner	900	SF	$5	$4,500
Non-traffic Rated Aluminum Access Hatch (9'-4" by 10')	1	EA	$2,500	$2,500
Non-traffic Rated Aluminum Access Hatch (8' by 10')	1	EA	$2,500	$2,500
Valve Vault	1	LS	$5,000	$5,000
Ladder	1	EA	$500	$500
Forcemain Connection	1	LS	$3,000	$3,000
12" Gravity Sewer	80	LF	$350	$28,000
8" Forcemain	70	LF	$150	$10,500
8" Plug Valve	3	EA	$5,000	$15,000
8" Check Valve	2	EA	$4,500	$9,000
Painting and Protective Coatings	1	LS	$7,500	$7,500
Pipe Supports	1	LS	$3,000	$3,000
Valve Vault Sump Pump	1	EA	$500	$500
Misc. Piping, Valves, Fittings, etc.	1	LS	$15,000	$15,000
SUBTOTAL				$816,537
Electrical	1	LS	$149,000	$149,000
Controls	1	LS	$34,000	$34,000
TOTAL				$999,500
BONDS, INSURANCE, OVERHEAD AND PROFIT			18%	$180,000
CONTINGENCY			25%	$250,000
TOTAL WITH CONTINGENCY				**$1,429,500**

Hahn Pump Station

When the influent flow is 1/2 the capacity of one pump, the pump starts/hr will be greatest.

Pump Cycle Time and Wet Well Volume

Pump Cycle Time	6	min	10 starts per hour
Single Pump	900	gpm	
1/2 of Single Pump	450	gpm	

Pump Flow	900	gpm	
Operational Wet Well Volume	1350	gal	Design Band (HWL Pump On to LWL Pump Off), trial/error to get pump starts per hour in table to goal above.
Pump Run Time with No Inflow	1.5	min	

	Average Inflow (gpm)									
	100	200	300	400	450	500	600	700	800	850
Wet Well Fill Time (min) at Inflow	13.50	6.75	4.50	3.38	3.00	2.70	2.25	1.93	1.69	1.59
Pump Run Time (min) With Inflow	1.7	1.9	2.3	2.7	3.0	3.4	4.5	6.8	13.5	27.0
Pump Starts/hr with Inflow	4.0	6.9	8.9	9.9	10.000	9.9	8.9	6.9	4.0	2.1
Pump Run Time (mins/hr) with Inflow	6.666667	13.33333333	20	26.66666667	30	33.33333	40	46.66667	53.33333	56.66667

Wet Well Length	9.333	ft	49.64	Sewer INV
Wet Well Width	10	ft	47.14	LWL
Operating Level	2.5	ft	<--- Inf. Pipe Inv. Elevation = 49.64' (Max. WSEL). 49.64 - 2.5' = 47.14' (Min. WSEL)	
			**(-2' to bottom of Wet well. For Minimum pump Submergence)	
Operating Volume	233.325	ft3		
Operating Volume	1745.271	gal		
Meets Need	YES			

Time to Fill Operational Volume (between Lead Pump Start and Pumps Off)

Goal is to reduce detention time. Change operating levels above to change volume of operation and optimize storage time.

Volume	233.3	cf
Volume	1745.3	gal
Pump Capacity (1 pump)	900	gpm
Pump Capacity (1 pump)	2.01	cfs

Flow (gpm)	% of Pump	Time to Fill (min)
100	11.1%	9.0
200	22.2%	4.5
300	33.3%	3.0
400	44.4%	2.3
500	55.6%	1.8
600	66.7%	1.5
700	77.8%	1.3
800	88.9%	1.1
900	100.0%	1.0

Job No.		Calc No.	

Computation

Project	City of Modesto - Emerald and Hahn Pumping Station	Computed	RN
System	Hahn Pumping Station	Date	8/25/2011
Component	System Curve	Reviewed	DH
Task	System Curve Calculations	Date	

The purpose of this spreadsheet is to develop the system curve for the Hahn submersible pumping station for the City of Modesto.

Flows

Description	Variable	Value	Notes
Minimum Flow	Q_{min}	100 gpm	
Maximum Flow	Q_{max}	900 gpm	Existing Maximum Flow - Matching Existing Flow Conditions
Design Flow	Q_{des}	900 gpm	Existing Maximum Flow - Matching Existing Flow Conditions
Suction Static Head	$H1$	0.00 ft	Submersible Pumps - No Suction Static Head
Discharge Static Head @ HWL	$H2$	23.40 ft	From Elevation: 49.64, To Elevation: 73.34' (CL of 8" C.I.P. with INV of 73.01')
Discharge Static Head @ LWL	$H2$	25.90 ft	From Elevation: 47.14, To Elevation: 73.34' (CL of 8" C.I.P. with INV of 73.01')

Straight Piping Losses

Code	C	Type of Pipe	Dia., d	Length, L	Flow, Q		Velocity, V	Headloss, H_p
DISCHARGE:								
CID	110	Plain Cast Iron	8.00 in	150.0 ft	900 gpm	1.05738E-05	5.74 ft/sec	3.09 ft
CID	110	Plain Cast Iron	8.00 in	190.0 ft	900 gpm	1.33935E-05	5.74 ft/sec	3.91 ft

Subtotals:

$$\sum \frac{10.44(L)}{C^{1.85} d^{4.8655}} =$$ 2.39673E-05 = K1'

Piping losses (at Qd_{es}): 7.00 ft

Fitting Losses

Code	K	Description	Dia., d	Number	Flow, Q		Velocity, V	Headloss, H_f
DISCHARGE:								
rfn	0.5	90 deg. Elbow - Reg, flg	5.00 in	1	900 gpm	0.41758928	14.71 ft/sec	1.68 ft
d_2	0.2	Increaser	5.00 in	1	900 gpm	0.167035712	14.71 ft/sec	0.67 ft
rfn	0.5	90 deg. Elbow - Reg, flg	8.00 in	1	900 gpm	0.063719067	5.74 ft/sec	0.26 ft
TT	0.2	Tee - Straight Line	8.00 in	2	900 gpm	0.050975254	5.74 ft/sec	0.20 ft
sc	2.5	Swing Check	8.00 in	1	900 gpm	0.318595337	5.74 ft/sec	1.28 ft
pv	1	Plug Valve	8.00 in	1	900 gpm	0.127438135	5.74 ft/sec	0.51 ft
rff	0.2	45 deg. Elbow - Reg, flg	8.00 in	4	900 gpm	0.101950508	5.74 ft/sec	0.41 ft
wbl	0.75	Wye -Branch to Line	8.00 in	1	900 gpm	0.095578601	5.74 ft/sec	0.38 ft
e	1	Exits	8.00 in	1	900 gpm	0.127438135	5.74 ft/sec	0.51 ft

Subtotals:

$$\sum \frac{K}{2g * (A)^2} =$$ 1.470320028 = K2'

Piping Losses (at Qmax)	7.00 ft
Fitting losses (at Q_{max}):	5.91 ft
TOTAL DYNAMIC LOSS	12.91 ft
TOTAL HEADLOSS	**38.81 ft**

Equations

Description	Variable	Comment
Total Dynamic Head	TDH	The TDH is calcuated at different flow rates between the minimum and maximum flows input .These values can then be plotted to develop the system curve.

Equations

Velocity: $$V = \frac{Q[gpm]}{448.8 x \pi x D[ft]^2 / 4}$$

$$H_p = (10.44)(L[ft]) \frac{Q[gpm]^{1.85}}{(C)^{1.85} (d[inches])^{4.8655}}$$

$$H_p = K1'(Q)^{1.85}$$

Piping Losses (Hazen Williams Formula):

Fitting Losses (Darcy Weisbach Equation): $$H_f = \frac{KV^2}{2g} = K2'(Q)^2$$

Total Dynamic Head (TDH): $$TDH = StaticHead[H_S] + H_P + H_F$$

Calculations and Results

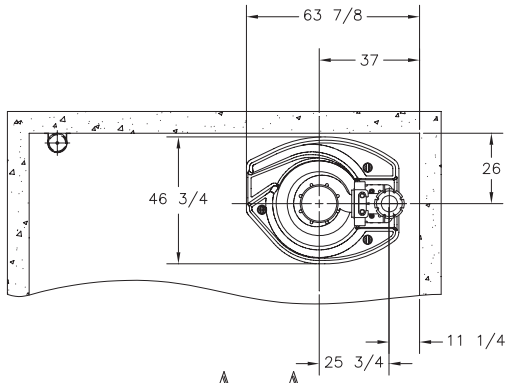
Q, gpm	Q, mgd	Pipe Losses, H_p	Fitting Losses	Static Losses	TDH @ All Pumps OFF	TDH @ Lead Pump ON
0	0.00	0.00 ft	0.00 ft	27.00 ft	25.90 ft	23.40 ft
100	0.14	0.12 ft	0.07 ft	27.00 ft	26.09 ft	23.59 ft
200	0.29	0.43 ft	0.29 ft	27.00 ft	26.63 ft	24.13 ft
300	0.43	0.92 ft	0.66 ft	27.00 ft	27.48 ft	24.98 ft
400	0.58	1.56 ft	1.17 ft	27.00 ft	28.63 ft	26.13 ft
500	0.72	2.36 ft	1.83 ft	27.00 ft	30.09 ft	27.59 ft
600	**0.86**	**3.31 ft**	**2.64 ft**	**27.00 ft**	31.84 ft	29.34 ft
700	1.01	4.40 ft	3.59 ft	27.00 ft	33.89 ft	31.39 ft
800	1.15	5.63 ft	4.69 ft	27.00 ft	36.22 ft	33.72 ft
900	1.30	7.00 ft	5.93 ft	27.00 ft	38.83 ft	36.33 ft
1,000	1.44	8.50 ft	7.33 ft	27.00 ft	41.73 ft	39.23 ft
1,200	**1.73**	**11.92 ft**	**10.55 ft**	**27.00 ft**	48.36 ft	45.86 ft
1,300	1.87	13.82 ft	12.38 ft	27.00 ft	52.10 ft	49.60 ft
1,301	1.87	13.84 ft	12.40 ft	27.00 ft	52.14 ft	49.64 ft
1,400	2.02	15.85 ft	14.36 ft	27.00 ft	56.11 ft	53.61 ft
1,450	2.09	16.91 ft	15.40 ft	27.00 ft	58.21 ft	55.71 ft
1,800	**2.59**	**25.23 ft**	**23.74 ft**	**27.00 ft**	74.86 ft	72.36 ft
2,000	2.88	30.66 ft	29.30 ft	27.00 ft	85.86 ft	83.36 ft
2,250	3.24	38.12 ft	37.09 ft	27.00 ft	101.11 ft	98.61 ft
2,300	3.31	39.70 ft	38.75 ft	27.00 ft	104.36 ft	101.86 ft
2,400	**3.46**	**42.95 ft**	**42.20 ft**	**27.00 ft**	111.05 ft	108.55 ft
2,550	3.67	48.05 ft	47.64 ft	27.00 ft	121.59 ft	119.09 ft
2,800	4.03	57.13 ft	57.43 ft	27.00 ft	140.46 ft	137.96 ft
3,050	4.39	66.92 ft	68.15 ft	27.00 ft	160.97 ft	158.47 ft
3,300	4.76	77.42 ft	79.78 ft	27.00 ft	183.10 ft	180.60 ft
3,550	5.12	88.62 ft	92.32 ft	27.00 ft	206.85 ft	204.35 ft
3,582	**5.16**	**90.11 ft**	**94.00 ft**	**27.00 ft**	210.00 ft	207.50 ft
4,000	5.76	110.52 ft	117.21 ft	27.00 ft	253.63 ft	251.13 ft
4,200	6.05	120.96 ft	129.23 ft	27.00 ft	276.08 ft	273.58 ft

Pipe Diameter	12.00 inch		Design Flow	2.01	cfs	900 gpm
Manning Coefficient	0.013 (ductile iron)			1.30	mgd	
slope	0.004		flow at 100% full	1.46	mgd	

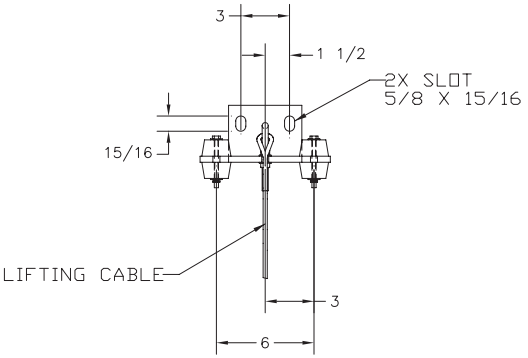
percent full	Flow Depth (in)	center angle (rad)	center angle (°)	wet area (in^2)	hydraulic radius (ft)	flow velocity (ft/s)	flow (ft^3/s)	flow (mgd)	flow (gpm)
0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1%	0.12	0.40	22.96	0.19	0.01	0.26	0.00	0.00	0.15
2%	0.24	0.57	32.52	0.54	0.01	0.40	0.00	0.00	0.68
3%	0.36	0.70	39.90	0.99	0.02	0.53	0.00	0.00	1.63
4%	0.48	0.81	46.15	1.52	0.03	0.64	0.01	0.00	3.01
5%	0.60	0.90	51.68	2.11	0.03	0.74	0.01	0.01	4.86
6%	0.72	0.99	56.72	2.77	0.04	0.83	0.02	0.01	7.16
7%	0.84	1.07	61.37	3.48	0.05	0.92	0.02	0.01	9.94
8%	0.96	1.15	65.72	4.24	0.05	1.00	0.03	0.02	13.19
9%	1.08	1.22	69.83	5.04	0.06	1.08	0.04	0.02	16.91
10%	1.20	1.29	73.74	5.89	0.06	1.15	0.05	0.03	21.11
11%	1.32	1.35	77.48	6.77	0.07	1.22	0.06	0.04	25.79
12%	1.44	1.41	81.07	7.69	0.08	1.29	0.07	0.04	30.93
13%	1.56	1.48	84.54	8.64	0.08	1.36	0.08	0.05	36.54
14%	1.68	1.53	87.89	9.62	0.09	1.42	0.09	0.06	42.62
15%	1.80	1.59	91.15	10.64	0.09	1.48	0.11	0.07	49.16
16%	1.92	1.65	94.31	11.68	0.10	1.54	0.13	0.08	56.15
17%	2.04	1.70	97.40	12.75	0.10	1.60	0.14	0.09	63.59
18%	2.16	1.75	100.42	13.84	0.11	1.66	0.16	0.10	71.48
19%	2.28	1.80	103.37	14.96	0.12	1.71	0.18	0.11	79.81
20%	2.40	1.85	106.26	16.10	0.12	1.76	0.20	0.13	88.56
21%	2.52	1.90	109.10	17.27	0.13	1.82	0.22	0.14	97.74
22%	2.64	1.95	111.89	18.45	0.13	1.87	0.24	0.15	107.33
23%	2.76	2.00	114.63	19.65	0.14	1.92	0.26	0.17	117.34
24%	2.88	2.05	117.34	20.87	0.14	1.96	0.28	0.18	127.74
25%	3.00	2.09	120.00	22.11	0.15	2.01	0.31	0.20	138.53
26%	3.12	2.14	122.63	23.37	0.15	2.06	0.33	0.22	149.70
27%	3.24	2.19	125.23	24.64	0.16	2.10	0.36	0.23	161.25
28%	3.36	2.23	127.79	25.92	0.16	2.14	0.39	0.25	173.17
29%	3.48	2.27	130.33	27.22	0.17	2.19	0.41	0.27	185.43
30%	3.60	2.32	132.84	28.54	0.17	2.23	0.44	0.29	198.04
31%	3.72	2.36	135.33	29.86	0.18	2.27	0.47	0.30	210.99
32%	3.84	2.41	137.80	31.20	0.18	2.31	0.50	0.32	224.26
33%	3.96	2.45	140.25	32.55	0.18	2.34	0.53	0.34	237.84
34%	4.08	2.49	142.67	33.91	0.19	2.38	0.56	0.36	251.73
35%	4.20	2.53	145.08	35.28	0.19	2.42	0.59	0.38	265.91
36%	4.32	2.57	147.48	36.66	0.20	2.45	0.62	0.40	280.37
37%	4.44	2.62	149.86	38.04	0.20	2.49	0.66	0.42	295.10
38%	4.56	2.66	152.23	39.44	0.21	2.52	0.69	0.45	310.09
39%	4.68	2.70	154.58	40.84	0.21	2.56	0.72	0.47	325.33
40%	4.80	2.74	156.93	42.25	0.21	2.59	0.76	0.49	340.80
41%	4.92	2.78	159.26	43.66	0.22	2.62	0.79	0.51	356.49
42%	5.04	2.82	161.59	45.08	0.22	2.65	0.83	0.54	372.39
43%	5.16	2.86	163.90	46.50	0.23	2.68	0.87	0.56	388.49
44%	5.28	2.90	166.22	47.93	0.23	2.71	0.90	0.58	404.78
45%	5.40	2.94	168.52	49.36	0.23	2.74	0.94	0.61	421.24
46%	5.52	2.98	170.82	50.79	0.24	2.77	0.98	0.63	437.85
47%	5.64	3.02	173.12	52.23	0.24	2.79	1.01	0.65	454.62
48%	5.76	3.06	175.42	53.67	0.24	2.82	1.05	0.68	471.51
49%	5.88	3.10	177.71	55.11	0.25	2.84	1.09	0.70	488.53
50%	6.00	3.14	180.00	56.55	0.25	2.87	1.13	0.73	505.65
51%	6.12	3.18	182.29	57.99	0.25	2.89	1.17	0.75	522.86
52%	6.24	3.22	184.58	59.43	0.26	2.92	1.20	0.78	540.15
53%	6.36	3.26	186.88	60.87	0.26	2.94	1.24	0.80	557.50
54%	6.48	3.30	189.18	62.30	0.26	2.96	1.28	0.83	574.90
55%	6.60	3.34	191.48	63.74	0.26	2.98	1.32	0.85	592.33
56%	6.72	3.38	193.78	65.17	0.27	3.00	1.36	0.88	609.78
57%	6.84	3.42	196.10	66.60	0.27	3.02	1.40	0.90	627.23
58%	6.96	3.46	198.41	68.02	0.27	3.04	1.44	0.93	644.66

percent full	Flow Depth (in)	center angle (rad)	center angle (°)	wet area (in^2)	hydraulic radius (ft)	flow velocity (ft/s)	flow (ft^3/s)	flow (mgd)	flow (gpm)
59%	7.08	3.50	200.74	69.44	0.28	3.06	1.48	0.95	662.07
60%	7.20	3.54	203.07	70.85	0.28	3.08	1.51	0.98	679.43
61%	7.32	3.59	205.42	72.26	0.28	3.09	1.55	1.00	696.73
62%	7.44	3.63	207.77	73.66	0.28	3.11	1.59	1.03	713.95
63%	7.56	3.67	210.14	75.06	0.28	3.13	1.63	1.05	731.07
64%	7.68	3.71	212.52	76.44	0.29	3.14	1.67	1.08	748.08
65%	7.80	3.75	214.92	77.82	0.29	3.15	1.70	1.10	764.95
66%	7.92	3.79	217.33	79.19	0.29	3.17	1.74	1.13	781.68
67%	8.04	3.84	219.75	80.55	0.29	3.18	1.78	1.15	798.24
68%	8.16	3.88	222.20	81.90	0.29	3.19	1.82	1.17	814.61
69%	8.28	3.92	224.67	83.24	0.29	3.20	1.85	1.20	830.77
70%	8.40	3.96	227.16	84.56	0.30	3.21	1.89	1.22	846.70
71%	8.52	4.01	229.67	85.87	0.30	3.22	1.92	1.24	862.38
72%	8.64	4.05	232.21	87.17	0.30	3.23	1.96	1.26	877.79
73%	8.76	4.10	234.77	88.46	0.30	3.24	1.99	1.29	892.91
74%	8.88	4.14	237.37	89.73	0.30	3.25	2.02	1.31	907.72
75%	9.00	4.19	240.00	90.99	0.30	3.25	2.05	1.33	922.18
76%	9.12	4.24	242.66	92.23	0.30	3.26	2.09	1.35	936.28
77%	9.24	4.28	245.37	93.45	0.30	3.26	2.12	1.37	949.99
78%	9.36	4.33	248.11	94.65	0.30	3.27	2.15	1.39	963.29
79%	9.48	4.38	250.90	95.83	0.30	3.27	2.17	1.41	976.14
80%	9.60	4.43	253.74	96.99	0.30	3.27	2.20	1.42	988.51
81%	9.72	4.48	256.63	98.14	0.30	3.27	2.23	1.44	1000.38
82%	9.84	4.53	259.58	99.25	0.30	3.27	2.25	1.46	1011.71
83%	9.96	4.58	262.60	100.35	0.30	3.27	2.28	1.47	1022.46
84%	10.08	4.64	265.69	101.42	0.30	3.27	2.30	1.49	1032.60
85%	10.20	4.69	268.85	102.46	0.30	3.26	2.32	1.50	1042.08
86%	10.32	4.75	272.11	103.47	0.30	3.26	2.34	1.51	1050.86
87%	10.44	4.81	275.46	104.46	0.30	3.25	2.36	1.52	1058.89
88%	10.56	4.87	278.93	105.41	0.30	3.25	2.38	1.54	1066.11
89%	10.68	4.93	282.52	106.33	0.30	3.24	2.39	1.54	1072.45
90%	10.80	5.00	286.26	107.21	0.30	3.23	2.40	1.55	1077.84
91%	10.92	5.06	290.17	108.06	0.30	3.21	2.41	1.56	1082.19
92%	11.04	5.14	294.28	108.86	0.29	3.20	2.42	1.56	1085.40
93%	11.16	5.21	298.63	109.62	0.29	3.18	2.42	1.57	1087.34
94%	11.28	5.29	303.28	110.33	0.29	3.16	2.42	1.57	1087.83
95%	11.40	5.38	308.32	110.98	0.29	3.14	2.42	1.56	1086.65
96%	11.52	5.48	313.85	111.58	0.28	3.12	2.41	1.56	1083.48
97%	11.64	5.59	320.10	112.11	0.28	3.08	2.40	1.55	1077.79
98%	11.76	5.72	327.48	112.56	0.27	3.05	2.38	1.54	1068.63
99%	11.88	5.88	337.04	112.91	0.27	2.99	2.35	1.52	1053.73
100%	12.00	6.28	360.00	113.10	0.25	2.87	2.25	1.46	1011.30

THIS DRAWING HAS A CORRESPONDING .pdf FILE. UPDATE .pdf WHEN REVISING THIS DRAWING.

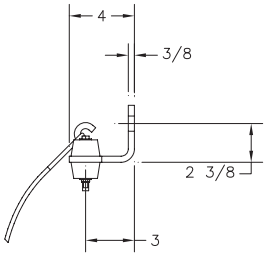


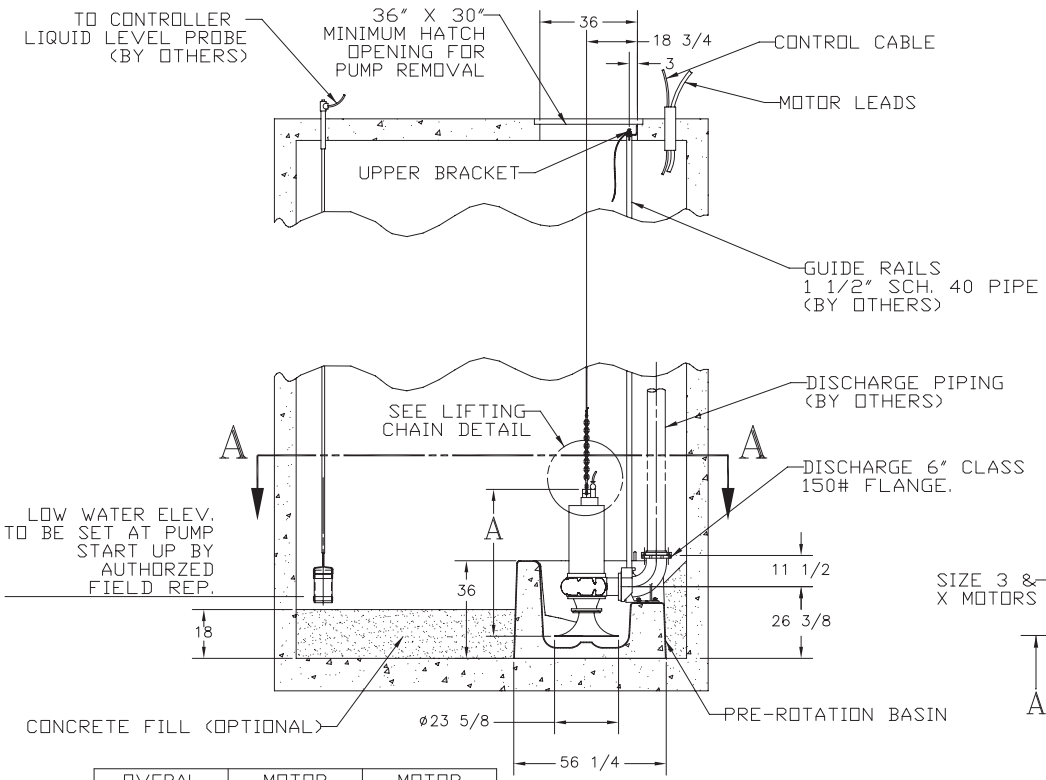
SECTION A–A



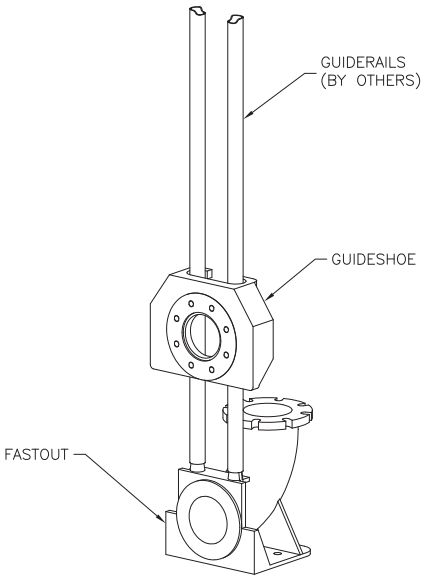
UPPER BRACKET DETAIL

(2) 1/2" ANCHORS BY OTHERS

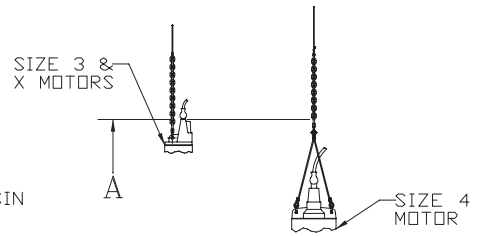




WEIGHTS	
E5K W/ SIZE 3 & X	705
E5K W/ SIZE 4	980
BASIN ASSEMBLY	408
BASIN W/ CONC FILL	3900
TOTAL	



FAST-OUT/GUIDE-SHOE ARRANGEMENT



LIFTING CHAIN DETAIL

OVERAL LENGTH	MOTOR SIZE 3 & X	MOTOR SIZE 4
A	54	88 3/4

REVISIONS

NO.	BY	DATE	CHK'D	LCL ECN	INT'L ECN	DESCRIPTION

CERTIFIED FOR CONSTRUCTION

DATE

BY

REFERENCE

DWG. NO.	DESCRIPTION
CHG 990510.1333	2.05

CUSTOMER

USER

SERIAL NO.

CUSTOMER ORDER NUMBER | EPS SALES SHEET NO.

DRAWN BY JCH DATE 1/7/99

CHECKED BRD DATE 1/22/99

APPROVED DATE

EnviroTech PUMPSYSTEMS A Weir Group company

WEMCO PUMP

GENERAL ARRANGEMENT
PRECAST PREROTATION BASIN
800 E5K IMMERSIBLE PUMP
WEMCO–HIDROSTAL PUMPS

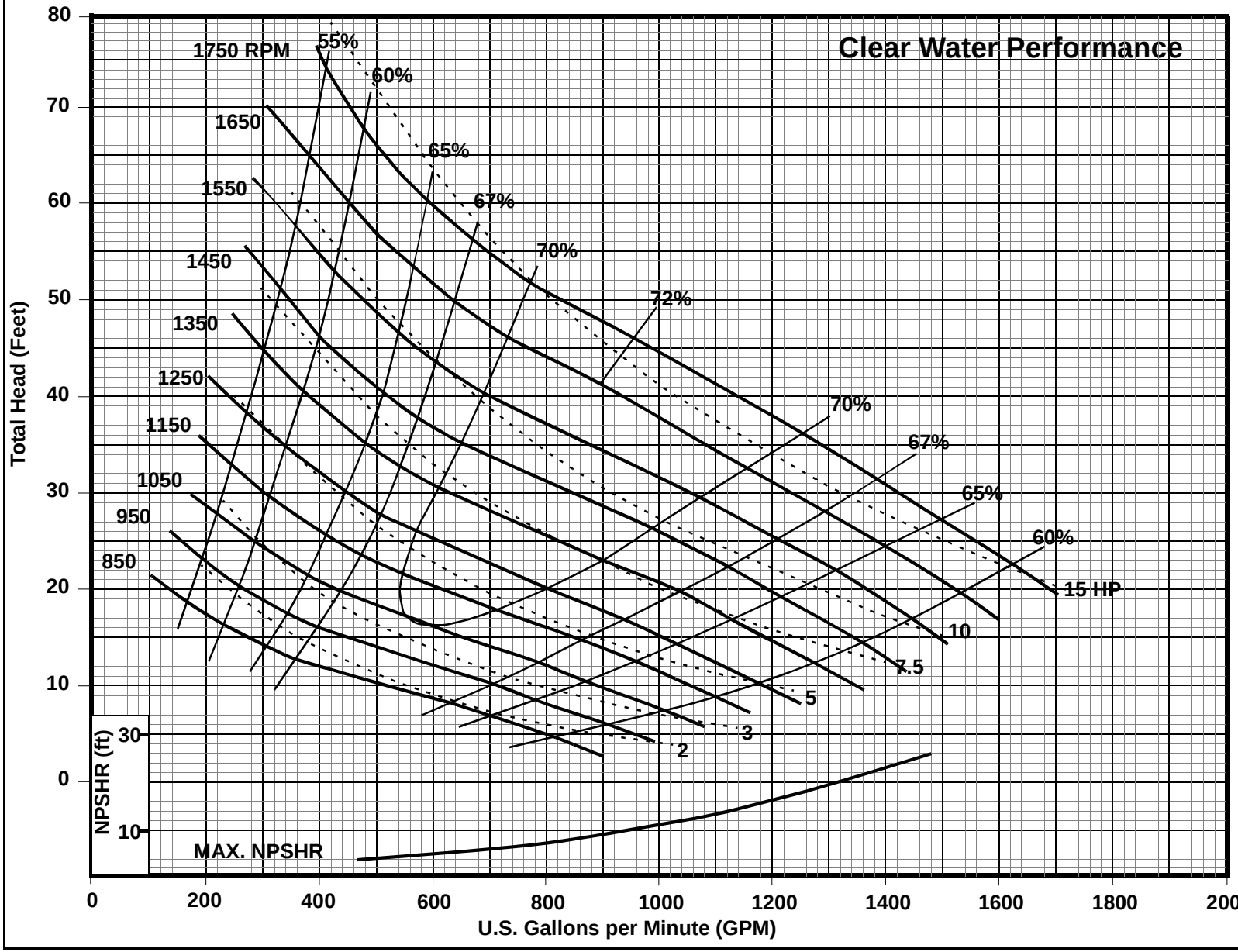
CAD NO. 79651-1 | SHEET 1 OF 1 | CODE NO. 69 /AER 500

SCALE 1:24 | SIZE D | DWG NO. 79651 | REVISION

DRAWING NO. 79651

WEMCO PUMP HIDROSTAL MODEL E5K-LS

WEIR SPECIALTY PUMPS
440 W. 800 S. Salt Lake City, Utah 84110
Phone: (801) 359-8731 Fax: (801) 355-9303



6.0” Suction
5.0” Discharge

10.00” Impeller Diameter

4.00” Max Sphere Size

$$BHP = \frac{GPM \times FT \times SG}{3960 \times Efficiency}$$

WEIR SPECIALTY PUMPS

The brake horsepower and efficiency shown is for pumps with properly installed and lubricated packing. Pumps with mechanical seals will require additional horsepower and the factory may be contacted for these values. Certified tests are performed using Hydraulic Institute acceptance level A.

Rev. 02
September 2005

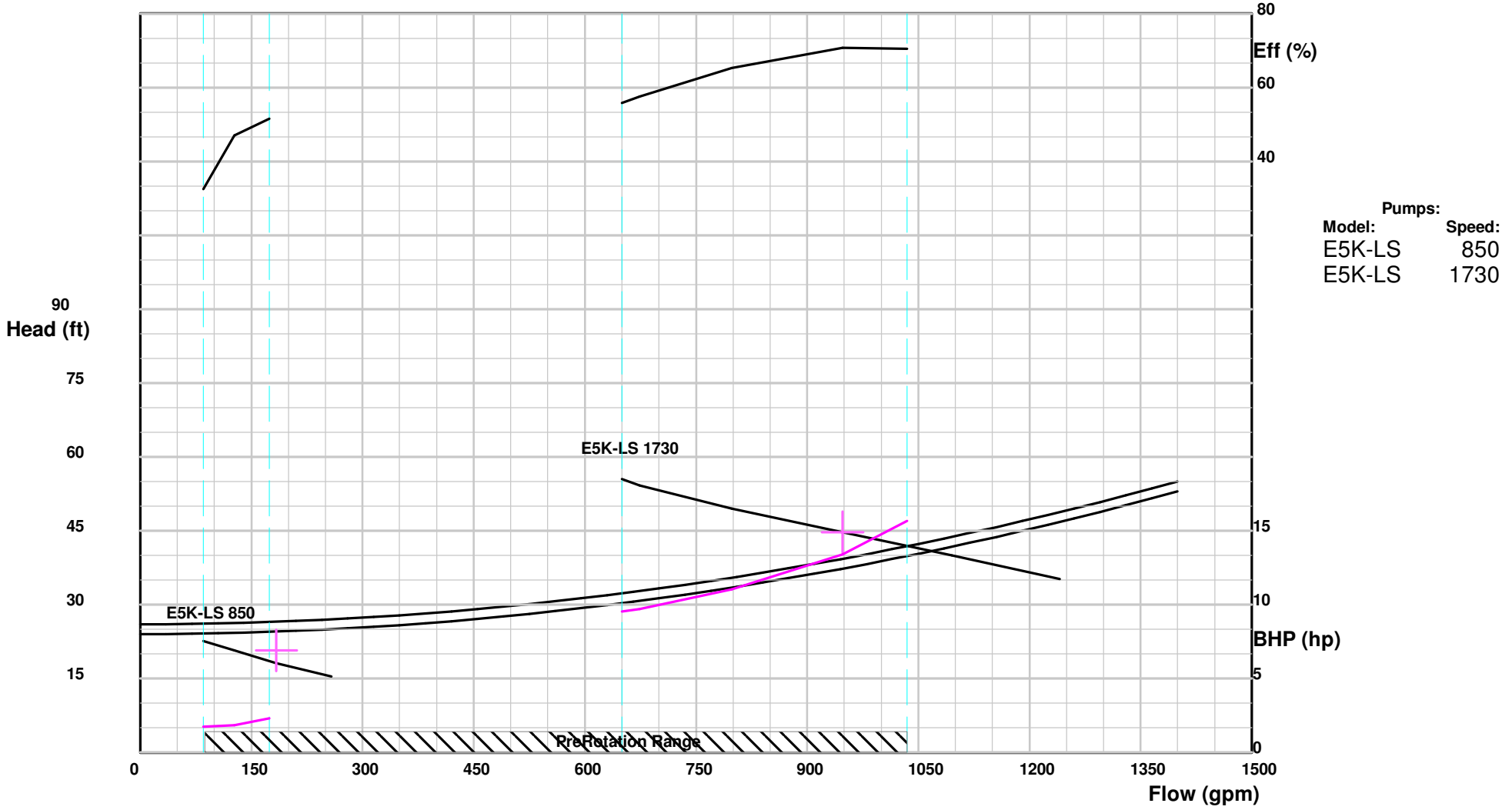
P25-D101

E5K-LS

WEMCO PUMP

HIDROSTAL PRE-ROTATION PERFORMANCE

WEIR SPECIALTY PUMPS
P. O. Box 209
440 West 800 South
Salt Lake City
Utah 84110
(801) 359-8731
FAX: (801) 530-7531
www.wemcopump.com



Pumps:

Model:	Speed:
E5K-LS	850
E5K-LS	1730

Customer Name: Modesto Hahn Lift Station
Pump ID: E5K-LS
Quote No:

Date: 08-26-2011
By: Frank Zgoda

Curve No.:

WEMCO-HIDROSTAL PUMPS
IMMERSIBLE SINGLE SPEED MOTOR DATA FOR TYPE E PUMPS

Synchronous Speed		1800					1200				900		
Motor Model 230 V		EEXK4	EEXP4	EEXW4	EE4B4	EE4S4	EKXA6	EEYY6	EEXK6	EEXO6	EEYY8	EKXR8	EEXR8
Motor Model 460 V		EEXK4	EEXP4	EEXW4	EE4B4	EE4S4	EKXA6	EEYY6	EEXK6	EEXO6	EEYY8	EKXR8	EEXR8
FULL LOAD PERF DATA	HP	15.0	20.0	25.0	32.0	43.0	4.1	5.3	9.6	10.6	2.7	3.3	5.3
	RPM	1720	1730	1740	1762	1760	1130	1100	1120	1133	812	840	844
	Efficiency	83	85	86	87	87	80	78	78	79	67	78	83
	Power Factor	84	82	76	79	79	69	70	74	71	53	74	73
	Input KW	13.5	17.6	22.0	27.0	37.0	3.8	5.1	9.2	10.0	3.0	3.2	4.8
	Amps (460V)	20.0	27.0	36.0	43.0	59.0	6.9	9.1	15.6	17.6	7.1	5.4	8.3
75% LOAD PERF DATA	HP	11.3	15.0	18.8	24.0	32.3	3.1	4.0	7.2	8.0	2.0	2.5	4.0
	RPM	1743	1754	1758	1778	1774	1175	1145	1156	1153	844	873	879
	Efficiency	83	85	86	85	87	78	78	80	80	67	77	84
	Power Factor	79	77	67	72	75	60	61	67	60	45	67	64
	Input KW	10.1	13.2	16.5	20.3	27.8	2.9	3.8	6.7	7.5	2.3	2.4	3.6
	Amps (460V)	15.9	21.0	28.0	33.4	45.9	6.8	9.0	13.8	14.7	7.0	5.3	8.2
50% LOAD PERF DATA	HP	7.5	10.0	12.5	16.0	21.5	2.1	2.7	4.8	5.3	1.4	1.7	2.7
	RPM	1765	1774	1773	1790	1782	1185	1155	1172	1168	852	881	886
	Efficiency	80	80	83	81	85	73	77	80	78	60	75	83
	Power Factor	68	67	52	60	68	50	48	57	47	36	58	50
	Input KW	6.8	8.8	11.0	13.5	18.5	2.0	2.6	4.6	5.0	1.5	1.6	2.4
	Amps (460V)	12.5	17.0	22.7	27.1	37.2	6.2	8.2	12.2	12.8	6.4	4.9	7.5
Start Amps (460 V)		114	151	238	318	389	35	33	47	74	16	21	44
NEMA Code Letter		G	G	J	J	J	H	E	C	F	E	F	H
Cable Type (230 V)		XC1A4	XC1A5	XC1A6	XD1A7	XD1A8	XB1D1	XB1D2	XC1A3	XC1A4	XB1D1	XB1D1	XB1D2
Cable OD		7/8	1"	1 1/8	1 3/8	1 1/2	5/8	3/4	11/16	7/8	3/4	3/4	3/4
Cable Leads (# X mm)		4 X 6	4 X 10	4 X 16	4 X 25	4 X 35	7 X 1.5	7 X 2.5	4 X 4	4 X 6	7 X 2.5	7 X 2.5	7 X 2.5
Cable Type (460 V)		XC1A2	XC1A3	XC1A4	XC1A5	XD1A6	XB1D1	XB1D1	XC1B1	XC1A2	XB1D1	XB1D1	XB1D1
Cable OD		11/16	11/16	7/8	1"	1 1/8	5/8	3/4	11/16	1"	3/4	3/4	3/4
Cable Leads (# X mm)		4 X 4	4 X 4	4 X 6	4 X 10	4 X 16	7 X 1.5	7 X 2.5	4 X 4	4 X 4	7 X 2.5	7 X 2.5	7 X 2.5
Locked rotor/run torque		2.6	2.7	3.3	3.9	3.6	2.8	2.0	2.3	2.7	2.2	2.2	3.3

All above motors use Wiring Diagram 96-EL 5431E

Motor Service Factor: 1.0
Maximum Temperature Rise (of windings): 115C
Maximum Ambient Temperature: 40C

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CITY OF MODESTO
Preliminary Design Report for Rehabilitation of Emerald Lift Station and Replacement of Hahn Lift Station

KICKOFF/WORKSHOP No. 1 MEETING

APRIL 5, 2011
9:00 AM- NOON

AGENDA

Participants

Lou Schlitz, City of Modesto
William Wong, City of Modesto
Jesse Franco, City of Modesto
Aaron Trott, City of Modesto
Tony Pascoal, City of Modesto
Dana Hunt, HDR
Ted Kontonickas, HDR
Kevin Pezzoni, Miller Pezzoni & Associates

Meeting – Agenda Items

I. Work Plan

A. Project Introduction
B. Project Team
   1. Roles and Responsibilities
   2. Communication
C. Scope of Work
   1. Project Tasks and Subtasks
   2. Optional Tasks
D. Project Schedule
   1. Project Schedule
   2. Deliverables, City Input, and Review Schedule
      1) Workshop Meetings
      2) Preferred Alternative Selection (1 week)
      3) Draft Preliminary Design Report Submittal – July 27, 2011
      4) Draft Preliminary Design Report review period (3 weeks)
      5) Final Preliminary Design Report Submittal – August 31, 2011
   3. Meeting – Dates/Time/Attendees
      1) Kickoff Meeting/Workshop Meeting No. 1 and Site Visit – April 5, 2011 (Today)

2) Workshop Meeting No. 2 and Site Visit – May 11, 2011 (9am-Noon)
3) Workshop Meeting No. 3 and Site Visit – June 8, 2011 (9am-Noon)
4) Draft Preliminary Design Report Meeting – July 27, 2011 (9am-11am)

E. Project Budget

II. Lift Station Alternatives

A. Emerald Lift Station
   1) Develop up to three conceptual level lift station alternatives including a combination of Rehabilitation and Replacement alternatives.
   2) Discussion Items
      a) Rehabilitation vs. Replacement
      b) Dry pit/wet pit vs. Submersible station
      c) Preferences, input, concerns

B. Hahn Lift Station
   1) Develop up to two conceptual level lift station alternatives for replacement of the lift station on the new site.
   2) Discussion Items
      a) Dry pit/wet pit vs. Submersible station
      b) Structures, walls/fence, landscaping, etc.
      c) Preferences, input, concerns

III. Design Criteria

A. Pump Station Items for Discussion (Hahn and Emerald)
   1) Grinders/Bar Racks
   2) Sump Pumps (location)
   3) Auxiliary Systems (water, compressed air, etc.)
   4) Forcemain Isolation Valve
   5) Wetwell Isolation Gate
   6) Single vs Dual Wetwell (isolation capability).
   7) Emergency bypass pumping capability (pump vs connections) (Flow?)
   8) Hoist and Monorail Systems
   9) Permanent vs. Portable Standby Generator (Hahn Lift Station)
   10) Flow Meters
   11) Variable Speed vs Constant Speed
   12) Monitoring, SCADA, and alarms for equipment failures and out of range process conditions. Alarm annunciation location.
   13) Uninterruptible power supply for instrumentation, controls, and telemetry.
   14) Other items

B. See “Design Criteria” attachment

IV. Other Scope of Work Tasks

A. Task 2 – Review Background Information
B. Task 3 – Utility Coordination
C. Task 4 – Survey
   1) Survey Notice-to-Proceed/Schedule

V. Background Information Request

VI. Site Visits

VII. Workshop Meeting No. 2/Site Visit

A. Date/Time:
   1) May 11, 2011; 9am-Noon
B. Discussion Topics:
   1) Design Criteria (Finalize)
   2) Lift Station Alternatives Discussion (Preferred Alternative Selection)

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CITY OF MODESTO
Preliminary Design Report for Rehabilitation of Emerald Lift Station and Replacement of Hahn Lift Station

KICKOFF/WORKSHOP No. 1 MEETING

APRIL 5, 2011
9:00 AM- NOON

Meeting Minutes
Revised

Participants

Lou Schlitz, City of Modesto
William Wong, City of Modesto
Jesse Franco, City of Modesto
Aaron Trott, City of Modesto
Tony Pascoal, City of Modesto
Dana Hunt, HDR
Ted Kontonickas, HDR
Gregg Miller, Miller Pezzoni & Associates
Kevin Pezzoni, Miller Pezzoni & Associates

Meeting Minutes

I. Work Plan

A. Scope of Work

1. The scope of work has been modified per City input from the contractual scope to provide two separately bound Preliminary Design Reports for Emerald and Hahn Lift Stations. This is a no cost change.

B. Project Schedule

1. Meeting – Dates/Time/Attendees
   a) Kickoff Meeting/Workshop Meeting No. 1 and Site Visit – April 5, 2011 (Today)
   b) Workshop Meeting No. 2 and Site Visit – May 12, 2011 (9am-Noon) – (Note: Meeting date revision due to City conflict
   c) Workshop Meeting No. 3 and Site Visit – June 9, 2011 (9am-Noon) – (Note: Meeting date was mistyped in the Work Plan provided)
   d) Draft Preliminary Design Report Meeting – July 27, 2011 (9am-11am)
2. All meetings have been scheduled.
   a) Lou has scheduled the meetings noted above with City staff.
   b) Dana has scheduled the meeting noted above with HDR and Miller-Pezzoni staff.

II. Lift Station Alternatives

A. General

1. HDR will evaluate up to two alternatives for the Hahn Lift Station and up to three alternatives for the Emerald Lift Station.

2. Upon discussion at the meeting, the following alternatives were selected for evaluation.

a) Emerald Lift Station

1) Rehabilitate the existing lift station for use as a drywell/wetwell station similar to the approach shown in the HDR interview presentation, including drywell and wetwell below grade expansions, standard stairs, overhead crane for pump removal, and drypit submersible pumps (Wemco or Flygt).

2) Rehabilitate the existing lift station for use as a submersible self-cleaning trench style type station, including structural modifications and potential wetwell below grade expansion(s). Above grade portions of the station above the wetwell will be demolished. The below grade portion of the drywell will be abandoned in place (filled and concrete placed in existing floor openings) Pumps manufacturers may include: Wemco or Flygt. The existing above grade portion of the drywell will be reused for electrical equipment.

3) Replace the existing list station with a new submersible self-cleaning trench style type station similar to the approach shown in the HDR proposal and interview presentation. The above grade portion of the station above the wetwell will be demolished for site access. The below grade portion of the drywell will be abandoned in place (filled and concrete placed in existing floor openings).The existing above grade portion of the drywell will be reused for electrical equipment. Pumps manufacturers may include: Wemco or Flygt.

b) Hahn Lift Station

1) The only alternative to be evaluated for Hahn includes replacement of the existing lift station on the new site with two-pump submersible station (1 duty pump plus 1 standby pump) similar to the approach shown in the HDR proposal and interview presentation, with the following exceptions as noted in the meeting.

- The parcel information for the site was provided by Lou. Map #25MO32.
- The site within the fence/walled area as shown in the proposal and interview will be enlarged as outlined below.
- Place pump station away from residence (NE corner of site) and locate control panel near wetwell. The other electrical panels (including the meter and transfer switch) shall be placed to accommodate incoming power and located to park the portable generator. The panels shall be placed back to back and likely on the east side of the site.
- Locate the fence set back from the two streets for the site a total distance of 20 feet (This includes 8 inches for curb, 4 foot sidewalk, 5”4” additional space to the property line, and an additional 10 feet beyond the property line which is the public utility easement (PUE). The entire area behind the curb to the fence shall be landscaped under this project and the 10 foot PUE may be used in the future for a soil bed odor control bed if needed. The property line location shall be confirmed by surveyor. Landscaping shall be like Rose Celeste site outside of fence; however, plant materials may be different.
- Provide rectangular wetwell with Wemco Pumps w/ pre-rotation basins similar to Northgate Drive Lift Station (plans provided by Lou to HDR). A rectangular station wetwell configuration is preferred over round configuration.
- Wetwell and Vault shall be elevated with non-traffic rated hatches.

- Permanent generator will not be provided.
- Site shall have concrete pavement, fence and sound walls similar to Rose Celeste List Station.
- Provide two gates for drive-thru and a man gate.

B. Emerald Lift Station Input and Direction

1. The firm capacity of the Emerald lift station shall be designed 3,100 gpm based on the Master Plan. Per direction at the meeting, the station shall be designed to pump 3,100 gpm = 4.5 mgd (reliably) with permanent standby power. In addition, the station shall be designed to pump 6,800 gpm = 9.8 mgd with all units operating, no standby power. The direction at meeting was to use a self priming portable unit to make up the difference between 6,800 gpm = 9.8 mgd and all installed pumps (duty and standby) since this will be a rare occasion when the West Truck is taken out of service in the future. It should be noted that 6,800 gpm = 9.8 mgd is the PWWF and the West Trunk will likely not be take out of service in the winter unless it is an emergency.
    a) Provide adequate space on site for the engine driven pump.
    b) Three electric submersible pumps (2 duty pumps plus 1 standby) plus the engine driven pump will be required to pump 6,800 gpm of flow. No standby pumps to be provided.
    c) The wetwell levels will have to be raised when operating the portable pump since there are limitations to the self-priming pump's lift. The City was consulted and believes that surcharging will not be an issue. The City will provide the maximum water elevation within the sewer at the lift station site that can be accommodated without impacting the upstream sewer system.
2. Lou provided information that the maximum surcharge level within the wetwell/ sewer at the Emerald site shall be no higher than elevation 70.55 (current datum).
3. Cleaning sand and grit from the existing Emerald Lift Station is difficult. Provide access for a vacuum truck on site.
4. No grease issue now, but also do not want to create a grease issue with the new station design.
5. The new Emerald Lift Station alternative would be the largest submersible station the City would have if it is replaced or rehabilitated to be a submersible station. The City is not adverse to trench style wetwells, although they would like examples of past projects to get a handle on the required O&M. The submersible stations have the advantage of not requiring staff to enter the wetwell.
6. The soil bed at Emerald is functioning properly and does not need to be replaced.
7. The City questioned the use of a 90° turn at the entrance to the wetwell in the alternative for the new proposed submersible station, since they were concerned that it may create more shearing and odor issues. Unfortunately, the site constraints provide limitations on the layout for a new submersible station. The layout will be evaluated to provide addition space between the 90 entrances and the ogee weir. Under normal operation the wetwell will run higher and splashing and shearing of flow is not anticipated to occur.
8. Rose Celeste is a trench style. Lou will send drawings to HDR as an example.
9. Provide a wetwell isolation gate.
10. Dual wetwells are not required.
11. If pump removal is from the interior of the building (drypit/wetpit alternative) a monorail and hoist are required. If pump removal is from the outside (hatch), the City's boom truck could possibly be used. The City's boom truck has a capacity of 5,000 LBS. City will verify the capacity of their boom truck to determine if it can unseat and lift the pumps. HDR will provide the selected equipment weight and force

required to unseat pump to the City. If a boom truck can not be used, a permanent monorail with crane will be provided.

12. Provide flow meter at Emerald. Flow meter shall be magnetic type. The flow meter may neck down in size from 20" diameter to save cost, but it is not required.. The diameter of the flow meter shall be appropriate for accurate readings upto 6,800 gpm.
13. Emerald pumps shall have variable frequency drives for the submersible alternatives. ABB is a preferred manufacturer. The existing pump station is constant speed due to the large non-self cleaning wetwell volume.
14. Emerald shall mimic the Scenic lift station as far as alarms, etc.
15. Tasks 8 to 9 are optional for Emerald Lift Station and will not be authorized until the preferred alternative is selected assuming that the existing pump station is reused. Based on the discussion, a worst case cost should be assumed in the alternatives cost analysis.

C. Hahn Lift Station Input and Direction

1. Surface drainage at Hahn drains into the existing wetwell (via a pipe near the curb near the existing drywell) when the rock wells flood. The existing wetwell will be reused as a sewer manhole in the system; however, the new station shall separate storm drainage from sewer flows by potentially converting the current Hahn dry pit into a rock well, provided the topography does not drain the location to another rockwell (drainage to be confirmed with survey of site). This information shall be included in the preliminary design report so it gets noted in the final design. City will have to address storm drain issues as part of a separate project.
2. 900 gpm is the firm capacity and shall be accomplished with one duty and one standby pump. HDR will send pump selection to City when selection is finalized. The City may have existing pumps in the system and wishes to standardize if possible. Currently the Hahn Lift Station has no grease issues.
3. Provide adequate space on the site for a vacuum truck. Path of travel in the site shall be designed to prevent staff from having to backup on the site. Provide two gates for drive-thru and a man gate. Provide a motorized gate with remote clicker. Door King is one manufacturer the City prefers. Keep wetwell towards NE corner of the site. Maintain the control panel closer to wetwell at NE corner of the site.
4. CMU walls shall be constructed on west and south sides away from property line, leaving the existing neighbor fences. Provide space for soil bed at Hahn site. Locate on the inside of the site fence at a later date by moving the fence. A landscaping strip shall be provided around the fence at this time for potential soil bed use. Fence shall be the same type as at Rose Celeste Lift Station. Provide bollards between panel and fence.
5. No permanent standby generator is required. The City will provide a portable generator when needed. Put in a manual transfer switch and plug for connection to a City provided portable generator. Square wetwells are preferred for submersible stations with pre-rotation basins when using Wemco pumps. In addition, the square wetwells allows for better accuracy from the ultrasonic level transducers.
6. The Hahn design shall include the following meeting decisions:
   a) Two access hatches.
   b) A bypass connection for portable pump shall be provided.
   c) No intermediate valve vault platform shall be provided.
   d) Provide pump back flush piping and valve. Provide a switch in the vault to allow the pumps to be operated.
   e) No bar screens or grinders are required.
   f) No interconnecting gravity drain from valve vault to wetwell will be provided. A sump pump will be used for vault drainage.
   g) Precast valve vault.
   h) No wetwell isolation slide gate.

i) No dual wetwells.
j) Large hatches.
k) No forcemain isolation valve.
l) Raise hatches and provide non-traffic rated hatches.

7. The pumps at Hahn shall be constant speed. Hahn controls shall be similar to the other City submersible lift stations. Provide sump pump run signal. No flow meter is required.

III. Design Criteria

A. Provide T-Lock or HDPE Stud Liner on all interior surfaces of new wetwells, except the floors. Details will need to be provided for sealing the T-lock at the wall to floor interfaces.

B. Top of structures shall be 6" above grade. This allows the use of 300 LB heavy-duty access hatches as opposed to H20 traffic-rated. Pumps and hatches shall be mounted closer to wetwell walls to allow easier access for staff and the vacuum trucks.

C. Provide 1" water service and reduced pressure backflow preventer to each site. If seal water is required it will be from the potable water service with backflow preventor. No air compressors or air service is required.

D. Slope forcemain up towards discharge manhole where new forcemain piping is installed.

E. No intrusion switches required on access hatches. They are required at all other doors and electrical panels.

F. Dezurik plug valves shall be provided for isolation and shall have fusion bonded epoxy lining. Check valve will be similar specification as La Loma Lift Station.

G. HDR will update the design criteria and provide at the next meeting.

IV. Other Scope of Work Tasks

A. Task 4 – Survey Work

1) Survey work will commence shortly and will be coordinated with Lou.

V. Next Meeting - Workshop Meeting No. 2/Site Visit

A. Date/Time:

1) May 11, 2011; 9am-Noon

B. Discussion Topics:

1) Design Criteria (Finalize)

2) Lift Station Alternatives Discussion (Preferred Alternative Selection)

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CITY OF MODESTO
Preliminary Design Report for Rehabilitation of Emerald Lift Station and Replacement of Hahn Lift Station

WORKSHOP No. 2 MEETING

MAY 12, 2011
9:00 AM- NOON

AGENDA

Participants

Lou Schlitz, City of Modesto
William Wong, City of Modesto
Jesse Franco, City of Modesto
Aaron Trott, City of Modesto
Tony Pascoal, City of Modesto
Dana Hunt, HDR
Ted Kontonickas, HDR
Kevin Pezzoni/Gregg Miller, Miller Pezzoni & Associates

Meeting – Agenda Items

I. Lift Station Alternatives

A. Emerald Lift Station
   1) Develop three conceptual level lift station alternatives including a combination of Rehabilitation and Replacement alternatives.
      a) Alternative 1 – Rehabilitation of the existing drypit/wetpit lift station
      b) Alternative 2 – Rehabilitation of the existing lift station into a submersible lift station
      c) Alternative 3 – Replacement of the existing lift station on site with a new submersible self cleaning trench style lift station
   2) Alternative development includes conceptual level alternatives including background information, design criteria, figures, descriptions, and cost estimates for City selection of the preferred alternative to be developed to the 35 percent level.

B. Hahn Lift Station
   1) Develop a single conceptual level lift station alternative for replacement of the lift station on the new site.
   2) Alternative development includes conceptual level development including background information, design criteria, figures, description, and cost estimate for City review prior to development of the preferred alternative to the 35 percent level.

C. City Review Period (1 week)
   1) City to provide direction on the preferred alternative for the Emerald Lift Station and comments on the information presented for incorporation into the preferred alternative

development and draft preliminary design report. Direction shall be provided to HDR by May 18th per the project schedule.

II. Other Scope of Work Tasks

A. Task 3 – Utility Coordination
   1) Utility information will be obtained.

B. Task 4 – Survey
   1) Survey information is expected this week.

C. Task 5 – Geotechnical Study
   1) Geotechnical work is dependent on the preferred lift station alternatives. Work is scheduled to commence on May 18th.

D. Subtask 6.3 – Develop Preferred Lift Station Alternative
   1) HDR will proceed with development of the preferred lift station alternatives for Emerald and Hahn Lift Stations.

E. Optional Task 8 – Corrosion Evaluation
   1) Corrosion evaluation work is dependent on the preferred lift station alternative selected for the Emerald Lift Station. If Alternative 1 or 2 is selected, work is scheduled to commence on May 18th. HDR will need authorization from the City for this task.

F. Optional Task 9 – Structural Evaluation
   1) Structural evaluation work is dependent on the preferred lift station alternative selected for the Emerald Lift Station. If Alternative 1 or 2 is selected, work is scheduled to commence following Task 8 on June 22th. HDR will need authorization from the City for this task.

III. Site Visit

A. A site visit is optional following the meeting based on participants request.

IV. Workshop Meeting No. 3/Site Visit

A. Date/Time:
   1) June 9, 2011; 9am-Noon

B. Discussion Topic:
   1) Preferred Lift Station Alternative development

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CITY OF MODESTO
Preliminary Design Report for Rehabilitation of Emerald Lift Station and Replacement of Hahn Lift Station

WORKSHOP MEETING No. 2

MAY 12, 2011
9:00 AM- NOON

MEETING MINUTES

Revised May 24, 2011

Participants

Lou Schlitz, City of Modesto
William Wong, City of Modesto
Jesse Franco, City of Modesto
Aaron Trott, City of Modesto
Tony Pascoal, City of Modesto
Dana Hunt, HDR
Ted Kontonickas, HDR
Kevin Pezzoni, Miller Pezzoni & Associates

Meeting Minutes

I. Emerald

A. The firm capacity of the Emerald lift station shall be designed for 3,100 gpm. Per direction at the Kickoff/ Workshop Meeting No. 1, the station shall be designed to pump 3,100 gpm = 4.5 mgd (reliably) with permanent standby power. In addition, the station shall be designed to pump 6,800 gpm = 9.8 mgd (total flow that must be pumped by the Emerald Lift Station in the future if the Emerald Relief Sewer is temporarily taken out of service for maintenance or any other reason) with all units operating with no standby power. The direction at Kickoff/ Workshop Meeting No. 1 was to use a self priming portable unit to make up the difference between 6,800 gpm = 9.8 mgd and all installed pumps (duty and standby) since this will be a rare occasion when the West Truck is taken out of service in the future. Upon receipt of the maximum allowable surcharge elevation of 70.55 (based on current NAVD88 datum) within the incoming sewer at the Emerald Lift Station, it was determined that this elevation was too low for proper operation of a self-priming engine-driven pump. Based on this determination the alternatives analysis for the Emerald Lift Station included the use of four 20 hp submersible pumps to pump flows in parallel to achieve 6,800 gpm. This concept was accepted by the City. Two pumps are required to pump PWWFs of 3,100 gpm with a third pump serving as backup. The City may elect to not install the forth pump in the wetwell initially and have a pump on hand that can be installed if needed. The City's Jefferson Lift Station uses Wemco F10K submersible pumps. All four 20 hp pumps could be operated from the existing electrical service.

B. HDR discussed the background information on the Emerald Lift Station, design criteria, and the three alternatives analyzed including layouts, construction costs, advantages and

disadvantages, and construction sequencing. The three alternatives are outlined below. The City indicated a preliminary selection of Alternative 3 based on the estimated construction cost and advantages and disadvantages outlined. A formal selection will be indicated in writing to HDR after the City review period (May 18, 2011). If the new lift station alternative is confirmed, the optional tasks for evaluating the corrosion and structural integrity of the existing lift station will not required in the project.

1) Alternative 1. Rehabilitate the existing lift station for use as a drywell/wetwell station similar to the approach shown in the HDR interview presentation, including drywell and wetwell below grade expansions, standard stairs, overhead crane for pump removal, and drypit submersible pumps (Wemco or Flygt).
2) Alternative 2. Rehabilitate the existing lift station for use as a submersible self-cleaning trench style type station, including structural modifications and potential wetwell below grade expansion(s). Above grade portions of the station above the wetwell will be demolished. The below grade portion of the drywell will be abandoned in place (filled and concrete placed in existing floor openings). Pumps manufacturers may include: Wemco or Flygt. The existing above grade portion of the drywell will be reused for electrical equipment.
3) Alternative 3. Replace the existing lift station with a new submersible self-cleaning trench style type station similar to the approach shown in the HDR proposal and interview presentation. The above grade portion of the station above the wetwell will be demolished for site access. The below grade portion of the drywell will be abandoned in place (filled and concrete placed in existing floor openings). The existing above grade portion of the drywell will be reused for electrical equipment. Pumps manufacturers may include Wemco or Flygt.

C. Approximately 10 feet of the 20" forcemain just upstream of the existing manhole off site where the forcemain discharges to gravity is asbestos cement pipe. The pre-design report should include provisions for replacing this piping under the design project.
D. The existing generator currently has 24 hours of fuel storage; therefore, no changes to the fuel tank will be required under the project.
E. The City has difficulty when trying to remove and install pumps with their boom truck at the Jefferson Lift Station. These are the same size and model of pumps anticipated to be installed at the Emerald Lift Station. The pre-design report should address this issue.
F. It is acceptable to drive over the valve vault portion of the new submersible lift station (Alternative 3) for improved access to the pumps and site. The access checkered plate or hatches would need to be designed for H20 loading. If a monorail is designed (which is preferred by the City due to current difficulty in removing pumps at the Jefferson Lift Station with a boom truck), the support frame should be configured so it does not conflict with the vacuum truck.
G. The pre-design should incorporate more opening area in the top of wetwell to allow access to the wetwell for maintenance. The City would prefer one large opening if possible. HDR indicated that this may not be possible but if not, the beams could be designed to be removed with the hatches and/or checker plates. A series of larger access hatches or checkered plates with removable beams could be provided. Small access hatches within the main access hatches or checkered plates should be provided for periodic inspection of the wetwell without having to remove the main access hatches/checker plates. The City also requested that a frame be placed in the wetwell to allow a portable intermediate platform to be placed within the wetwell for better/closer access.
H. The City has another submersible trench-style station where flow down the "Ogee" weir to the end wall creates an aerosol effect. The new station "Ogee" weir should be designed to minimize the aerosol effect. The City indicated that with the pre-rotation basin design the wetwell may not need to be as deep as shown on the drawing. HDR indicated that the depth

would be minimized but the pumps would be on VFDs and that approximately one foot of depth would be required for each pump (4 feet total) for proper operation of the pumps.

I. Level monitoring and control should be provided by ultrasonic transducers. The ultrasonic level sensors require enough free area without obstructions to provide accurate measurement. The City uses HydroRanger equipment at the other stations.

J. If there is not enough space within the existing building, the electrical gear could be located outside. The gear would require a minimum NEMA 3R rating. The City indicated a preference for the equipment to be located indoors.

K. If the existing maintenance room is removed to allow additional access on site or used for restroom facilities and the new electrical equipment must be installed within the existing electrical room while keeping the existing electrical equipment in service during construction, the existing ship ladder could be replaced with a standard ladder for temporary access to dry pit to allow more space within the existing electrical room. City would like a restroom and a hand wash station with an electric water heater. The restroom could be added inside the existing maintenance room, if the room is kept rather than removed to provide additional site access. The City will provide direction on if restroom facilities should be provided and if the existing maintenance room should be removed to provide additional on-site access. Note: If the maintenance room is kept and used for the new electrical equipment, a restroom may be located in the existing electrical room after the existing electrical equipment is demolished.

L. At the site visit after the meeting, the City requested the following:

   a. Repave the site with concrete.

   b. Maintain storm drainage within the site. The drainage currently flows into the dirt or landscaped areas.

   c. Provide a small curbed concrete area and drain adjacent to the wetwell so washwater from cleaning pumps can be drained back to the wetwell.

   d. Shift the new lift station to the north to allow the vacuum truck better access into the site.

   e. Bring in water to the new restroom from the existing water to the site.

   f. Replace existing HVAC in the building.

   g. Evaluate the switches and wires associated with the lighting and the receptacles and their associated wiring in the portion of the existing building that will remain on site. The receptacles were not replaced on previous projects and are outdated. The lighting controls should be upgraded.

II. Hahn

A. A single new 12” sewer from the existing Hahn lift station wetwell (future collection system manhole) will be routed to the new lift station on the northeast area of the site.

B. The north and east fence lines should parallel with the property line along the street to maintain a constant 20 feet apron. Namely, match the onsite line of the PUE.

C. Supports should be added towards the top of the wetwell to allow the City to lower an intermediate grating platform into the wetwell to facilitate maintenance. Grating shall be fiberglass.

D. The hinges on the valve vault access hatch should be oriented in the proper position for access to the ladder. The piping within the vault should be shifted to provide more clearance between the ladder and piping. The ladder should not be located at the low spot in the vault.

E. City requested that HDR talk with them prior to authorizing the geotechnical work at the site since they may want to position the boring appropriately or add additional geotechnical work to evaluate the drainage at the site.

F. A self-priming emergency bypass pump can be used at Hahn since the sewer is deep and surcharging is not an issue.

G. Two check valves shall be used on the discharge of the sump pump.

H. A hatch shall be provided over the entire wetwell to allow the entire wetwell to be opened up.

III. City Review Period

A. City to provide direction on the preferred alternative for the Emerald Lift Station and comments on the information presented for incorporation into the preferred alternative development and draft preliminary design reports. Direction shall be provided to HDR by May 18th per the project schedule.

IV. Workshop Meeting No. 3/Site Visit

A. Date/Time:

1) June 9, 2011; 9am-Noon

B. Discussion Topic:

1) Preferred Lift Station Alternative development

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CITY OF MODESTO
Preliminary Design Report for Rehabilitation of Emerald Lift Station and Replacement of Hahn Lift Station

WORKSHOP No. 3 MEETING

JUNE 10, 2011
9:00 AM- NOON

AGENDA

Participants

Lou Schlitz, City of Modesto
William Wong, City of Modesto
Jesse Franco, City of Modesto
Aaron Trott, City of Modesto
Tony Pascoal, City of Modesto
Dana Hunt, HDR
Ted Kontonickas, HDR
Kevin Pezzoni/Gregg Miller, Miller Pezzoni & Associates

Meeting – Agenda Items

I. Preferred Lift Station Alternatives

A. Emerald Lift Station

1) Preferred Alternative (Alternative 3) - Replace the existing lift station with a new submersible, self cleaning trench style, pump station.
   a) Pump station will be provided with four submersible electric Wemco or Flygt pumps with VFDs. Two pumps shall be capable of pumping flows of 3,100 gpm. All four pumps shall be capable of pumping flows of 6,800 gpm. Permanent standby power shall be capable of operating 2 pumps.
   b) Reuse above grade portion of the existing drywell (electrical room and mechanical/storage room) for new electrical equipment and restroom. Provide ventilation with wall fans.
   c) Provide monorail crane over lift station wetwell to remove of pumps.
   d) Demolish the above grade portion of the wetwell (ie. stairs) to 3 feet below grade and pave.
   e) Abandon in place the below grade portion of the wetwell and drywell. Remove equipment, place holes for groundwater movement (per structural engineer), and backfill structures. Place concrete with dowels and reinforcement at dry well top floor to fill in openings in areas of existing stairs and grating.
2) Design Criteria (Updated)
3) Pump Selection/Wetwell Setpoints

4) Drawings/Layouts
5) Preferred Alternative Description
6) Discussion Items
   a) Electrical/Instrumentation
   b) Building Layout (Electrical and Restroom)
   b) Re-use of existing soil bed odor control system w/ new pump station
   c) Location/height of removable grating
   d) Wetwell access/Temporary Handrail
   e) Pump Removal (Monorail)/Washdown Area
   f) Other
7) Construction Cost Estimate (Construction Cost Estimate: $2.1M, to be updated in Draft Preliminary Design Report)
8) Construction Constraints and Sequencing (To be included in Draft Preliminary Design Report)
9) Construction Schedule (To be included in Draft Preliminary Design Report)

B. Hahn Lift Station
   1) Preferred Alternative - Replace the existing lift station with a new submersible pump station located on the new site.
   2) Design Criteria (Updated)
   3) Pump Selection/Wetwell Setpoints
   4) Drawings/Layouts
   5) Preferred Alternative Description
   6) Discussion Items
      a) Electrical/Instrumentation
      b) Location/height of removable grating
      c) Other
   7) Construction Cost Estimate (Construction Cost Estimate: $1.4M, to be updated in Draft Preliminary Design Report)
   8) Construction Constraints and Sequencing (To be included in Draft Preliminary Design Report)
   9) Construction Schedule (To be included in Draft Preliminary Design Report)

II. Other Items

A. Task 3 - Utility Coordination
   1) Utility information will be obtained and incorporated into the Draft Preliminary Design Reports.
   2) List of contacts used for the Tier 2 project
B. Task 4 – Survey
   1) Survey information has been obtained and HDR is working with MVE to obtain missing information. Survey information will be incorporated into the Draft Preliminary Design Reports.
   2) Per MVE, record drawings and latest survey show the incoming sewer to the lift station as sloping up
C. Task 5 – Geotechnical
   1) Geotechnical work is underway. Geotechnical information will be incorporated into the Draft Preliminary Design Reports and the geotechnical reports will be provide as an appendix.

D. Task 7 (Optional) – Public Outreach Architectural/Landscape Assistance
   1) Discuss if Task 7 should be included in the project and if so, obtain written authorization by the City.
E. Task 8 (Optional) – Corrosion Evaluation
   1) Task 8 has not been authorized and this task will not be included in the project.
F. Task 9 (Optional) – Structural Evaluation
   1) Task 9 has not been authorized and this task will not be included in the project.

III. Site Visit

A. A site visit is optional following the meeting based on participants' request.

IV. Draft Preliminary Design Report Review Meeting

A. Date/Time:
   1) July 27, 2011; 9am-11am
B. Discussion Topic:
   1) Draft Preliminary Design Report

1) Draft Preliminary Design Report Review Period for City Comments

a. City Review Period:
   1) July 27, 2011 – August 17, 2011
b. City Review Comments to HDR
   1) August 17, 2011

2) Final Preliminary Design Report

a. Submittal Date:
   1) August 31, 2011 (No Meeting)

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CITY OF MODESTO
Preliminary Design Report for Rehabilitation of Emerald Lift Station and Replacement of Hahn Lift Station

WORKSHOP MEETING No. 3

June 10, 2011
9:00 AM- NOON

MEETING MINUTES

Participants

Lou Schlitz, City of Modesto
William Wong, City of Modesto (Partial Attendance)
Jesse Franco, City of Modesto
Aaron Trott, City of Modesto
Tony Pascoal, City of Modesto
Dana Hunt, HDR
Ted Kontonickas, HDR
Kevin Pezzoni, Miller Pezzoni & Associates

Meeting Minutes

I. Emerald Lift Station

The preferred alternative is Alternative 3 - Replace the existing lift station with a new submersible, self cleaning trench style wetwell. The lift station will be provided with four submersible electric Wemco or Flygt pumps with variable frequency drives (the City is considering various wetwell configurations which will likely impact the pump manufacturer to be specified. The City will provide direction to HDR by Friday June 17, 2011. See below for additional information). Two pumps shall be capable of pumping flows of 3,100 gpm (min). All four pumps shall be capable of pumping flows of 6,800 gpm. All pumps will be sized identically.

A. Existing generator will operate two pumps and a plug will be provided to allow a portable generator to be brought to the site for running all pumps. The station will not be designed to allow both the permanent and a portable generator (using the plug) to be operated at the same time. It is envisioned that a portable generator would be sized to operate all four pumps plus station loads. Shutdown of the Emerald Relief Trunk will be planned so that provisions for emergency standby power can be in place prior to the shutdown.

B. The City would like to be able to drive over the northeast portion of wetwell (which is currently located slightly above grade) for improved access to the new lift station. The top of the below-grade wetwell in this location will need to be removed to accommodate this request. The structural engineer will need to evaluate the structural impact and identify any modifications to support the above grade portions of the building that remain. The existing below-grade portion of the dry well will be abandoned and filled in with material to avoid having to maintain ventilation and drainage below grade. The wetwell will be abandoned and the top 3 feet of structure will be demolished and paved over. This includes the access stairs and the at-grade

portion. The structural engineer will review the impacts and identify any structural modifications required to support the above grade portions of the building (mechanical room) that will remain. The structural engineer has recommended uniform rock for filling the space below grade, although the City prefers controlled density fill to completely fill all spaces. This will be discussed with the structural engineer. Holes in the below-grade walls will be drilled to allow groundwater intrusion.

C. The above grade portion of the existing drywell (electrical room and mechanical/storage room) will be used for new electrical equipment and restroom facilities. The City prefers a single electrical lineup on the south wall of the building. The City will relocate the existing SCADA panel prior to construction. The wall between the electrical room and maintenance room will need to be removed. The structural engineer will need to determine if any structural modifications are required to support the roof. A double door will be added in the west wall of the maintenance room after the wetwell access stairwell is demolished. Existing electrical panels should be salvaged.

D. Ventilation will be required in the building. Supply air will be introduced by a fan in the north wall, air will be drawn through both the electrical panels and the room by an exhaust fan in the south wall. The supply/exhaust arrangement will provide positive pressure in the room. Wind direction is from the northwest.

E. A toilet within a partitioned stall and service sink will be installed in the northeast corner of the building. No new walls are needed. The service sink will be wall mounted and have a front stainless steel cap.

F. The new odor control blower for the new wetwell will be shown on the site plan. Only one fan is required. A standby fan is not required. The odor control soil bed will be reinstalled after construction of the new lift station. Wash water will be provided at the pump cleaning area. The pump washdown area will be configured so a truck can back up at an angle to remove and lift pumps. The monorail shall be extended farther south to allow pumps to be dropped on a flat bed. City will provide the height of their flat bed truck so the height of the monorail can be determined.

G. The first draft of the survey information has been obtained and HDR is working with MVE to obtain missing information. Survey information will be incorporated into the Draft Preliminary Design Reports. MVE stated that based on the record drawings and the site survey, the pipe between the manhole in Emerald and the manhole in the site slope up. Upon review of existing drawings at the meeting this is not the case and the MVE will need to correct/re-evaluate this.

H. Pumps shall be centered with the influent sewer and monorail. Aluminum checkered plate with small hinged access hatches shall be provided above the wetwell. Stainless steel angle supports shall be provided on the north and south walls of wetwell to support removable grating between the pumps. Temporary grating should be located one foot above the crown of the influent pipe. City will lower personnel and grating with a safety harness system. No ladder is required inside the wetwell. An opening will be provided over the entire wetwell. A fixed wall support will be provided for the influent gate operator. Holes in top perimeter of wetwell walls will be provided to allow placement of removable handrail sections. Handrail shall be provided by the contractor.

I. Provide two H20 rated spring assisted access hatches over the valve vault. The middle beam should be fixed and the two outer beams adjacent to the centerline of the hatch openings should be removable. Hatches should have hinges in the north/south orientation.

J. The minimum speed of any pump may be limited to 70% speed to keep its associated check valve open. Wetwell setpoints for the four pumps were discussed at the meeting and will be provided in the Draft Preliminary Design Report.

K. Two wetwell configurations were discussed.

    1. A self-cleaning trench style wetwell with an “Ogee” ramp, a depressed sump at the far end, and Flygt submersible pumps.
    2. A trench style wetwell with a sloped or “Ogee” ramp and the use of a Wemco pre-rotation basin.

The City will let HDR know their preferred option within the next week. Option 1 will allow either Flygt or Wemco to bid on the project, although Flygt would have a cost advantage. A tight specification written around Flygt would have to be written. Wemco would be the only manufacturer to bid on option 2.

L. The City requested additional space between the last and second to last pump in the wetwell to allow proper operation of the transducer. The distance depends on the pump start levels. The City will work with HDR to determine the distance.

II. Hahn Lit Station

A. Existing transformer will remain in place. Kevin will determine if a new transformer should be installed within the new site or if a new electrical service should be installed from the existing transformer to the lift station. All other existing panels should be salvaged.

B. The two pumps should be configured as lead/lag although only one pump will normally operate at a time. At “Pump On” level (invert of the influent sewer), the “Lead” pump runs to pump down the wetwell. If the level continues to rise (to 6” above the invert of the influent sewer), the “Lag” pump will start and operate with the lead pump until both pump “shut-off” level is reached. Each pump shall alternate as “Lead” pump between starts. The wetwell should be sized for a maximum of 10 pump starts per hour (to be confirmed with the pump manufacturer).

C. There is a 4” capped storm drain pipe at Hahn (lamp hole) that drains to the existing wetwell. City will let HDR know if it should be abandoned in this project.

D. North fence of lift station site should parallel the curved property line through the use of direction changes at the fence posts.

E. No ladder is required within the wetwell. The City will lower personnel and grating with safety harness system. Supports and removable grating will be located at the midpoint of the wetwell. Stainless steel angle supports shall be provided on three walls of wetwell to support removable grating.

F. MVE will need to survey all manholes and pipe inverts at manholes, and not rely on existing record drawings.

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CITY OF MODESTO
Preliminary Design Report for Rehabilitation of Emerald Lift Station and Replacement of Hahn Lift Station

PRELIMINARY DESIGN REPORT MEETING

July 27, 2011
9:00 AM- 11:00 AM

AGENDA

Participants

Lou Schlitz, City of Modesto
William Wong, City of Modesto
Jesse Franco, City of Modesto
Aaron Trott, City of Modesto
Tony Pascoal, City of Modesto
Dana Hunt, HDR
Ted Kontonickas, HDR
Kevin Pezzoni/Gregg Miller, Miller Pezzoni & Associates

Meeting – Agenda Items

I. Draft Preliminary Design Reports

A. Preliminary Draft Design Reports will be delivered for Emerald Lift Station and Hahn Lift Station and the contents of the deliverables will be discussed.

II. Other Items

A. Task 4 – Survey
   1) Survey information has been incorporated into the Draft Preliminary Design Reports' Appendix.

B. Task 5 – Geotechnical
   1) Geotechnical Reports has been incorporated into the Draft Preliminary Design Reports' Appendix.

C. Task 7 (Optional) – Public Outreach Architectural/Landscape Assistance
   1) Discuss if Task 7 should be included in the project and if so, obtain written authorization by the City.

D. City design schedule for detailed design.

III. Draft Preliminary Design Report Review Period for City Comments

A. City Review Period:
   1) July 27, 2011 – August 17, 2011

B. City Review Comments to HDR
   1) August 17, 2011

IV. Final Preliminary Design Report

A. Submittal Date:
   1) August 31, 2011 (No Meeting)

HDR | ONE COMPANY *Many Solutions*℠

CITY OF MODESTO
Preliminary Design Report for Rehabilitation of Emerald Lift Station and Replacement of Hahn Lift Station

PRELIMINARY DESIGN REPORT MEETING

July 27, 2011
9:00 AM- 11:00 AM

MEETING MINUTES

Participants

Lou Schlitz, City of Modesto
Jesse Franco, City of Modesto
Aaron Trott, City of Modesto
Tony Pascoal, City of Modesto
Dana Hunt, HDR
Ted Kontonickas, HDR
Mason Beck, HDR
Kevin Pezzoni, Miller Pezzoni & Associates

Meeting Minutes

I. General Draft Preliminary Design Report

A. The Preliminary Draft Design Reports were delivered for Emerald Lift Station and Hahn Lift Station.

B. The agenda and minutes for this meeting will be included in the Final Preliminary Design Reports.

II. Hahn Draft Preliminary Design Report

A. Surveyor didn't obtain the elevation of the critical (lowest incoming sewer) 12-inch sanitary sewer invert within the existing wetwell. The elevation is critical since it is needed to determine the elevations of the influent sewer to the new lift station. The City can coordinate the pump down of the wet well with the surveyor so the elevation can be obtained.

B. Additional demolition information will be added to Figure 2. The existing pump station will be abandoned and filled with CDF. The 6" suction pipes from the wetwell and the 6" force main to be abandoned shall be filled with CDF. The top portion of the drywell structure will be removed to the depth per CalTrans standards (3 to 3.5 feet). The sidewalk and curb will be replaced to match existing conditions after demolition is complete.

C. The location of the HydroRanger transducer will be shown in Figure 3.

D. The street light and lamp pole near the existing lift station shall remain in place.

E. The man gate will be moved slightly to the west to prevent conflicts with the electrically operated rolling gate and latches.

F. A fan will be provided in the valve vault as currently shown. The fan shall be sized for 6 air changes per hour with a flow switch. The fan will run 24/7 with an alarm on fan fail.

G. The lift station wet well and valve vault will be kept as two independent structures as shown in Figure 3. The contract documents shall allow for cast-in-place or precast concrete wetwell and/or valve vault.

H. Spray on wet well liner will not be used. The HDPE stud liner or PVC T-Lock liner shall be used and shall seal properly at the floor.

I. Figure 10 should be referenced as a process and instrumentation diagram (P&ID) instead of a single line diagram.

J. The corners of wet well shall be grouted at 45 degree angles to the floor and rounded. This is not clear on current plan/section.

K. The lead pump will turn on at the 12-inch gravity sewer invert. Lag pump will start at 6-inches above 12-inch invert. Figure 4 will be corrected. The table on Figure 4 should reference the distance relative to the incoming sewer inverts rather than an elevation.

L. 2 sack concrete slurry instead of CDF will be used at base of existing wetwell during demolition.

M. No drops shall be used on the sewer influent manhole. Temporary interior drops are acceptable during construction and testing; no outside drops are allowed.

N. The Wemco pre-rotation pump curve shall be added to Figure 7.

O. The anticipated field construction duration is 6 months. Working days shall be calculated as an average of 20 days per month.

P. Kevin will edit the P&ID and revise the electrical panel layout per discussions at the meeting.

III. Emerald Draft Preliminary Design Report

A. The four irrigation laterals shown near the soil bed to the west of the site do not exist. These lines will be removed from the site plans.

B. The site plans will be updated with revisions to the survey. The fence location will be confirmed on the site plan.

C. The existing pipes to be abandoned shall be plugged on both ends with concrete. The abandoned pipes shall be filled with CDF.

D. The existing sluice gate shall be salvaged to the City.

E. The manhole covers shall be 36-inch diameter and centered on the manholes.

F. Provide soap dispenser, mirror, and paper towels next to service sink. Include in text on drawings.

G. The building supply and exhaust fans will be offset from each other on opposite walls to enhance ventilation. The exhaust fan shown shall be moved to the east.

H. The monorail shall be cantilevered from the west side of the site to avoid issues with vacuum truck access. The beam shall remain centered over the pumps. Provide lights with the switch mounted to the monorail. The beam shall be extended to the south to ensure a checkered plate can be removed and placed on a truck.

I. The wet well exhaust fan shall be pad mounted and located adjacent to the generator. A duct will be hard piped into the wet well, and will drop to within 1 foot above the removable grating location.

J. Remove ARVs from the pump discharge. Ensure that no intermediate high points occur along the forcemain to its discharge location.

K. A fan shall be added to both the valve vault and flow meter vault.

L. Add cleanouts or 45 degree angles to sump pump discharge line from flow meter vault. Pipeline will be under pressure.

M. The City prefers all electrical boxes and conduit to be inside and hidden from view to keep exterior of building clean. Kevin will optimize installation locations. Option to run all conduit from the panels inside of the building parallel to the panels before dropping below grade to the pumps.

N. The existing influent sewer is plastic lined. Water line enters the building from the south and doesn't tie in to the east.

O. HDR discussed an issue with the pump operation at high wetwell levels. Although the wetwell level should not exceed the high water level when 4 pumps are operating, a condition could occur which may result in very high levels in the wetwell. The station's pumps will not operate under such hydraulic conditions. A valved gravity bypass line from the wetwell to the force main as well as other solutions were discussed with the City. The City indicated that they will throttle the plug valves and operate the pumps at low speed to allow the pump curves and system curve to intersect and allow the pumps to dewater the lift station at very high wet well levels. HDR recommends that this topic be further discussed during detailed design.

IV. Other Items

A. Task 4 – Survey

1) Survey information has been incorporated into the Draft Preliminary Design Reports' Appendix.

2) There are some issues with the survey information provided. The City is reviewing the information at this time with their current records and their survey staff. Comments will be provided to HDR to provide to MVE. HDR to coordinate with surveyor.

3) Revised survey information will be incorporated into the Final Preliminary Design Reports. The City has authorized submission for payment by MVE up to 50% of the survey contract.

B. Task 5 – Geotechnical

1) Geotechnical Reports has been incorporated into the Draft Preliminary Design Reports' Appendix. Two hard copies of the geotechnical reports were also delivered to the City.

C. Task 7 (Optional) – Public Outreach Architectural/Landscape Assistance

1) Task 7 will not be included at this time. The City will determine if this task should be incorporated.

D. The City is unsure of the timing for detailed design at this time.

V. Draft Preliminary Design Report Review Period for City Comments

A. City Review Period:

1) July 27, 2011 – August 17, 2011

B. City Review Comments to HDR

1) August 17, 2011

VI. Final Preliminary Design Report

A. Submittal Date:

1) August 31, 2011 (No Meeting)

SURVEY REPORT
Hahn Lift Station
Modesto, California

August 15, 2011

By

MVE| Civil Solutions, Inc.
1117 “L” Street
Modesto, CA 95354
Job No. NC10542

1.0 DESCRIPTION OF CONTROL POINTS

SET MAG NAIL – Set Magnetic Nail
SET ½" IRON PIPE W/ MVE CAP

2.0 DESCRIPTION OF MONUMENTS

City of Modesto – G.P.S. Network
Station I.D. 2222 – 2" Brass Cap labeled in Monument Well
Station I.D. 2424 – 2" Brass Cap labeled in Monument Well
Station I.D. 2620 – 2" Brass Cap labeled in Monument Well
Station I.D. 2721 – GPS Cap in 1.5" Iron Pipe

3.0 DESCRIPTION OF COORDINATE SYSTEM

The City of Modesto Horizontal GPS (NAD83 California Coordinate System Zone 3 Survey Feet.

4.0 DESCRIPTION OF VERTICAL DATUM

CITY OF MODESTO BENCHMARK: 574B
CHISELED SQUARE ON CURB NORTH END OF RETURN NORTHEAST CORNER OF HONEY CREEK ROAD AND NIGHTINGALE DRIVE.
ELEVATION = 75.460 (NAVD 88)

Northing: 2075540
Easting: 6401272

5.0 FIELD OBSERVATIONS AND FINDINGS

At the existing lift station wet well, the high flow through the existing 12" VCP invert from the west near the bottom of the wet well prevented us from directly obtaining an invert reading. MVE determine the top of pipe elevation and subtracted the standard pipe wall thickness for a 12" VCP pipe (1.26") and inner diameter (12") dimensions to obtain the pipe invert.

Layer Name	Layer Description	Color	Lintype	Lineweight
Z-PT-CTRL	Non-Standard Layer	7	Continuous	default
X-PD-CONT	Existing Pavement Delineation Solid Striping	95	Continuous	0.25
X-PD-DA	Existing Pavement Delineation Dashed Striping	95	HIDDEN	0.25
X-PN-BARR	Existing Plan Barricade	200	HIDDEN2	0.25
X-PN-BC	Existing Plan Back of Curb	41	Continuous	0.25
X-PN-CONC	Existing Plan Concrete	41	DASHED2	0.25
X-PN-EP	Existing Plan Edge of Pavement	243	Continuous	0.25
X-PN-FC	Existing Plan Face of Curb	41	DASHED2	0.25
X-PN-FL	Existing Plan Flowline	41	DASHED2	0.25
X-PN-MW	Existing Plan Masonry Wall	200	_MW	0.25
X-PN-SL	Existing Plan Street Light	200	HIDDEN	0.25
X-PN-ST	Existing Plan Structure	200	HIDDEN2	0.25
X-PN-SW	Existing Plan Sidewalk	41	Continuous	0.25
X-PN-TREE	Existing Plan Tree	200	Continuous	0.25
X-PN-TX	Existing Plan Notes, Labels etc.	200	Continuous	0.25
X-PN-WDF	Existing Plan Wood Fence	200	_Box-Fence	0.25
X-SD-PI	Existing Storm Drain Pipe	111	_XSD	0.25
X-SS-FM	Existing Sanitary Sewer Force Main	40	_XSSFM	0.25
X-SS-MHDATA	Existing Sanitary Sewer Manhole Data	2	Continuous	0.25
X-SS-PI	Existing Sanitary Sewer Pipe	40	_XSS	0.25
X-WT-PI	Existing Water Pipe	161	_XW	0.25
Z-TP-BSW	Design Points Topography Back of Sidewalk	3	Continuous	0.35
Z-TP-BSWTX	Design Points Topography Back of Sidewalk Elevation	60	Continuous	0.25
Z-TP-CONC	Design Points Topography Concrete	3	Continuous	0.35
Z-TP-CONCTX	Design Points Topography Concrete Elevation	60	Continuous	0.25
Z-TP-CTRL	LDT Points Topography Control (Backsite, Mon, Bench etc.)	3	Continuous	0.35
Z-TP-EP	Design Points Topography Edge of Pavement	3	Continuous	0.35
Z-TP-EPTX	Design Points Topography Edge of Pavement Elevation	60	Continuous	0.25
Z-TP-FL	Design Points Topography Flowline	3	Continuous	0.35
Z-TP-FLTX	Design Points Topography Flowline Elevation	60	Continuous	0.25
Z-TP-GRD	Design Points Topography Ground	3	Continuous	0.35
Z-TP-GRDTX	Design Points Topography Ground Elevation	60	Continuous	0.25
Z-TP-OFF	Design Points Topography	7	Continuous	1
Z-TP-PA	Design Points Topography Pavement	3	Continuous	0.35
Z-TP-PATX	Design Points Topography Pavement Elevation	60	Continuous	0.25
Z-TP-SD	Design Points Topography Storm Drain	3	Continuous	0.35
Z-TP-SDTX	LDT Points Topography Storm Drain Elevation	60	Continuous	0.25
Z-TP-SS	LDT Points Topography Sanitary Sewer	3	Continuous	0.35
Z-TP-SSTX	LDT Points Topography Sanitary Sewer Elevation	60	Continuous	0.25
Z-TP-TC	Design Points Topography Top of Curb	3	Continuous	0.35
Z-TP-TCTX	Design Points Topography Top of Curb Elevation	60	Continuous	0.25
X-UT-ST	Existing Dry Utilities Structure	71	HIDDEN	0.25
X-SS-ST	Existing Sanitary Sewer Structure	40	HIDDEN	0.25
X-SD-ST	Existing Storm Drain Structure	111	HIDDEN	0.25
X-WT-ST	Existing Water Structure	161	HIDDEN	0.25
X-WT-TX	Existing Water Notes, Labels etc.	161	Continuous	0.25
X-MA-TX	Existing Mapping Notes, Labels etc.	3	Continuous	0.35
EG-TP-CONT-MAJ	Non-Standard Layer	11	Continuous	default
EG-X-CN-MNR	Non-Standard Layer	7	Continuous	default
NC10542recbndy|X-MA-CL	Existing Mapping Center Line	2	NC10542recbndy|CENTER2	0.25
NC10542recbndy|X-MA-LL	Existing Mapping Lot Line	3	NC10542recbndy|HIDDEN	0.35
NC10542recbndy|X-MA-PL	Existing Mapping Property Line	6	Continuous	0.8
NC10542recbndy|X-MA-PUE	Existing Mapping Public Utility Easement	2	NC10542recbndy|BORDER2	0.25
NC10542recbndy|X-MA-RW	Existing Mapping Right of Way	4	Continuous	0.5
NC10542recbndy|X-MA-SN	Existing Mapping Street Name	3	Continuous	0.35
NC10542recbndy|X-MA-REC	Existing Mapping Surrounding Data (Record Info, Lot No. etc.	2	Continuous	0.25
NC10542recbndy|X-MA-PUETX	Existing Mapping Public Utility Easement Text	2	Continuous	0.25
NC10542recbndy|P-MA-TIC	Proposed Mapping Property or Centerline Tick	2	Continuous	default
NC10542recbndy|P-PN-NAR	Proposed Plan North Arrow	4	Continuous	0.5
NC10542recbndy|P-MA-TX	Proposed Mapping Notes, Labels etc.	3	Continuous	0.35
NC10542recbndy|P-PN-DIM	Proposed Plan Dimension	3	Continuous	default
X-SD-MHDATA	Existing Storm Drain Manhole Data	2	Continuous	0.25
X-UT-ELEC	Existing Dry Utilities Electrical Conduit	71	_XE	0.25
X-UT-CATV	Existing Dry Utilities Cable TV Line	71	_XCATV	0.25
X-UT-GAS	Existing Dry Utilities Gas Line	71	_XG	0.25
X-UT-TEL	Existing Dry Utilities Telephone Line	71	_XT	0.25
X-UT-TX	Existing Dry Utilities Notes, Labels etc.	71	Continuous	0.25

Point Number	Northing	Easting	Elevation	Descripiton
1	2075491.847	6401217.035	75.49	START
100	2075491.847	6401217.035	75.49	SET MAG NAIL
102	2074887.944	6401261.797	77.02	SET 1/2"" IP W/ MVE CAP
103	2074887.953	6401261.797	77.00	CHECK
104	2075460.533	6401069.102	74.71	EP
105	2075458.967	6401069.37	74.57	FL
106	2075458.364	6401069.843	75.04	TC
107	2075453.5	6401070.591	75.19	BSW
108	2075453.415	6401071.024	75.25	CONC
109	2075429.603	6401075.7	76.36	CONC
110	2075429.461	6401075.189	76.37	FENCE
111	2075433.782	6401093.221	76.16	FENCE
112	2075433.998	6401093.325	76.33	CONC
113	2075456.45	6401092.738	75.13	CONC
114	2075456.286	6401091.597	75.12	CONC
115	2075457.412	6401091.494	75.10	CONC
116	2075455.449	6401080.277	75.18	CONC
117	2075442.528	6401082.51	75.75	CONC
118	2075432.495	6401084.159	76.17	CONC
119	2075456.343	6401091.471	75.51	DRAIN
120	2075457.069	6401092.005	77.89	BRICK PILLAR
121	2075457.353	6401090.56	75.13	BSW
122	2075462.413	6401089.77	74.92	TC
123	2075463.105	6401089.781	74.47	FL
124	2075464.568	6401089.634	74.55	EP
125	2075449.154	6401066.694	76.36	TREE1.9DIA20DRIP
126	2075463.386	6401096.8	74.87	TCDRIVEW
127	2075463.98	6401096.533	74.39	FL
128	2075465.514	6401096.311	74.53	EP
129	2075458.485	6401097.627	75.02	BSW
130	2075465.268	6401107.861	74.52	TC
131	2075465.674	6401107.86	74.36	FL
132	2075467.364	6401119.589	74.32	FL
133	2075466.772	6401119.694	74.80	TC DRIVE E
134	2075461.828	6401120.337	74.99	BSW
135	2075468.866	6401119.484	74.45	EP
136	2075472.244	6401159.623	74.42	EP
137	2075470.775	6401159.716	74.27	FL
138	2075467.692	6401160.001	74.83	SD CO 2X2
139	2075465.084	6401160.034	74.92	BSW
140	2075468.411	6401179.651	74.76	SD CO 2X2
141	2075472.254	6401179.84	74.24	DI
142	2075471.508	6401182.663	74.28	FL
143	2075470.842	6401182.638	74.77	TC
144	2075472.909	6401182.584	74.43	EP
145	2075465.735	6401182.697	74.90	BSW

146	2075464.646	6401189.136	75.12	BSW
147	2075469.156	6401191.191	74.98	TC WC RAMP
148	2075469.8	6401191.478	74.49	FL
149	2075471.181	6401192.17	74.65	EP
150	2075468.11	6401197.034	74.77	EP
151	2075466.956	6401195.801	74.61	FL
152	2075466.618	6401195.49	74.71	TC WC RAMP
153	2075462.631	6401192.306	75.23	TC
154	2075461.817	6401191.145	75.22	SL
155	2075463.443	6401190.993	75.13	CONC
156	2075461.28	6401189.323	75.18	CONC
157	2075459.543	6401191.1	75.21	CONC
158	2075461.688	6401193.056	75.23	CONC
159	2075459.72	6401194.899	75.38	BSW
160	2075462.729	6401198.952	75.21	TC WC RAMP
161	2075463.14	6401199.519	74.72	FL
162	2075464.069	6401200.836	74.90	EP
163	2075456.551	6401204.067	75.09	EP
164	2075456.248	6401202.573	74.92	FL
165	2075456.141	6401201.988	75.42	TC
166	2075455.096	6401197.022	75.56	BSW
167	2075435.337	6401195.739	75.97	H20 METER
168	2075432.624	6401194.137	76.03	H2O SHUTOFF S
169	2075435.822	6401193.942	76.01	H2O SHUTOFF N
170	2075436.136	6401193.157	75.98	CONC
171	2075436.274	6401194.854	75.99	CONC
172	2075432.252	6401194.865	76.01	CONC
173	2075432.24	6401193.154	75.98	CONC
174	2075428.564	6401192.74	76.02	H2O VALVE1.5X1NS
175	2075428.531	6401193.827	76.06	H2O VALVE1.5X1NS
176	2075428.438	6401197.864	75.70	BSW
177	2075428.628	6401202.832	75.55	TC
178	2075428.56	6401203.496	75.05	FL
179	2075428.543	6401204.94	75.22	EP
180	2075386.736	6401205.607	75.31	EP
181	2075386.706	6401204.181	75.14	FL
182	2075386.655	6401203.531	75.61	TC DRIVE N
183	2075386.417	6401198.455	75.76	BSW
184	2075389.114	6401186.429	76.48	TV CABLE
185	2075391.028	6401186.163	76.47	MIDELEC2.5X1.5EW
186	2075391.225	6401179.526	76.85	CONC
187	2075391.126	6401198.334	75.78	CONC
188	2075365.235	6401198.738	75.69	CONC
189	2075365.715	6401180.86	76.80	CONC
190	2075364.348	6401198.882	75.75	BSW
191	2075362.889	6401197.781	75.74	H2O METER
192	2075375.179	6401204.323	75.16	FL

193	2075375.207	6401205.839	75.31	EP
194	2075375.159	6401203.76	75.33	TC
195	2075375.095	6401198.65	75.76	BSW
196	2075364.358	6401203.967	75.63	TC
197	2075364.406	6401204.517	75.15	FL
198	2075364.805	6401205.955	75.33	EP
199	2075326.3	6401206.682	75.42	EP
200	2075326.248	6401205.174	75.25	FL
201	2075326.155	6401204.509	75.70	TC
202	2075326.008	6401199.494	75.87	BSW
203	2075326.168	6401199.376	75.85	CONC
204	2075326.119	6401197.635	75.94	CONC
205	2075323.655	6401197.543	75.89	CONC
206	2075323.67	6401199.398	75.86	CONC
207	2075324.246	6401198.577	78.13	FH
208	2075325.731	6401209.907	75.51	H2O VALVE1.5X1NS
209	2075307.198	6401198.485	75.92	H2O METER
210	2075283.586	6401207.194	75.51	EP
211	2075283.662	6401205.806	75.33	FL
212	2075283.587	6401205.178	75.82	TC DRIVE N
213	2075283.528	6401200.08	75.95	BSW
214	2075271.911	6401205.476	75.51	TC
215	2075271.899	6401205.97	75.34	FL
216	2075260.649	6401206.156	75.37	FL
217	2075260.633	6401207.767	75.56	EP
218	2075260.615	6401205.516	75.85	TC DRIVE S
219	2075260.501	6401200.492	75.97	BSW
220	2075256.669	6401200.677	76.01	BSW
221	2075256.266	6401205.582	75.86	TC
222	2075256.559	6401206.273	75.39	FL
223	2075256.147	6401207.781	75.61	EP
224	2075257.878	6401222.976	75.86	EP
225	2075256.815	6401244.599	75.59	EP
226	2075256.885	6401246.174	75.39	FL
227	2075256.199	6401246.793	75.85	TC
228	2075256.307	6401251.823	75.99	BSW
229	2075254.615	6401258.735	76.52	HIGH VOLTAGE
230	2075254.703	6401262.629	76.63	HIGH VOLTAGE
231	2075258.466	6401262.613	76.53	HIGH VOLTAGE
232	2075258.414	6401258.607	76.45	HIGH VOLTAGE
233	2075254.831	6401258.668	76.51	HIGH VOLTAGE
234	2075256.262	6401263.973	76.40	MIDELEC2.5X1.5EW
235	2075258.048	6401263.79	76.51	TV CABLE 2X1NS
236	2075260.87	6401246.714	75.88	TC DRIVE S
237	2075260.873	6401245.995	75.39	FL
238	2075260.857	6401244.521	75.49	EP
239	2075272.369	6401245.94	75.35	FL

240	2075272.343	6401246.574	75.52	TC
241	2075283.66	6401246.379	75.79	TC DRIVE N
242	2075283.725	6401245.873	75.32	FL
243	2075283.768	6401244.249	75.47	EP
244	2075283.967	6401251.404	75.93	BSW
245	2075305.334	6401252.235	75.99	H2O METER
246	2075319.646	6401250.775	75.93	BSW
247	2075319.4	6401245.806	75.77	TC DRIVE S
248	2075319.53	6401245.201	75.28	FL
249	2075319.511	6401243.728	75.37	EP
250	2075328.396	6401245.657	75.44	TC
251	2075328.436	6401245.078	75.28	FL
252	2075338.128	6401244.886	75.30	FL
253	2075338.138	6401245.451	75.78	TC DRIVE N
254	2075338.073	6401243.354	75.46	EP
255	2075338.349	6401250.513	76.02	BSW
256	2075361.317	6401251.899	76.47	H2O METER
257	2075364.865	6401250.111	75.81	BSW
258	2075364.7	6401245.047	75.70	TC DRIVE S
259	2075364.706	6401244.443	75.20	FL
260	2075364.697	6401242.919	75.37	EP
261	2075376.32	6401244.371	75.14	FL
262	2075376.433	6401245.031	75.33	TC
263	2075387.865	6401249.833	75.77	BSW
264	2075387.714	6401244.819	75.63	TC DRIVE N
265	2075387.686	6401244.071	75.14	FL
266	2075387.687	6401242.553	75.30	EP
267	2075388.316	6401261.764	76.48	H2O VALVE1.5X1NS
268	2075391.913	6401261.679	76.65	PG&E CO
269	2075393.309	6401261.826	76.69	MID ELECT
270	2075395.297	6401261.784	76.43	TV CABLE
271	2075397.658	6401249.654	75.75	BSW
272	2075397.484	6401244.523	75.63	TC DRIVE S
273	2075397.419	6401243.917	75.14	FL
274	2075397.392	6401242.425	75.28	EP
275	2075408.471	6401243.787	75.08	FL
276	2075408.531	6401244.52	75.25	TC
277	2075419.436	6401244.245	75.59	TC DRIVE N
278	2075419.478	6401243.695	75.11	FL
279	2075419.373	6401242.092	75.22	EP
280	2075419.619	6401249.329	75.72	BSW
281	2075446.61	6401248.766	75.61	BSW
282	2075446.607	6401243.749	75.46	TC WC RAMP
283	2075446.551	6401243.187	74.99	FL
284	2075446.495	6401241.549	75.10	EP
285	2075455.205	6401241.963	75.08	EP
286	2075455.338	6401243.461	74.94	FL

287	2075463.535	6401246.184	74.85	FL
288	2075463.254	6401246.564	75.36	TC WC RAMP
289	2075464.404	6401244.883	74.94	EP
290	2075454.167	6401243.872	75.01	TC
291	2075453.224	6401248.9	75.08	BSW
292	2075458.061	6401251.617	75.71	BSW
293	2075457.827	6401252.07	75.75	BSW
294	2075457.302	6401251.597	75.75	TC
295	2075452.634	6401249.243	75.68	TC
296	2075446.692	6401248.784	75.62	TC
297	2075460.783	6401255.142	75.74	BSW
298	2075466.877	6401261.473	75.39	BSW
299	2075471.72	6401260.716	75.29	TC
300	2075472.349	6401260.621	74.77	FL
301	2075473.712	6401260.464	74.90	EP
302	2075463.208	6401246.713	75.36	TC WC RAMP
303	2075463.352	6401246.421	74.85	FL
304	2075464.396	6401244.917	74.94	EP
305	2075473.31	6401264.777	74.69	DI
306	2075469.111	6401264.792	75.29	SD CO 2X2
307	2075474.42	6401284.724	74.98	EP
308	2075472.994	6401284.905	74.92	FL
309	2075472.358	6401285.052	75.36	TC
310	2075467.396	6401285.152	75.51	BSW
311	2075467.328	6401285.113	75.52	CONC
312	2075464.563	6401285.463	75.58	CONC
313	2075464.386	6401288.843	75.56	CONC
314	2075467.279	6401288.73	75.52	CONC
315	2075467.27	6401285.365	75.52	CONC
316	2075466.926	6401285.775	75.53	BULLARD
317	2075467.079	6401292.015	75.68	BULLARD
318	2075467.34	6401290.766	76.10	CONC
319	2075467.23	6401288.876	76.09	CONC
320	2075463.82	6401290.806	76.09	CONC
321	2075467.309	6401290.808	76.10	CONC
322	2075466.97	6401289.812	76.12	ELEC BOX
323	2075464.194	6401289.822	76.07	ELEC BOX
324	2075468.013	6401327.709	75.67	BSW
325	2075473.075	6401327.553	75.48	TC
326	2075473.703	6401327.525	74.98	FL
327	2075475.218	6401327.459	75.19	EP
328	2075467.843	6401340.381	75.72	BULLARD
329	2075467.884	6401349.973	75.72	BULLARD
330	2075468.294	6401351.286	75.70	CONC
331	2075464.807	6401351.225	75.74	CONC
332	2075465.165	6401347.187	75.74	CONC
333	2075468.192	6401347.127	75.68	CONC

334	2075468.044	6401347.102	75.96	CONC
335	2075464.712	6401347.051	75.96	CONC
336	2075464.597	6401343.704	75.96	CONC
337	2075468.047	6401343.635	75.92	CONC
338	2075468.196	6401343.615	75.70	CONC
339	2075468.164	6401339.531	75.72	CONC
340	2075464.904	6401339.685	75.75	CONC
341	2075464.915	6401343.636	75.72	CONC
342	2075462.883	6401342.51	75.70	MID VALVE.5 SOUT
343	2075461.191	6401338.415	75.95	MID VAULT
344	2075457.866	6401338.675	76.07	MID VAULT
345	2075457.917	6401342.331	75.98	MID VAULT
346	2075457.829	6401342.635	76.04	HIGH VOLTAGE
347	2075458.156	6401346.158	76.02	HIGH VOLTAGE
348	2075461.195	6401342.334	76.05	HIGH VOLTAGE
349	2075464.947	6401343.842	75.97	ELECT BOX
350	2075467.528	6401344.024	75.92	ELECT BOX
351	2075467.612	6401346.67	75.98	ELECT BOX
352	2075465.17	6401346.774	75.61	ELECT BOX
353	2075464.817	6401347.758	75.66	ANTENNA
354	2075461.926	6401350.359	75.95	ELEC BOX
355	2075462.187	6401355.422	75.84	ELEC BOX
356	2075456.485	6401350.819	76.50	ELEC BOX
357	2075456.732	6401355.668	76.36	ELEC BOX
358	2075455.959	6401356.706	76.43	BULLARD
359	2075462.93	6401356.088	76.00	BULLARD
360	2075468.456	6401356.663	75.74	BSW
361	2075473.511	6401356.301	75.61	TC
362	2075474.167	6401356.202	75.12	FL
363	2075475.666	6401356.126	75.26	EP
364	2075474.64	6401368.472	75.12	EP
365	2075474.046	6401368.53	75.29	TC
366	2075474.54	6401380.012	75.63	TC
367	2075475.131	6401379.968	75.15	FL
368	2075476.618	6401379.931	75.32	EP
369	2075469.493	6401380.227	75.77	BSW
370	2075468.424	6401356.735	75.74	CONC
371	2075453.534	6401357.29	76.87	CONC
372	2075454.446	6401350.507	76.70	CONC WALL
373	2075454.089	6401321.916	76.79	CONC WALL
374	2075458.93	6401348.439	76.13	OG
375	2075455.33	6401346.943	76.66	OG
376	2075456.037	6401334.226	76.63	OG
377	2075462.363	6401333.38	76.44	OG
378	2075466.6	6401334.637	75.97	OG
379	2075467.562	6401338.862	75.84	OG
380	2075486.296	6401379.667	75.71	PAV

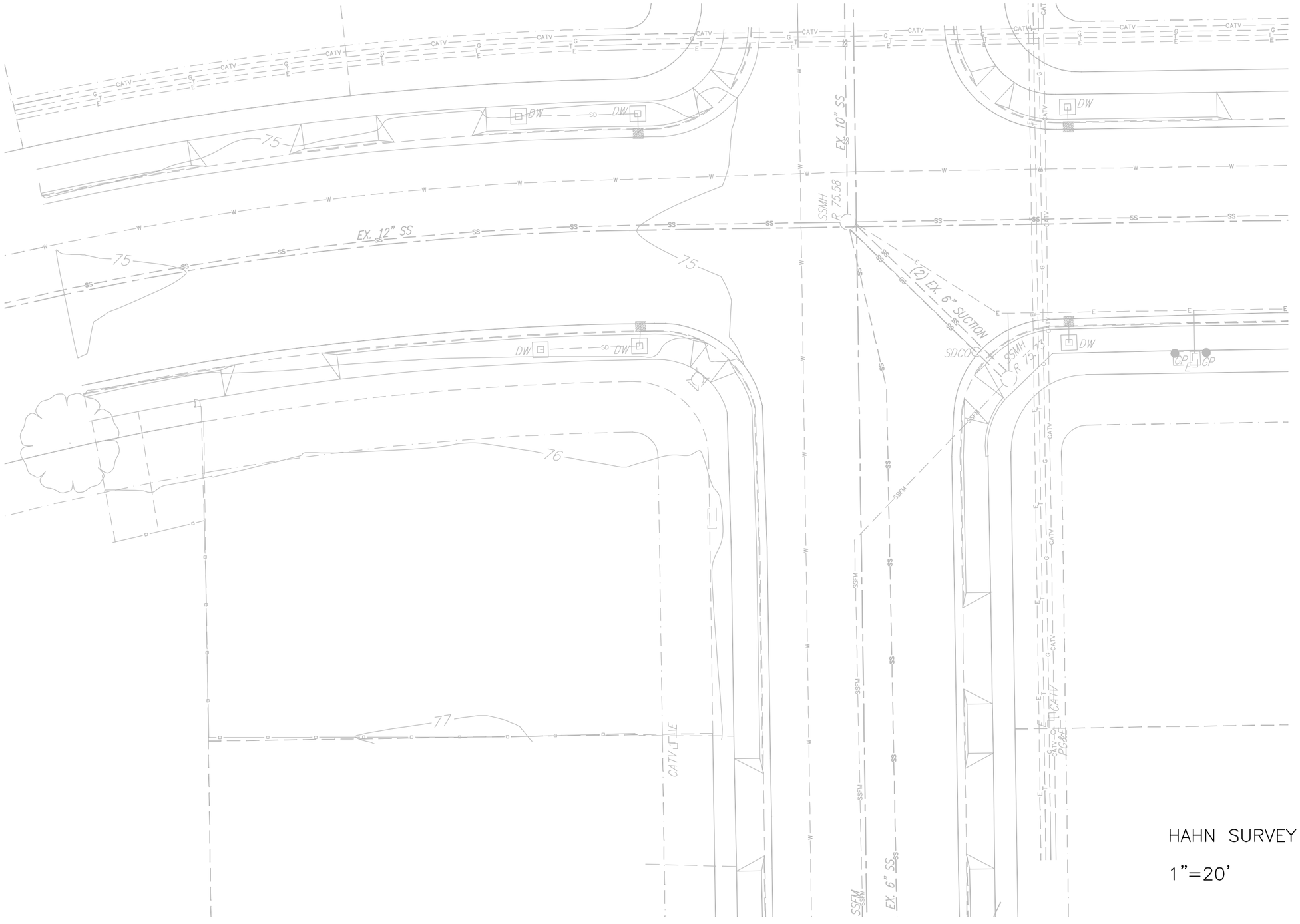
381	2075495.424	6401379.032	75.79	PAV
382	2075509.816	6401378.478	75.61	PAV
383	2075513.52	6401378.475	75.35	EP
384	2075514.961	6401378.294	75.24	FL
385	2075515.545	6401378.358	75.42	TC
386	2075520.716	6401378.207	75.82	BSW
387	2075520.099	6401366.149	75.77	BSW
388	2075515.128	6401366.276	75.62	TC
389	2075514.482	6401366.335	75.15	FL
390	2075513.004	6401366.359	75.31	EP
391	2075521.396	6401361.237	75.74	H2O METER
392	2075519.347	6401331.611	75.70	BSW
393	2075514.343	6401331.884	75.54	TC
394	2075513.683	6401331.892	75.01	FL
395	2075512.183	6401331.9	75.23	EP
396	2075513.444	6401317.548	75.02	FL
397	2075514.122	6401317.267	75.50	TC DRIVE E
398	2075519.164	6401317.096	75.66	TC
399	2075514.032	6401306.017	75.13	TC
400	2075513.371	6401306.163	74.95	FL
401	2075511.921	6401306.112	75.09	EP
402	2075511.742	6401294.201	75.07	EP
403	2075513.166	6401294.147	74.96	FL
404	2075513.704	6401294.037	75.43	TCDRIVEW
405	2075518.698	6401293.994	75.66	BSW
406	2075519.97	6401291.642	75.48	H2O METER
407	2075518.236	6401262.117	75.42	BSW
408	2075513.269	6401262.164	75.32	TC
409	2075512.573	6401262.186	74.83	FL
410	2075511.829	6401264.65	74.90	DI
411	2075515.826	6401264.497	75.40	SD CO 2X2
412	2075514.283	6401253.389	74.94	FL
413	2075512.993	6401252.947	75.09	EP
414	2075515.025	6401253.697	75.43	TC WC RAMP
415	2075519.911	6401255.108	75.54	BSW
416	2075517.949	6401249.208	74.99	TC
417	2075517.478	6401248.854	74.90	FL
418	2075516.127	6401247.694	75.04	EP
419	2075520.647	6401243.627	75.16	EP
420	2075521.47	6401245.006	74.95	TC WC RAMP
421	2075522.059	6401245.457	75.46	TC WC RAMP
422	2075524.723	6401249.632	75.71	BSW
423	2075531.781	6401247.355	75.81	BSW
424	2075531.637	6401242.327	75.55	TC
425	2075531.765	6401241.738	75.05	FL
426	2075531.842	6401240.124	75.21	EP
427	2075532.026	6401231.683	75.58	PAV

428	2075531.838	6401220.869	75.53	PAV
429	2075531.664	6401209.503	75.31	PAV
430	2075531.49	6401203.378	75.19	EP
431	2075531.497	6401201.907	75.00	FL
432	2075525.019	6401211.119	75.29	H2O VALVE1.5X1NS
433	2075531.273	6401201.271	75.48	TC
434	2075531.178	6401196.359	75.63	BSW
435	2075523.936	6401194.286	75.36	BSW
436	2075521.285	6401198.513	75.24	TC WC RAMP
437	2075520.94	6401199.204	74.74	FL
438	2075519.978	6401200.563	74.95	EP
439	2075516.736	6401195.368	74.52	FL
440	2075517.168	6401195.017	74.60	TC
441	2075514.195	6401190.67	74.94	TC WC RAMP
442	2075513.528	6401190.992	74.48	FL
443	2075512.048	6401191.614	74.64	EP
444	2075518.503	6401188.437	75.08	BSW
445	2075516.993	6401181.973	74.90	BSW
446	2075512.067	6401182.065	74.64	TC
447	2075511.305	6401182.086	74.16	FL
448	2075509.86	6401182.082	74.37	EP
449	2075510.549	6401179.401	74.24	DI
450	2075514.455	6401179.297	74.82	SD CO 2X2
451	2075501.558	6401185.891	74.62	H2O VALVE
452	2075525.07	6401211.171	75.29	H2O VALVE
453	2075517.569	6401165.378	75.15	H2O METER
454	2075513.924	6401155.651	74.89	SD CO 2X2
455	2075516.144	6401155.733	74.93	BSW
456	2075511.188	6401155.713	74.82	TC
457	2075510.591	6401155.594	74.31	FL
458	2075509.147	6401155.959	74.45	EP
459	2075508.604	6401149.638	74.44	EP
460	2075510.177	6401149.454	74.32	FL
461	2075510.733	6401149.429	74.80	TC DRIVE E
462	2075515.838	6401149.195	74.94	BSW
463	2075509.973	6401138.913	74.49	TC
464	2075509.492	6401138.924	74.32	FL
465	2075508.448	6401127.981	74.32	FL
466	2075508.996	6401127.878	74.81	TCDRIVEW
467	2075506.975	6401128.046	74.46	EP
468	2075514.088	6401127.409	74.97	BSW
469	2075507.4	6401113.243	74.85	TC DRIVE E
470	2075506.776	6401113.256	74.34	FL
471	2075505.234	6401102.47	74.38	FL
472	2075503.799	6401102.64	74.51	EP
473	2075505.726	6401102.398	74.49	TC
474	2075510.953	6401101.729	75.03	BSW

475	2075508.924	6401090.212	74.99	BSW
476	2075504.253	6401090.838	74.83	TCDRIVEW
477	2075503.554	6401090.9	74.41	FL
478	2075502.126	6401091.143	74.50	EP
479	2075507.191	6401069.246	75.25	H2O METER
480	2075503.402	6401060.15	75.23	BSW
481	2075498.689	6401061.018	75.05	TC
482	2075498.044	6401061.109	74.55	FL
483	2075496.477	6401061.419	74.72	EP
484	2075488.822	6401064.684	74.84	PAV
485	2075479.176	6401066.343	75.03	PAV
486	2075467.747	6401068	74.94	PAV
487	2075475.769	6401113.346	74.62	PAV
488	2075487.036	6401114.108	74.73	PAV
489	2075498.186	6401112.872	74.60	PAV
490	2075500.852	6401168.44	74.58	PAV
491	2075491.274	6401169.201	74.74	PAV
492	2075482.867	6401169.45	74.78	PAV
493	2075470.142	6401205.666	75.34	PAV
494	2075491.282	6401205.548	75.26	PAV
495	2075510.144	6401206.634	75.24	PAV
496	2075511.174	6401222.086	75.53	PAV
497	2075512.358	6401239.794	75.26	PAV
498	2075502.027	6401246.775	75.24	PAV
499	2075503.453	6401258.574	75.06	H2O VALVE
500	2075491.355	6401257.956	75.26	PAV
501	2075478.43	6401257.953	75.02	PAV
502	2075478.079	6401234.537	75.40	PAV
503	2075477.455	6401221.044	75.50	PAV
504	2075458.966	6401211.929	75.27	H2O VALVE
505	2075446.531	6401210.124	75.31	PAV
506	2075446.601	6401225.22	75.50	PAV
507	2075447.235	6401237.767	75.22	PAV
508	2075389.781	6401237.769	75.45	PAV
509	2075389.016	6401222.494	75.63	PAV
510	2075388.145	6401210.652	75.44	PAV
511	2075332.877	6401214.087	75.59	PAV
512	2075333.076	6401226.14	75.75	PAV
513	2075333.898	6401238.287	75.56	PAV
514	2075278.432	6401237.615	75.65	PAV
515	2075277.24	6401225.362	75.79	PAV
516	2075276.272	6401212.751	75.65	PAV
517	2075250.103	6401230.361	77.19	BULLARD
518	2075247.048	6401234.195	77.26	BULLARD
519	2075247.624	6401239.129	77.20	BULLARD
520	2075247.674	6401243.789	77.26	BULLARD
521	2075250.614	6401247.813	77.35	BULLARD

522	2075240.244	6401228.258	77.13	BULLARD
523	2075236.086	6401228.627	77.12	BULLARD
524	2075235.695	6401224.999	77.12	BULLARD
525	2075239.732	6401224.638	77.43	BULLARD
526	2075241.012	6401223.867	77.07	CONC
527	2075235.052	6401223.624	77.09	CONC
528	2075235.046	6401229.272	77.07	CONC
529	2075240.906	6401229.263	77.08	CONC
530	2075237.846	6401226.358	77.09	SS MH
531	2075312.493	6401231.511	75.72	SS MH
532	2075461.899	6401252.868	75.63	SD MH
533	2075467.217	6401246.414	74.90	CO
534	2075504.769	6401302.977	75.33	PAV
535	2075492.548	6401304.265	75.37	PAV
536	2075481.111	6401304.262	75.21	PAV
537	2075483.951	6401349.594	75.46	PAV
538	2075493.458	6401349.169	75.61	PAV
539	2075505.774	6401348.889	75.46	PAV
540	2075459.247	6401182.582	75.27	OG
541	2075440.956	6401186.788	76.17	OG
542	2075417.793	6401186.999	76.22	OG
543	2075394.97	6401187.549	76.25	OG
544	2075395.77	6401160.661	76.55	OG
545	2075391.611	6401178.794	76.66	FENCE
546	2075390.94	6401151.937	77.14	FENCE
547	2075400.24	6401146.304	76.56	OG
548	2075399.052	6401119.406	76.44	OG
549	2075391.098	6401109.499	76.76	FENCE
550	2075390.833	6401094.242	76.64	FENCE
551	2075400.979	6401098.425	76.46	OG
552	2075425.011	6401100.594	76.16	OG
553	2075424.705	6401093.568	76.31	FENCE
554	2075433.514	6401093.331	76.14	FENCE
555	2075424.113	6401124.359	76.42	OG
556	2075424.414	6401153.156	76.51	OG
557	2075424.203	6401174.409	76.57	OG
558	2075443.507	6401177.299	75.93	OG
559	2075444.058	6401145.531	76.23	OG
560	2075443.266	6401118.621	76.19	OG
561	2075441.175	6401094.974	75.96	OG
562	2075455.968	6401095.743	75.05	OG
563	2075457.529	6401122.108	75.09	OG
564	2075458.883	6401149.973	75.22	OG
565	2075460.351	6401174.174	75.10	OG
566	2075456.176	6401194.07	75.42	OG
567	2075402.784	6400834.065	75.51	SSMH
568	2075492.982	6401220.923	75.48	SD MH

569	2075245.594	6401246.878	77.32	OG
570	2075243.472	6401231.308	77.19	OG
571	2075240.351	6401205.968	76.98	OG
572	2075202.807	6401203.321	77.07	OG
573	2075199.99	6401229.554	77.18	OG
574	2075200.125	6401251.073	77.16	OG
575	2075154.511	6401250.453	76.97	OG
576	2075154.444	6401225.508	76.85	OG
577	2075153.168	6401203.32	76.97	OG
578	2074792.474	6401231.505	77.15	BULLARD
579	2074792.411	6401235.493	77.10	BULLARD
580	2074788.723	6401235.234	77.13	BULLARD
581	2074788.86	6401231.358	77.11	BULLARD
582	2074790.694	6401233.272	77.21	SS MH
583	2074793.605	6401230.998	77.15	CONC
584	2074793.689	6401236.318	77.12	CONC
585	2074788.09	6401236.091	77.14	CONC
586	2074788.737	6401230.372	77.19	CONC
587	2074425.545	6401238.407	81.70	SSMH
20100	2050204.342	6408052.566	-	FND.BDISK PT2222
20106	2071179.62	6397280.207	-	2620
20109	2076590.952	6402542.756	-	2721
20110	2060366.367	6418753.06	-	2424



HAHN SURVEY PLAN

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GEOTECHNICAL SERVICES REPORT
HAHN LIFT STATION REMODEL/ REPLACEMENT
CITY OF MODESTO
MODESTO, CALIFORNIA

July 19, 2011

KLEINFELDER
Bright People. Right Solutions.

File No. 119671.G01
July 19, 2011

Ms. Dana Hunt
HDR Engineering, Inc.
2121 North California Blvd
Walnut Creek, CA 94596

Subject: **Geotechnical Services Report**
Proposed Remodel/Replacement
Hahn Lift Station
City of Modesto
Modesto, California

Dear Ms. Hunt:

Kleinfelder is pleased to present the results of our geotechnical services performed for the proposed remodel/replacement of the City of Modesto Hahn Lift Station in Modesto, California. The accompanying report includes background information regarding the anticipated construction, purpose of our services, and scope of services provided. In addition, discussions regarding our investigative procedures and the site conditions encountered during our field exploration are presented. Finally, geotechnical conclusions and recommendations are provided for project design and construction. The appendix of the report includes logs of borings and a summary of laboratory tests.

We appreciate the opportunity to provide our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact us.

Respectfully submitted,

KLEINFELDER WEST, INC.

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
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EXP. 12-31-11
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GEOTECHNICAL SERVICES REPORT
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

1.0 INTRODUCTION

In this report we present the results of our geotechnical services performed for the proposed remodel/replacement of the City of Modesto Hahn Lift Station located southwest of the intersection of Nightingale Drive and Honey Creek Road in Modesto, California. A site plan and vicinity map showing the approximate location of the proposed lift station remodel/replacement explorations is presented on Plate 1.

We understand the existing lift station will likely be replaced; however, it is possible that portions of the existing structures can be remodeled. We understand the approximate 35-foot deep replacement wet well will be located on the east side of the site. An approximate 10-foot valve vault will be located adjacent to the proposed wet well. An approximate 30-foot deep new sewer line connecting an existing manhole at the center of Nightingale Drive and Honey Creek Road to the lift station is planned. We anticipate the wet well structure will be supported on a mat foundation and the precast vault structure will be supported on compacted soil or aggregate base. We anticipate loading for the structures will be less than 2,000 pounds per square foot. Additional details of the proposed construction are not known to our firm at this time.

In the event the structural or grading details outlined above are inconsistent with the final design criteria, our firm should be contacted prior to final design in order that we may update our recommendations as needed.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of our services was to:

- Explore and evaluate the subsurface conditions as close as possible to the proposed replacement structure locations.

- Develop recommendations related to the geotechnical aspects of project design and construction.

The scope of our services was outlined in our proposal dated December 7, 2010 (Proposal No. 114781.PROPA2) and included the following:

- A visual site reconnaissance to observe the surface conditions at the project site.

- A field investigation that consisted of drilling borings as close as possible to the proposed replacement structure locations to explore the subsurface conditions.

- Laboratory testing of representative samples obtained during the field investigation to evaluate relevant physical and engineering parameters of the subsurface soils

- Evaluation of the data obtained and an engineering analysis to develop our conclusions and recommendations

- Preparation of this report which includes:

  - A description of the proposed project

  - A description of the field and laboratory investigations

- A description of the surface and subsurface conditions encountered during our field investigation
- Conclusions and recommendations related to the geotechnical aspects of the proposed project design and construction
- A site plan and vicinity map, and
- An appendix that includes logs of borings and a summary of laboratory tests.

3.0 FIELD AND LABORATORY INVESTIGATIONS

3.1 FIELD INVESTIGATION

The subsurface conditions at the proposed improvement locations were explored on June 8, 2011, by drilling two borings to depths of approximately 21½ and 51½ feet below existing site grade. The borings were drilled using a Simco 2400 truck-mounted drill rig equipped with 4-inch O.D. solid-stem auger. The approximate boring locations are indicated on Plate 1.

During the drilling operations, penetration tests were performed in accordance with ASTM D-1586 at regular intervals using a Modified California Sampler to evaluate the relative density of coarse-grained (cohesionless) soil and to retain soil samples for laboratory testing. The penetration tests were performed by initially driving the sampler 6 inches into the bottom of the bore hole using a 140 pound trip-hammer falling 30 inches to penetrate loose soil cuttings and "seat" the sampler. Thereafter, the sampler was progressively driven an additional 12 inches, with the results recorded as the corresponding number of blows required to advance the sampler 12 inches, or any part thereof. The consistency of fine grained (cohesive) soil was determined in accordance with ASTM D-2488. A representative with our firm maintained logs of the borings and visually classified the soils encountered according to the Unified Soil Classification System and Kleinfelder's Soils Description Key (see Plates A-1 and A-2 of the appendix). Soil samples obtained from the borings were packaged and sealed in the field to reduce moisture loss and disturbance and brought to our laboratory for testing.

A key to the Logs of Borings is presented on Plate A-3 of the appendix. The Logs of Borings drilled for this investigation are presented on Plates A-4 and A-5 of the appendix. The borings were located in the field by visual sighting and/or pacing from existing site features; therefore, the locations shown on Plate 1 should be considered approximate and may vary from that indicated on the plates. The field penetration resistance (blows/foot) shown on the logs of borings represents field penetration data that has not been corrected for overburden pressure, sampler size, hammer type, borehole diameter, rod length, sampling method or any other correction factor.

3.2 LABORATORY INVESTIGATION

Laboratory tests were performed in accordance with current ASTM standards on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory-testing program was formulated with emphasis on the evaluation of natural moisture content, in-place density, and percent passing the #200 sieve of the materials encountered. The results of the laboratory tests are summarized on Plate A-6 of the appendix. This information, along with the field observations, was used to prepare the final test boring logs.

4.0 SITE CONDITIONS

4.1 SURFACE

At the time of our explorations, the project site consisted of an open lawn area. We understand a residence with a pool existed on the site previously. Boring B-1 was drilled at the proposed wet well location on the eastern portion of the site. Boring B-2 was drilled on the western portion of the site in an area that appeared to have previously contained a pool. The site was bound to the south and west by residences, to the north by Nightingale Drive and residences, and to the east by Honey Creek Road and residences. The precise locations of underground utility lines and other buried objects at the site are unknown to our firm at this time.

4.2 SUBSURFACE CONDITIONS

The near-surface soils consisted of loose, silty, and clayey sand that extended to a depth of approximately 2½. The near-surface soils were underlain by firm to very-hard, sandy silt that extended to depths of approximately 7½ and 8 feet in borings B-1 and B-2, respectively. An exception was medium-dense, silty sand soil encountered between depths of approximately 4 and 6 feet in boring B-1. The sandy silt was underlain by medium-dense, poorly-graded sand that extended to a depth of approximately 11 feet. The poorly-graded sand was underlain by firm to hard, sandy silt that extended to depths of approximately 12 and 13 feet in borings B-1 and B-2, respectively. The sandy silt was underlain by interbedded and discontinuous strata of medium-dense, silty, and poorly-graded sand; firm to hard, sandy silt; and hard, sandy clay that extended to the depths explored.

The borings were checked for the presence of groundwater during and immediately following drilling operations. Groundwater was measured in boring B-1 at a depth of approximately 20 feet below existing grade just after drilling. It should be noted that groundwater elevations and soil moisture conditions within the project area will vary depending on seasonal rainfall, land use, and/or runoff conditions not apparent at the time of our field investigation.

Detailed descriptions of the subsurface conditions encountered in the borings drilled for this investigation are presented on the Logs of Borings, Plates A-4 and A-5 of the appendix.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Based on our findings, it is our professional opinion that the site should be suitable from a geotechnical standpoint for support of the proposed lift station replacement structures provided the recommendations contained herein are incorporated into the project design. Given the subsurface conditions encountered, the majority of the subsurface soils at the proposed structure foundation depths should be essentially non-expansive. The primary geotechnical considerations are the presence of undocumented fill placed to backfill around and above existing structures at the site and the groundwater encountered near the proposed depth of the pump structure. Based on our borings, the onsite soils, minus any debris, should be adequate for use as engineered fill.

Specific conclusions and recommendations addressing the geotechnical considerations, as well as general recommendations regarding the geotechnical aspects of design and construction, are presented in the following sections. The conclusions and recommendations are based on the structure layout and grading plan provided to us and the information contained in Section 1.0.

5.2 EXCAVATIONS

5.2.1 General

The owner and contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including the current Occupational Safety and Health Agency (OSHA) Excavation and Trench Safety Standards. Construction site safety is generally the sole responsibility of the contractor, who should also be solely responsible for the means, methods, and sequencing of construction operations. We are providing our recommendations solely as a service to our client. Under no circumstances should the information provided in the following subsections be interpreted to mean that Kleinfelder is assuming

responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

As discussed in Section 4.2 of this report, the soils encountered consisted primarily of sand and silt soils to the depth explored. Relatively "clean" sand was predominate between depths of approximately 8 and 11 feet in both borings and 13 and 20 feet in boring B-1. Free groundwater was encountered in boring B-1 at a depth of approximately 20 feet. Therefore, it appears that groundwater will be encountered within the excavation for the wet well structure. However, it is possible that the groundwater elevation could rise or fall prior to the time of construction.

5.2.2 Excavation Difficulty

As noted in Section 1.0, excavations to at least 10, 30, and 35 feet below ground surface are proposed for the vault, pipeline, and wet well structures, respectively. We assume that excavations to approximately 2 feet below these depths will be required for foundations and bedding. It is our opinion that the excavations can be performed with typical large, backhoe-type excavation or earth moving equipment. Somewhat slower excavations should be anticipated where hard, sandy silt or cemented soils are encountered. In addition, caving and sloughing soils should be anticipated in loose sand soil.

It should be understood, however, that this report does not represent a study of the excavatability of the subsurface materials that may be encountered within the limits of the proposed project. The contractor should independently evaluate the condition of the subsurface materials in order to select the appropriate excavation equipment and techniques.

5.2.3 Sloped Excavations

All discussions in this subsection regarding stable excavation slopes assume minimal equipment vibration and adequate setback of excavated materials and construction equipment from the excavation slopes. The minimum setback distance for excavated materials and construction equipment should be one-half the excavation depth. We

have also assumed that the moisture content of the soils in the excavation faces will not be allowed to dry. This can be accomplished by not allowing excavations to remain open for long periods of time without sprinkling the sides to prevent drying.

In our professional opinion, the loose to medium-dense sand soils anticipated to be encountered in the majority of the planned excavations will require sloped excavations (if possible) and/or sheeting to prevent caving or sloughing. Where silt soils are encountered, relatively-steep temporary excavation slopes may be possible. Much of the loose to medium-dense silty to relatively "clean" sand strata encountered at various depths are essentially cohesionless, with very little silt and clay "binder." Accordingly, these soils are susceptible to caving, loss of ground, and undercutting of overlying soils during or soon after excavation.

The following table provides maximum temporary slope inclinations for the various soil conditions encountered in our borings. Maximum slope inclinations used in construction should be based on the weakest soil layer encountered.

Table 1: Temporary Slope Inclinations

Soil Type	Maximum Slope Inclination (Horizontal to Vertical) For Excavation Depths of 20 Feet or Less
Medium-Stiff to Stiff Clay or Silt	1:1
Very-Stiff to hard Clay or Silt	¾:1
All "Clean" Sand	1½:1
Loose to Medium-Dense Silty Sand and Soft Silt or Clay	1½:1
Dense Silty Sand	1:1

We anticipate that loose to medium-dense silty and relatively "clean" sand will be encountered in the majority of the excavations. Therefore, excavations should be planned at slopes no steeper than 1½:1 unless shoring is planned.

The above table was developed under the assumption that temporary excavations will not extend below groundwater and that dewatering will lower groundwater to below the planned depths of excavation. This also assumes the temporary excavations will not

be exposed to direct rainfall, runoff, or surcharge loading. Heavy equipment, construction materials, excavated soil, and vehicular traffic should not be allowed within one-half the slope height from the top of any excavation. During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff water should be collected and disposed of outside the construction limits.

5.2.4 Shored Excavations

Where the excavations will be within one-half the slope height from the existing structures, shoring will be required. Where potentially caving sands are encountered, excavations will likely require continuous or solid-type shoring (e.g., interlocking sheet piles or similar system) during excavation. Furthermore, the sand may not stand vertically long enough to move shoring into place following excavation. Shoring should be removed as backfilling progresses. The Contractor should have a California licensed structural engineer design the required shoring systems prior to earthwork activities.

Shoring should be designed to resist the earth pressure exerted by the retained soil plus any additional lateral force due to surcharge loading, i.e., construction equipment, foundations, roadways, etc., at or near the shoring. The following equivalent fluid earth pressures are recommended assuming a maximum shoring height of 35 feet, a level ground surface, an effective soil unit weight of approximately 120 pounds per cubic foot (pcf), and a fully drained soil condition:

Table 2: Equivalent Fluid Earth Pressures

Earth Pressure Condition	Lateral Earth Pressure (pcf)
Active	35
At-Rest	55
Passive	400

5.2.5 Existing Structures, Pipelines, et cetera

Temporary sloped excavations should not encroach adjoining buildings, walls, or other structures within an area defined by an imaginary 2.5(horizontal):1(vertical) line drawn outward and downward from closest edge of the structure. Furthermore, sloped excavations should maintain a minimum 1-foot separation from adjacent pipelines and pipeline backfill. Where the stability of a structure may be endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation.

Removal of material in a shored excavation causes a change of stress in the soils beside and beneath the open excavation. This change in stress has corresponding inward lateral deformations of the soil at the sides of the excavation. Likewise, this horizontal movement is accompanied by a vertical settlement of the retained soil mass. Even well-constructed shoring will experience lateral movement, typically between 0.5 and 2 percent of the excavation depth. The average vertical settlement due to lateral movement may be taken as twice the lateral movement. Settlement tends to be greatest close to the excavation, but extends over a horizontal distance that may equal twice the excavation depth from the top of the shoring.

The Contractor should anticipate developing a program to continually monitor existing improvements to detect movement and allow for remedial actions. In addition, a complete survey of existing utilities, pavements and structures adjacent to those portions of the proposed excavations that will be shored should be performed. The purpose of this review would be to evaluate the ability of the existing features to withstand horizontal and vertical movements associated with a shored and/or dewatered excavation. If movements are greater than the tolerance of existing project features, tie-backs, dead-man anchors, cross bracing, or alternative shoring or dewatering systems may be needed to reduce deflections. The owner and Contractor should anticipate repairing cracks in pavements adjacent to shored portions of the excavation due to lateral displacements of the shoring system.

5.3 DEWATERING

Based on our boring information and the construction details noted in Section 1.0, we anticipate dewatering will be required for construction of the pump structure. It is also possible that dewatering may be required for construction of the vault structure or pipelines on the south side of the site if seepage from the canal occurs.

Construction methods and dewatering systems will be left to the contractor. We assume that the required dewatering system will be in operation before excavations are made below groundwater and will remain in operation during all backfill operations. We stress that slope instability will likely occur if dewatering operations are interrupted.

5.4 FOUNDATIONS

5.5.1 Pump Structure

In our opinion, the proposed wet well structure may be supported on a mat foundation bearing on compacted existing soils at a depth of approximately 35 to 37 feet. Based on our borings, it appears the foundation will be supported by hard, sandy silt and/or medium-dense sand. We recommend the foundation be supported by at least 1 foot of engineered fill compacted to a minimum of 90 percent relative compaction at a moisture content 1 to 4 percent greater than optimum as determined by the ASTM D-1557 test method. The engineered fill can consist of overexcavated and recompacted existing soils. As an option, 2 feet of compacted crushed rock or aggregate base can be placed instead of the engineered fill. The net allowable bearing pressure used to size the mat foundation supported on engineered fill or rock should not exceed 2,500 pounds per square foot (psf) for dead plus sustained live loads. A net allowable bearing pressure of 3,333 psf may be used for dead plus sustained live loads and including seismic loads.

Total settlement of the pump structure foundation will vary depending on the plan dimensions of the foundation and the actual load supported. Based on the assumed foundation dimensions and static load, (less than 2,000 psf), we estimate that maximum total foundation settlement for the pump structure supported on engineered

fill or rock (as described in this section) will be on the order of ½ inch and differential settlement will be less than ½ inch.

If the mat foundation is designed using approximate flexible methods (Winkler foundation), a coefficient of subgrade reaction (k-value) of 200 pounds per square inch per inch (assuming a square plate measuring 1 foot by 1 foot) can be used in design. The above value was determined based on published correlations for the soil types encountered at the site. The k-value used for design should be adjusted appropriately depending on the length, width and embedment of the mat foundation. Field plate load tests should be performed to better define the subgrade modulus if the mat foundation will be critical or sensitive to loading and deflection.

Upward buoyant forces can be resisted by the weight of the structure and the weight of the soil within a cone defined by a projected line extending outward and upward from the mat foundation at an angle of 30 degrees from vertical. Soil unit weight of 120 pcf above groundwater and 58 pcf below groundwater may be used in design.

5.5.2 Valve Vault

We recommend the precast vault structure be supported by at least 1 foot of engineered fill compacted to a minimum of 90 percent relative compaction at a moisture content 1 to 4 percent greater than optimum as determined by the ASTM D-1557 test method. The engineered fill can consist of overexcavated and recompacted existing soils. As an option, 12 inches of compacted, crushed rock or aggregate base can be placed instead of the engineered fill. The net allowable bearing pressure used to size foundations should not exceed 2,500 psf for dead plus sustained live loads. A net allowable bearing pressure of 3,333 psf may be used for dead plus sustained live loads and including seismic loads.

Total settlement of the vault structure will vary depending on the plan dimensions of the structure and the actual load supported. Based on the assumed structure dimensions and static loads, we estimate that maximum total settlement and differential settlement for the vault structure will be less than ½ inch.

5.5.3 General Foundation Notes

Prior to placing steel or concrete, foundation excavations should be cleaned of all loose or disturbed soil and water. All foundation excavations should be observed by the project Geotechnical Engineer just prior to placing steel or concrete to confirm that the recommendations contained herein are implemented during construction.

The structural engineer should evaluate foundation configurations and reinforcement requirements to account for loading, shrinkage, and temperature stresses. As a minimum, continuous foundations should be reinforced with at least two No. 4 reinforcement bars, one top and one bottom, to provide structural continuity and permit spanning of local subgrade irregularities.

5.5 LATERAL RESISTANCE

Resistance to lateral loads (including those due to wind or seismic forces) may be determined using an at-rest coefficient of friction of 0.55 between the bottom of cast-in-place concrete foundations and the underlying aggregate base, crushed rock, or soils. Lateral resistance for structural foundations can alternatively be provided by the passive soil pressure acting against the vertical face of the spread, continuous, or mat foundations. The passive pressure available in undisturbed native soils and engineered fill is 400 pcf. The two modes of resistance can be combined. However, since horizontal movement is required to mobilize passive resistance, the allowable at-rest frictional resistance should be reduced by 50 percent.

A downward drag coefficient of friction of 0.45 can be used between the pump structure walls and adjacent fill soil.

Lateral resistance parameters provided above are ultimate values. Therefore, a suitable factor of safety should be applied for design purposes. The appropriate factor of safety will depend on the design condition and should be determined by the project Structural Engineer.

If passive pressures are used for lateral resistance against the lift station mat foundation, the excavation should extend a minimum of 2 feet laterally on each side of

the mat to facility hand cleaning and provide room for hand-operated compaction equipment ("wackers," vibratory plates, or pneumatic compactors).

5.6 CBC SEISMIC DESIGN CRITERIA

The 2010 CBC is based on the 2009 IBC and on ASCE 7-05. The following seismic design parameters are based on the 2010 CBC and were calculated from the USGS website. The Maximum Considered Earthquake (MCE) mapped spectral accelerations for 0.2 second and 1 second periods (S_s and S_1) were estimated using Section 1613 of 2010 CBC and the estimated latitude of 37.6933° N and longitude of 121.0547° W. The mapped acceleration values and associated soil amplification factors (F_a and F_V) based on 2010 CBC are presented in the table below. Corresponding site modified (S_{MS} and S_{M1}) and design spectral accelerations (S_{DS} and S_{D1}) are also presented in the table below.

Table 3: Ground Motion Parameters Based on 2010 CBC

Parameter	Value	2010 CBC Reference
S_S	0.844g	Section 1613.5.1
S_1	0.299g	Section 1613.5.1
Site Class	D	Table 1613.5.2
F_a	1.162	Table 1613.5.3(1)
F_v	1.803	Table 1613.5.3(2)
S_{MS}	0.981g	Section 1613.5.3
S_{M1}	0.538g	Section 1613.5.3
S_{DS}	0.654g	Section 1613.5.4
S_{D1}	0.359g	Section 1613.5.4

According to Section 1802.2.7 of 2010 CBC, PGA can be estimated using a site-specific study or PGA can be taken as S_{DS}/2.5, where S_{DS} is determined using Section 1613 of 2010 CBC as presented in the table above. A site specific study was beyond our proposed scope of services. Using S_{DS}/2.5 results in a PGA of 0.262g.

5.7 BELOW GRADE STRUCTURAL WALLS

The below subgrade structure pump and tank walls should be designed to resist the earth pressure exerted by the retained, compacted backfill plus any additional force due to surcharge loading, i.e., construction equipment, foundations, roadways, etc., at or near the walls. Groundwater was encountered at a depth of approximately 20 feet in our boring. We do not have any information that indicates how high groundwater can rise in the area. Therefore, unless the historical depth to groundwater in this area can be confirmed from well data, we recommend hydrostatic pressures be included in design of the walls below a depth of approximately 20 feet. The following equivalent fluid earth pressures are recommended.

Table 4: Equivalent Below Grade Structural Wall Fluid Earth Pressures

Earth Pressure Condition	Backfill Slope	Lateral Earth Pressure (pcf)
Active	Level	35
Active, below groundwater	Level	80
At-rest	Level	55
At rest, below groundwater	Level	90

For active seismic pressures, we recommend the values in the below table be used based on the peak ground acceleration included in Section 5.6 of this report. The values presented in Table 4 are not combined with the values presented in Table 5 for seismic design.

Table 5: Active Seismic Pressures

Peak Ground Acceleration	Backfill Condition	Active Earth Pressure (pcf)
DE (0.262g)	Level, above groundwater	60
	Level, below groundwater	105

Walls capable of deflecting a minimum of 0.1 percent of their height at the top may be designed using the active earth pressure. Walls incapable of this deflection or that are fully constrained against deflection should be designed for the at-rest earth pressure.

Where uniform surcharge loads are located within a lateral distance from constrained and unconstrained walls equal to the wall height, 45 and 30 percent of the surcharge

load, respectively, should be applied uniformly over the entire height of the wall. A soil unit weight of 120 pcf for moist soil conditions may be used in design.

If truck travel is planned within approximately 3 feet of any buried structure walls, a uniform surcharge of two additional feet of soil should be assumed in these areas. This effectively adds approximately 70 psf to the active soil pressure diagram.

All backfill should be placed and compacted in accordance with recommendations provided herein for engineered fill. During grading and backfilling adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall or within a lateral distance equal to the wall height, whichever is greater, to avoid overstressing of the wall. Within this zone, only hand-operated equipment ("wackers," vibratory plates, or pneumatic compactors) should be used to compact backfill soils.

Expansive soils, i.e., clays, plastic silts, and/or clayey sands, should not be used for backfill against the walls. The wedge of nonexpansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 1:1 or flatter.

5.8 SITE DRAINAGE

Foundation and slab performance depends greatly on how well runoff water drains from the site. Accordingly, positive drainage should be provided away from building pads and pavement areas toward appropriate drop inlets or other surface drainage devices without ponding. The drainage should be maintained both during construction and over the life span of the project. Landscaping after construction should not promote ponding of water adjacent to the structures.

5.9 GENERAL EARTHWORK

The following presents recommendations for general earthwork criteria. Previous sections should be reviewed for specific or supplemental earthwork recommendations.

5.9.1 Site Stripping

Prior to general site grading, all asphalt concrete, concrete flatwork, trees and their root systems, surface vegetation, and debris should be removed and disposed of outside the construction limits. The depth of stripping should be determined in the field by the project Geotechnical Engineer after demolition is complete. Upon approval of the owner and/or landscape architect, any stripped topsoil (less any debris) may be stockpiled and placed in landscape areas. This material, however, should not be incorporated into any engineered fill.

It is likely that underground utility lines or buried objects will be encountered within the areas of construction. Where encountered, these items should be removed and disposed of off-site or protected in place if they will remain. Existing utility pipelines that extend beyond the limits of the proposed construction and will be abandoned in-place should be plugged with cement grout to prevent migration of soil and/or water. All excavations resulting from removal activities should be cleaned of loose or disturbed material and dish-shaped with sides sloped 3:1 (3 horizontal to 1 vertical) or flatter to permit access for compaction equipment.

5.9.2 Subgrade Preparation

Previous sections discuss specific subgrade preparation recommendations related to foundations. Where not specifically addressed by these previous sections, all subgrade areas that will receive engineered fill for support of structures should be scarified to a depth of at least 12 inches, uniformly moisture conditioned to between 1 and 4 percent above the optimum moisture content, and compacted as engineered fill to at least 90 percent of the maximum dry density as determined by the ASTM D-1557 test method.

In-place scarification and compaction may not be adequate to densify all disturbed soil within areas grubbed or otherwise disturbed below a depth of about 6 inches. Therefore, overexcavation of disturbed soil, scarification and compaction of the exposed subgrade, and replacement with engineered fill may be required to sufficiently densify all disturbed soil.

5.9.4 Fill Materials

The existing soils encountered in our borings, minus organics, debris and/or other deleterious materials, should be suitable for use as engineered fill. All import fill soils should be nearly free of organic or other deleterious material, essentially non-plastic, and less than 3 inches in maximum dimension. In general, well-graded mixtures of gravel, sand, non-plastic silt, and small quantities of cobbles, rock fragments, and/or clay are acceptable for use as import fill. All imported fill materials to be used for engineered fill should be approved by the project Geotechnical Engineer prior to being transported to the site. General guidelines for import fill are provided in Table 6.

Table 6: Import Fill Guidelines

Gradation (ASTM C136)	
Sieve Size	Percent Passing
3-inch	100
No. 4	50 – 100
No. 200	15 – 70
Plasticity (ASTM D4318)	
Liquid Limit	Plasticity Index
Less than 30	Less than 12
Organic Content (ASTM D2974)	
Less than 3 percent	

Trench backfill and bedding placed within existing or future city right-of-ways should meet or exceed the requirements outlined in the current city specifications. Trench backfill or bedding placed outside existing or future right-of-ways could consist of native or imported soil that meets the requirements for fill material provided above. However, in very moist conditions (near or below groundwater), coarse-grained sand and/or gravel should be avoided for pipe bedding or trench zone backfill unless the material is fully enclosed in a geotextile filter fabric such as Mirafi 140N or an equivalent substitute. In a very moist or saturated condition, fine-grained soil can migrate into the coarse sand or gravel voids and cause “loss of ground” or differential settlement along and/or adjacent to the trenches, thereby leading to pipe joint displacement and pavement distress.

Trench backfill recommendations provided above should be considered minimum requirements only. More stringent material specifications may be required to fulfill bedding requirements for specific types of pipe. The project Civil Engineer should develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this study.

5.9.5 Engineered Fill

All fill soils, either native or imported, required to bring the site to final grade should be compacted as engineered fill. Import fill or native subgrade soil should be uniformly moisture conditioned to between 1 and 4 percent above the optimum moisture content, placed in horizontal lifts less than 12 inches in loose thickness, and compacted to at least 90 percent of the maximum dry density as determined by the D-1557 ASTM test method. Additional fill lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable. Discing and/or blending may be required to uniformly moisture condition soils used for engineered fill. The contact between existing soils and engineered fill beneath structures should be no steeper than 4:1 within a depth of approximately 3 feet of planned finished subgrade. All trench backfill in structure areas should be placed and compacted in accordance with recommendations provided above for engineered fill.

6.0 LIMITATIONS

The conclusions and recommendations of this report are for design purposes for the proposed City of Modesto Hahn Lift Station remodel/replacement project as described in the text of this report. The conclusions and recommendations in this report are invalid if:

- The assumed structural or grading details change
- The report is used for adjacent or other property
- Any other change is implemented which materially alters the project from that proposed at the time this report was prepared

The scope of services was limited to that outlined in our proposal dated December 7, 2010 (Proposal No. 114781.PROPA2). It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on the field explorations, limited laboratory testing, and engineering analyses performed.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more-detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involve greater expense, our clients participate in determining levels of service which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this report with Kleinfelder so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk, and expectations for future performance and maintenance.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil or groundwater conditions could vary between or beyond the points explored. If soil or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the estimated building loads and the design depths or locations of the foundations, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed and the conclusions of this report are modified or approved in writing by Kleinfelder.

As the geotechnical engineering firm that performed the geotechnical evaluation for this project, Kleinfelder should be retained to confirm that the recommendations of this report are properly incorporated in the design of this project and properly implemented during construction. This may avoid misinterpretation of the information by other parties and will allow us to review and modify our recommendations if variations in the soil conditions are encountered. As a minimum, Kleinfelder should be retained to provide the following continuing services for the project:

- Review the project plans and specifications, including any revisions or modifications

- Observe and evaluate the site earthwork operations to confirm subgrade soils are suitable for construction of foundations, slabs-on-grade, pavements and placement of engineered fill

- Confirm engineered fill for the structure and other improvements are placed and compacted per the project specifications

- Observe foundation bearing soils to confirm conditions are as anticipated, and

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field. Kleinfelder should be retained so that all geotechnical aspects of construction will be monitored by a representative from Kleinfelder, including site preparation, preparation of foundations, installation of piles, and placement of engineered fill and trench backfill. These services provide Kleinfelder the opportunity to observe the actual soil and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If Kleinfelder is not retained to provide these services, we will cease to be the engineer of record for this project and will assume no responsibility for any potential claim during or after construction on this project. If changed site conditions affect the recommendations presented herein, Kleinfelder should also be retained to perform a supplemental evaluation and to issue a revision to our original report.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that Kleinfelder's geotechnical engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction. Furthermore, the contractor should be prepared to handle contamination conditions encountered at this site, which may affect the excavation, removal, or disposal of soil; dewatering of excavations; and health and safety of workers.

We are not corrosion engineers. You may wish to retain a competent corrosion engineer to design corrosion protection systems appropriate for the project.

This report was prepared in accordance with the generally accepted standard of practice that existed in Stanislaus County at the time the report was written. No warranty, expressed or implied, is made.

It is the CLIENT'S responsibility to see that all parties to the project, including the designer, contractor, subcontractor, etc., are made aware of this report in its entirety.

This report may be used only by the client and only for the purposes stated within a reasonable time from its issuance, but in no event later than three years from the date of the report. Land use, site conditions (both on- and off-site), or other factors may change over time, and additional work may be required. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else, unless specifically agreed to in advance by Kleinfelder in writing, will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

APPENDIX
LOGS OF BORINGS AND
SUMMARY OF LABORATORY TESTING

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2488)

MAJOR DIVISIONS				GRAPHIC LOG		TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH <5% FINES	$Cu \geq 4$ and $1 \leq Cc \leq 3$		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			$Cu < 4$ and/or $1 > Cc > 3$		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5 to 12% FINES	$Cu \geq 4$ and $1 \leq Cc \leq 3$		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			$Cu < 4$ and/or $1 > Cc > 3$		GP-GM	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GP-GC	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH >12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	$Cu \geq 6$ and $1 \leq Cc \leq 3$		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			$Cu < 6$ and/or $1 > Cc > 3$		SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5 to 12% FINES	$Cu \geq 6$ and $1 \leq Cc \leq 3$		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			$Cu < 6$ and/or $1 > Cc > 3$		SP-SM	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SP-SC	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH >12% FINES			SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)				ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY,
					CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
					CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
					OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
					CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
					OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

USCS (2487) STO11G029H.GPJ 7/11/11

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File Number: STO11G029h

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2488)
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

PLATE
A-1

SOIL DESCRIPTION KEY

MOISTURE CONTENT

DESCRIPTION	ABBR	FIELD TEST
Dry	D	Absence of moisture, dusty, dry to the touch
Moist	M	Damp but no visible water
Wet	W	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

PLASTICITY

DESCRIPTION	ABBR	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm) thread cannot be rolled at any water content.
Low (L)	LP	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	MP	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	HP	It takes considerable time rolling and kneeding to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4 in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4 in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CONSISTENCY - FINE-GRAINED SOIL

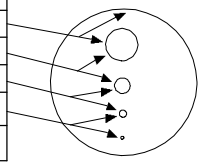
CONSISTENCY	ABBR	FIELD TEST
Very Soft	VS	Thumb will penetrate soil more than 1 in. (25 mm)
Soft	S	Thumb will penetrate soil about 1 in. (25 mm)
Firm	F	Thumb will indent soil about 1/4 in. (6 mm)
Hard	H	Thumb wil not indent soil but readily indented with thumbnail
Very Hard	VH	Thumbnail will not indent soil

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12"	>12"	Larger than basketball-sized
Cobbles		3 - 12'	3 - 12"	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3"	3/4 -3"	Thumb-sized to fist-sized
	fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19"	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock salt-sized
	fine	#200 - #10	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029	Flour-sized and smaller

REACTION WITH HCL

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately



ANGULARITY

DESCRIPTION	ABBR	CRITERIA
Angular	A	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	SA	Particles are similar to angular description but have rounded edges
Subrounded	SR	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	R	Particles have smoothly curved sides and no edges

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	ABBR	SPT (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
Very Loose	VL	<4	<4	<5	0 - 15	Easily penetrated with 1/2-inch reinforcing rod by hand
Loose	L	4 - 10	5 - 12	5 - 15	15 - 35	Difficult to penetrate with 1/2-inch reinforcing rod pushed by hand
Medium Dense	MD	10 - 30	12- 35	15 - 40	35 - 65	Easily penetrated a foot with 1/2-inch reinforcing rod driven with 5-lb. hammer
Dense	D	30 - 50	35 - 60	40 - 70	65 - 85	Difficult to penetrate a foot with 1/2-inch reinforcing rod driven with 5-lb. hammer
Very Dense	VD	>50	>60	>70	85 - 100	Penetrated only a few inches with 1/2-inch reinforcing rod driven with 5-lb. hammer

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SOIL DESCRIPTION KEY
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

PLATE
A-2

FISH SCREENS LOG KEY STO11G029H.GPJ 7/11/11

LOG SYMBOLS

	BULK/BAG SAMPLE	-4	PERCENT FINER THAN THE NO. 4 SIEVE (ASTM Test Method C 136)
	MODIFIED CALIFORNIA SAMPLER (2-1/2 inch outside diameter)	-200	PERCENT FINER THAN THE NO. 200 SIEVE (ASTM Test Method C 117)
	CALIFORNIA SAMPLER (3 inch outside diameter)	LL	LIQUID LIMIT (ASTM Test Method D 4318)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter)	PI	PLASTICITY INDEX (ASTM Test Method D 4318)
	CONTINUOUS CORE	TXCU	CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (EM 1110-1-1906)
	SHELBY TUBE	EI	EXPANSION INDEX (UBC STANDARD 18-2)
	ROCK CORE	COL	COLLAPSE POTENTIAL
	WATER LEVEL (level where first encountered)	UC	UNCONFINED COMPRESSION (ASTM Test Method D 2166)
	WATER LEVEL (level after completion)		
	SEEPAGE	MC	MOISTURE CONTENT (ASTM Test Method D 2216)

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.

2. No warranty is provided as to the continuity of soil conditions between individual sample locations.

3. Logs represent general soil conditions observed at the point of exploration on the date indicated.

4. In general, Unified Soil Classification System designations presented on the logs were evaluated by visual methods. Where laboratory tests were performed, the designations reflect the laboratory test results.

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LOG KEY
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

PLATE
A-3

KA-LOG_KEY STO11G029H.GPJ 7/11/11

Surface Conditions: Lawn

Groundwater: Groundwater encountered at a depth of about 20 feet below existing site grade.

Method: Solid stem auger

Equipment: Simco 2400 truck mounted drill rig equipped with 140lb. auto hammer

Date Completed: 6/8/2011

Logged By: B.C.

Total Depth: 51.5 feet

Boring Diameter: 4 inches

Depth (feet)	FIELD: Sample Type	FIELD: Sample No.	FIELD: Blows/Foot	FIELD: Pocket Penetrometer (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	Graphic Log	DESCRIPTION
													(SC) CLAYEY SAND - Dark brown, moist, firm grained, very loose
		1-2-1	8		117	12							**(ML) SANDY SILT** - Brown, moist, firm
5													**(SM) SILTY SAND** - Brown, moist, medium dense, fine to medium grained
		1-5-1	28										**(ML) SANDY SILT** - Gray-brown, moist, hard
													(SP) POORLY GRADED SAND - Light brown, moist, medium dense, fine to coarse grained
10													
		1-10-1	27										**(ML) SANDY SILT** - Brown, moist, hard
													(SP) POORLY GRADED SAND WITH SILT - Brown, moist, , medium dense, fine to medium grained
15													
		1-15-1	22										Less silt, light brown
													Red-brown
20												▼	
		1-20-1	13										**(ML) SANDY SILT** - Gray-brown, moist, firm
25													**(SM) SILTY SAND** - Brown, wet, very dense, fine to medium grained, very silty
		1-25-1	36/6"										**(ML) SANDY SILT** - Brown, wet, hard, very sandy

P-LOG_2007 BLOWS PER 6 INCHES STO11G029H.GPJ 7/11/11

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LOG OF BORING B-1
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

PLATE
1 of 2
A-4

Depth (feet)	Sample Type	Sample No.	Blows/Foot	Pocket Penetrometer (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Graphic Log	DESCRIPTION
30		1-30-1	24										**(SM) SILTY SAND** - Dark brown, wet, medium dense, fine grained
35		1-35-1	21		94	28							**(CL) SANDY CLAY** - Red-brown, wet, low to medium plasticity, hard
40		1-40-1	25		87	31							**(SM) SILTY SAND** - Orange-brown, wet, medium dense, fine grained
45		1-45-1	12		92	23				52			Very silty Fine to medium grained
50		1-50-1	42										**(ML) SANDY SILT** - Gray-brown, moist, hard
													Boring completed at a depth of 51.5 feet below existing site grade.
55													
60													

FIELD | LABORATORY

P-LOG_2007 BLOWS PER 6 INCHES STO11G029H.GPJ 7/11/11

KLEINFELDER
Bright People. Right Solutions.

Drafted By: G. GOMEZ
Date: 7/11/2011
Project No.: 119671.G01
File Number: STO11G029h

LOG OF BORING B-1
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

PLATE
2 of 2
A-4

Surface Conditions: Lawn

Groundwater: Groundwater not encountered during drilling.

Method: Solid stem auger

Equipment: Simco 2400 truck mounted drill rig equipped with 140lb. auto hammer

Date Completed: 6/8/2011

Logged By: B.C.

Total Depth: 21.5 feet

Boring Diameter: 4 inches

Depth (feet)	FIELD: Sample Type	FIELD: Sample No.	FIELD: Blows/Foot	FIELD: Pocket Penetrometer (tsf)	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Liquid Limit	LABORATORY: Plasticity Index	LABORATORY: Passing #4 Sieve (%)	LABORATORY: Passing #200 Sieve (%)	LABORATORY: Other Tests	Graphic Log	DESCRIPTION
													(SM) SILTY SAND - Brown, moist, fine grained
		2-2-1	43										**(ML) SANDY SILT** - Gray-brown, moist, very hard
													Hard
5		2-5-1	10		90	19							Very sandy, firm
													(SP) POORLY GRADED SAND - Orange-brown, moist, medium dense, fine to medium grained
10		2-10-1	13		91	25							**(ML) SANDY SILT** - Gray-brown, moist, firm
													(SM) SILTY SAND - Olive-brown, moist, medium dense, fine to medium grained
15		2-15-1	16										
20		2-20-1	13										More moist
													Boring completed at a depth of 21.5 feet below existing site grade.
25													

P-LOG_2007 BLOWS PER 6 INCHES STO11G029H.GPJ 7/11/11

KLEINFELDER
Bright People. Right Solutions.

Drafted By: G. GOMEZ
Date: 7/11/2011
Project No.: 119671.G01
File Number: STO11G029h

LOG OF BORING B-2
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

PLATE
1 of 1
A-5

BORING NO.	SAMPLE DEPTH (ft)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (% of dry weight)	PARTICLE SIZE SIEVE SIZE (percent passing)							ATTERBERG LIMITS		OTHER TESTS
				#4	#8	#16	#30	#50	#100	#200	L.L.	P.I.	
B-1	2.0	117	12										
B-1	35.0	94	28										
B-1	40.0	87	31										
B-1	45.0	92	23							52			
B-2	5.0	90	19										
B-2	10.0	91	25										

KLEINFELDER
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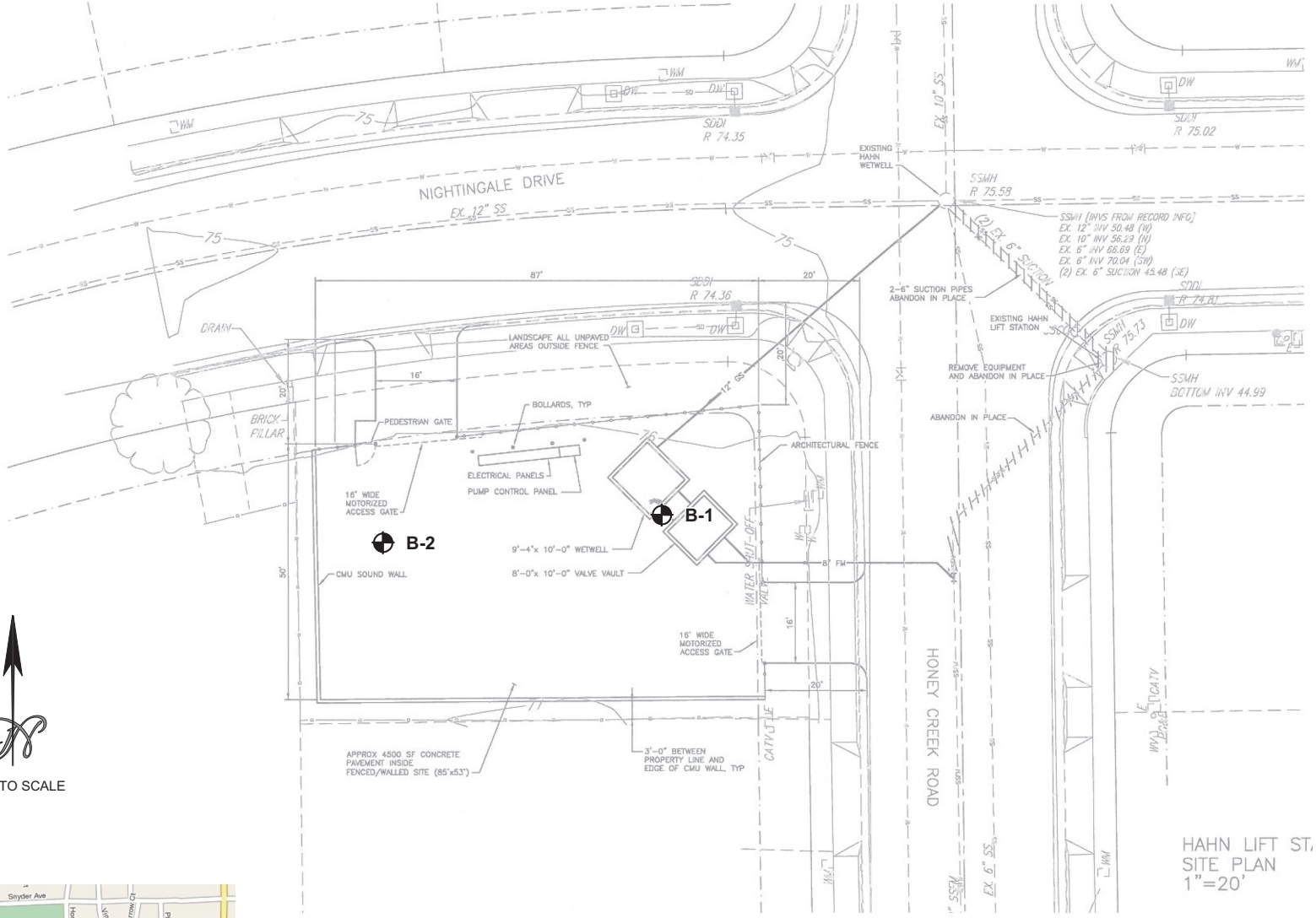
Drafted By: G. GOMEZ
Date: 7/11/2011
Project No.: 119671.G01
File Number: STO11G029h

SUMMARY OF LABORATORY TESTS
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

PLATE
1 of 1
A-6

KA-LABSUM STO11G029H.GPJ 7/11/11



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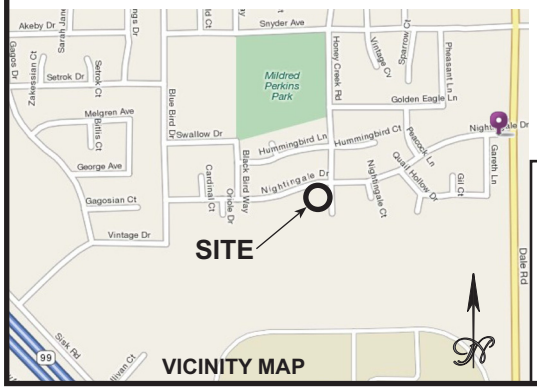


B-1 DENOTES NUMBERS AND APPROXIMATE LOCATIONS OF BORINGS DRILLED FOR THIS INVESTIGATION

KLEINFELDER

www.Kleinfelder.com

Project Number: 119671.G01	
Graphic Date: 7/6/11	
Graphic By: G. GOMEZ	
Checked By:B.C.	
File Name: MOD11D018.fh11	

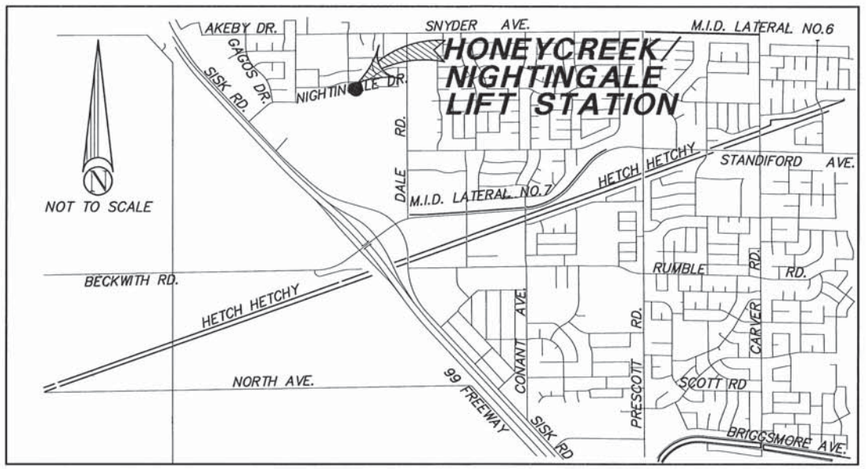
SITE PLAN AND VICINITY MAP
PROPOSED REMODEL/REPLACEMENT
HAHN LIFT STATION
CITY OF MODESTO
MODESTO, CALIFORNIA

Plate

1

CITY OF MODESTO

HONEYCREEK ROAD AND NIGHTINGALE DRIVE SEWAGE LIFT STATION REHABILITATION



LOCATION MAP

NOT TO SCALE
NOTE: ALL STREETS ARE NOT SHOWN

NOTES

1. CONTRACTOR SHALL VERIFY DEPTH OF EXISTING LINES BEFORE BEGINNING CONSTRUCTION.
2. CONTRACTOR SHALL LOCATE & PRESERVE ALL SURFACE & SUB-SURFACE FACILITIES WHICH MAY BE IN WORKING AREA. CALL U.S.A. TEL. 1-800-642-2444, 48 HOURS BEFORE BEGINNING CONSTRUCTION.
3. CONTRACTOR SHALL MAINTAIN SEWER SERVICE DURING CONSTRUCTION.

SHEET INDEX

LEGEND

G	EXISTING GAS PIPELINE
S	EXISTING SEWER LINE
SD	EXISTING STORMDRAIN LINE
W	EXISTING WATER LINE
T	EXISTING TELEPHONE LINE
E	EXISTING ELECTRICAL CONDUIT
	EXISTING SEWER MANHOLE
	EXISTING STORMDRAIN MANHOLE
	EXISTING VALVE
	EXISTING FIRE HYDRANT
	EXISTING POWER POLE
	DIRECTION OF FLOW
	EXISTING CATCH BASIN
	EXISTING PULL BOX
	HALFTONE DENOTES EXISTING FACILITIES
	BLACK DENOTES PROPOSED FACILITIES

ABBREVIATIONS

A.C.P.	=	ASBESTOS CEMENT PIPE
D.I.P.	=	DUCTILE IRON PIPE
V.C.P.	=	VITRIFIED CLAY PIPE
C.I.P.	=	CAST IRON PIPE
O.C.	=	ON CENTER
EXIST.	=	EXISTING
TYP.	=	TYPICAL
SPECS.	=	SPECIFICATIONS
ELECT.	=	ELECTRICAL
A.B.	=	ANCHOR BOLTS
DIA.	=	DIAMETER
SCH.	=	SCHEDULE
BRKT.	=	BRACKET
CEM.	=	CEMENT
R.C.	=	REINFORCED CONCRETE
MIN.	=	MINIMUM
MAX.	=	MAXIMUM
REF.	=	REFERENCE
THK.	=	THICK
E.P.	=	EDGE OF PAVEMENT

REGISTERED PROFESSIONAL ENGINEER
MARK HOUGHTON
No. C 53316
Exp. 6/30/99
CIVIL
STATE OF CALIFORNIA
1/20/99

DRAWN BY: P. SOARES	DATE 9/98
CHECKED BY:	DATE
ASBUILT BY: D. BECKER	DATE 3.15.2000
ASBUILT PLOTTED: ED ESHOO	DATE 4.11.2000
FIELD BOOK:	PAGE:
REFERENCE NO.	
REVISED:	DATE

APPROVED BY: [signature] DATE: 1-25-99

801 11th STREET
P.O. BOX 642
MODESTO, CA 95353
PHONE: (209) 577-5215

CITY of MODESTO
DEPARTMENT OF ENGINEERING AND TRANSPORTATION

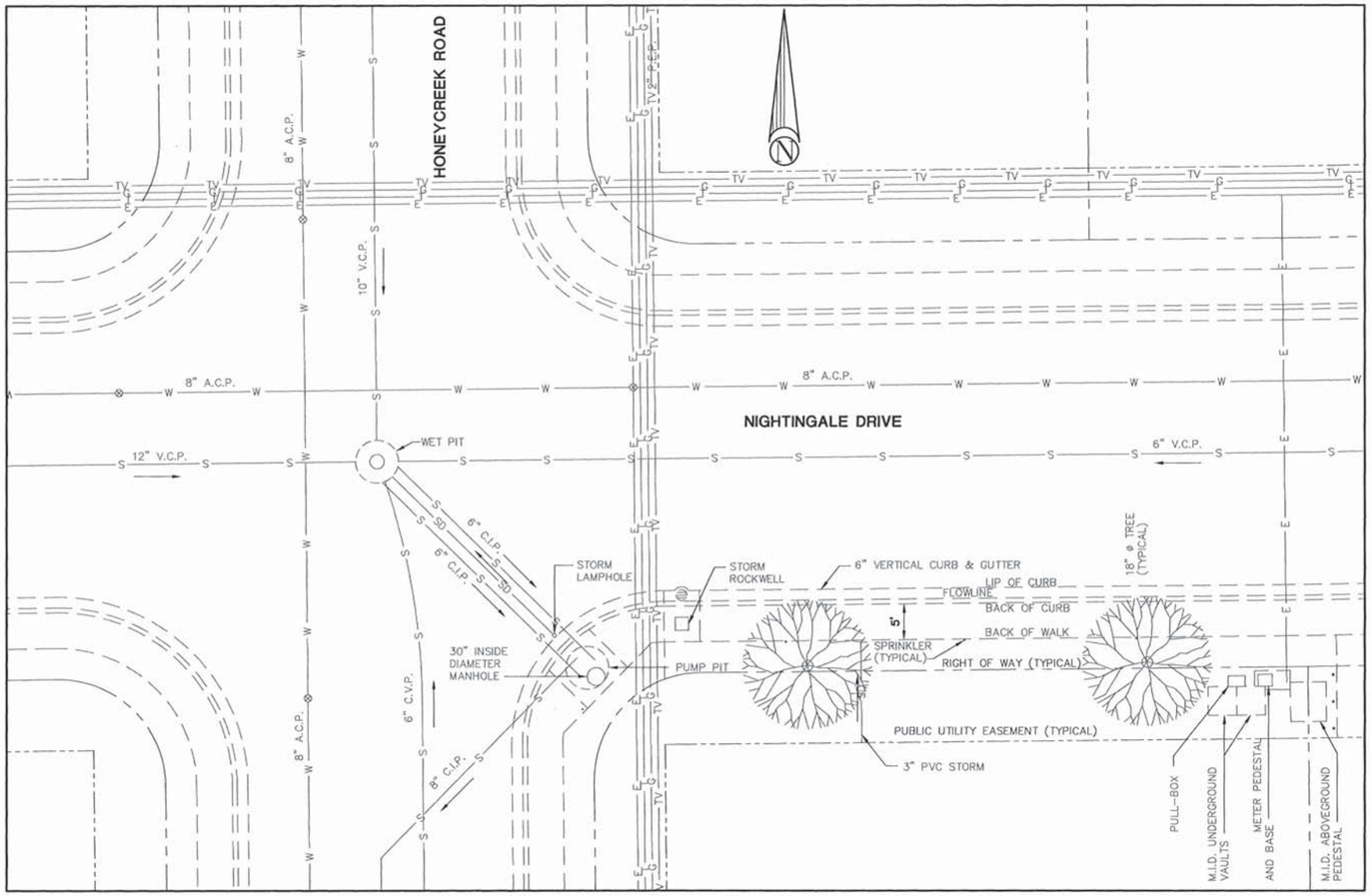
TITLE SHEET

HONEYCREEK RD. AND NIGHTINGALE DR. SEWAGE LIFT STATION REHABILITATION

ACTIVITY NO. J586

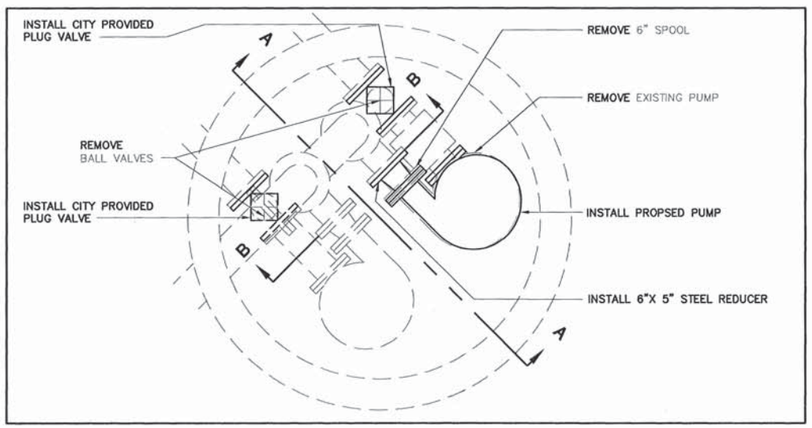
PAGE NO. 1/7

FILE NO. ~~458~~ 12-D-447



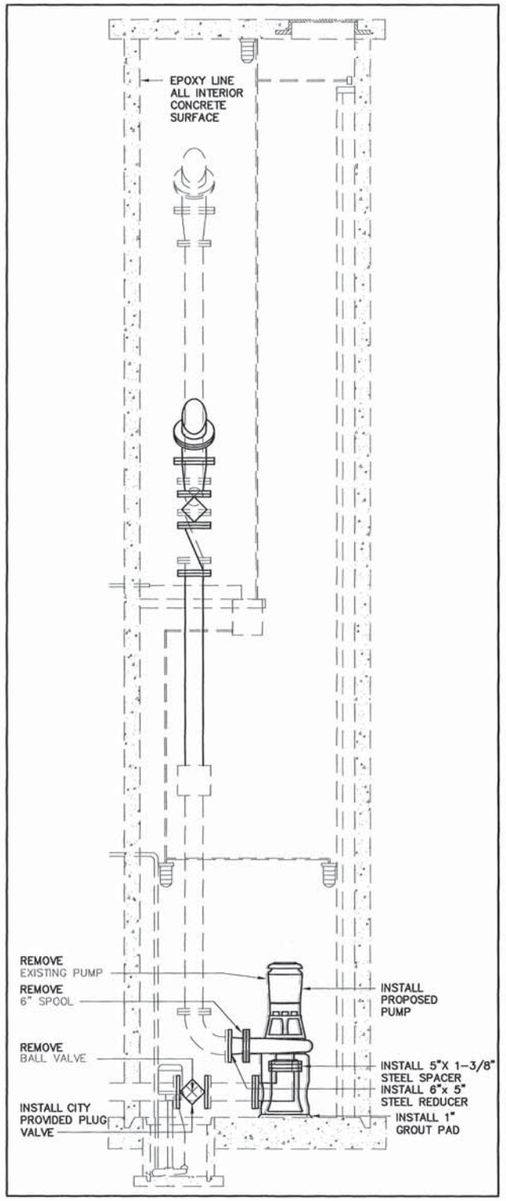
SITE PLAN

SCALE 1"=10'



PUMP PIT
PLAN VIEW

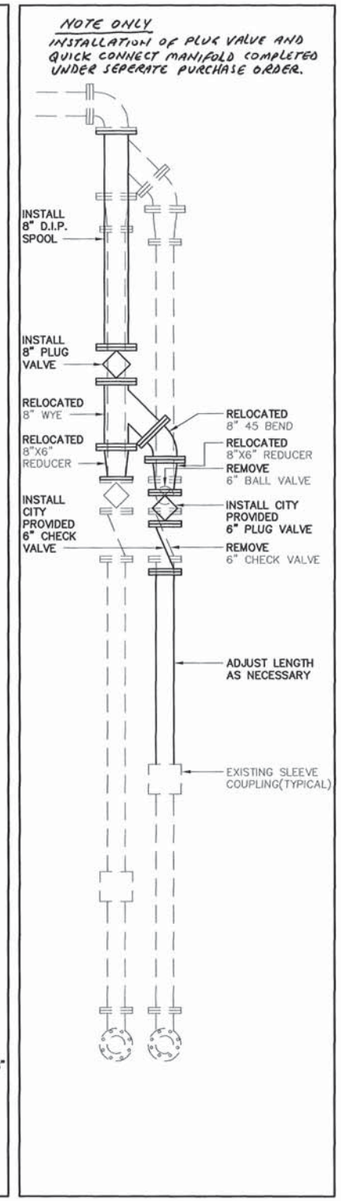
SCALE 3/4"=1'



PUMP PIT
SECTION A-A

SCALE 1/2"=1'

NOTE ONLY
INSTALLATION OF PLUG VALVE AND QUICK CONNECT MANIFOLD COMPLETED UNDER SEPERATE PURCHASE ORDER.



DISCHARGE PIPE
PARTIAL SECTION B-B

SCALE 1/2"=1'

REGISTERED PROFESSIONAL ENGINEER
MARK HOUGHTON
No. C 53316
Exp. 6/30/99
CIVIL
STATE OF CALIFORNIA
1/24/99

DRAWN BY: P. SOARES	DATE: 9/98
CHECKED BY:	DATE
ASBUILT BY: D. BECKER 3.15.2000	DATE
ASBUILT PLOTTED: ED ESHOO 4.11.2000	DATE
FIELD BOOK:	PAGE:
REFERENCE NO.	
REVISED:	DATE

ASBUILTED BY: Richard DATE: 1.25.00

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CITY of MODESTO
DEPARTMENT OF ENGINEERING AND TRANSPORTATION

PLAN & DETAIL SHEET

HONEYCREEK RD. AND NIGHTINGALE DR. SEWAGE LIFT STATION REHABILITATION

ACTIVITY NO. J586

PAGE NO. 2/7

FILE NO. 458 12-D-447

ELECTRICAL LEGEND

- FLUORESCENT LIGHTING FIXTURE -SURFACE MOUNTED -SEE FIXTURE SCHEDULE
- FLUORESCENT LIGHTING FIXTURE -RECESSED -SEE FIXTURE SCHEDULE
- INCANDESCENT LIGHTING FIXTURE -CEILING MOUNTED -SEE FIXTURE SCHEDULE
- INCANDESCENT LIGHTING FIXTURE -WALL MOUNTED -SEE FIXTURE SCHEDULE
- INCANDESCENT LIGHTING FIXTURE -RECESSED -SEE FIXTURE SCHEDULE
- S_1 SINGLE POLE TOGGLE SWITCH +48"
- S_2 TWO POLE TOGGLE SWITCH +48"
- S_3 THREE WAY TOGGLE SWITCH +48"
- S_4 FOUR WAY TOGGLE SWITCH +48"
- D_1 SINGLE POLE DIMMER SWITCH +48"
- CEILING MOUNTED EXHAUST FAN -N.I.E.S. -CONNECT AS REQUIRED
- CONCRETE PULL BOX -SIZE AS NOTED, N-1G SHOWN -W/ TIE-DOWN HARDWARE + "ELECTRICAL" LID -TRAFFIC LID AS REQD.
- TIME SWITCH -SANGAMO #WZ -INT. ASTRO DIAL, CARRYOVER, SEP. BYPASS SW
- S.W.P. SWITCH SUBSCRIPTS -a = DEVICE CONTROLLED, k = KEY, p = PILOT LIGHT
- DUPLEX RECEPTACLE +15" U.N.O.
- FLOOR TELEPHONE RECEPTACLE -WALKER #718AL-G
- FLOOR POWER RECEPTACLE -WALKER #713ALDF5G-G UNDERFLOOR RACEWAY -WALKER #4
- 50 AMP. 4 WIRE, GROUND RECEPTACLE -A + H #5754 WITH #5714 CORD SET +15" U.N.O.
- 30 AMP. 4 WIRE, GROUND RECEPTACLE -A + H #5744 WITH #5715 CORD SET +15" U.N.O.
- JUNCTION BOX -SIZE AND TYPE AS REQUIRED
- FLOOR JUNCTION BOX -WALKER #800, WITH ABANDON PLUG
- PANEL BOARD -SEE SCHEDULE
- CONDUIT -SURFACE MOUNTED OR ABOVE CEILING -IMC SURFACE MT., EMT W/COMP. FTG. ABOVE CEILING
- CONDUIT -CONCEALED BELOW FLOOR OR U.G. -EMT W/COMP. RING FTG. UN. FLR. -SCH 40 PVC W/IMC. ELLS U.G.
- HOMERUN TO RESPECTIVE PANEL OR TERMINAL

NOTE: BRANCH CIRCUIT WITHOUT FURTHER DESIGNATION IS A #12 WIRE CIRCUIT FOR MORE THAN 2 #12 WIRES AS FOLLOWS: —#— 3 #12, —##— 4 #12, ETC. FOR OTHER SIZES AS FOLLOWS: —10#— 3 #10, —6#— 4 #6, ETC. -3/4 CONDUIT U.N.O.

- FUSED DISCONNECT SWITCH -SIZE AS NOTED -30A. SHOWN
- COMBINATION STARTER -SIZE AS NOTED -SIZE 3 SHOWN
- FULL VOLTAGE STARTER -SIZE AS NOTED -SIZE 3 SHOWN
- MOTOR -N.I.E.S. CONNECT AS REQUIRED
- THERMOSTAT -N.I.E.S. INSTALL AND CONNECT AS REQUIRED +48"
- FIXTURE IDENTIFICATION -NUMERAL INDICATES LAMP WATTS, LETTER INDICATES FIXT. TYPE
- N.I.E.S. ABBREV. FOR NOT IN ELECTRICAL SECTION OF THESE PLANS OR SPEC'S
- NL ABBREV. FOR NIGHT LIGHT
- EL ABBREV. FOR EMERGENCY LIGHT
- WP ABBREV. FOR WEATHERPROOF
- MT ABBREV. FOR EMPTY CONDUIT WITH 1 #12 COPPER PULL WIRE
- EP ABBREV. FOR EXPLOSION PROOF
- TELEPHONE OUTLET -4-11/16"SQ. BOX W/ 1 DEV. RING + COVER -PULL CORD TO ABOVE CEILING +15" U.N.O.
- COMPUTER DATA OUTLET +15" U.N.O.
- (E) DENOTES EXISTING
- (N) DENOTES NEW
- (P) DENOTES PROPOSED
- (F) DENOTES FUTURE

GENERAL NOTES:

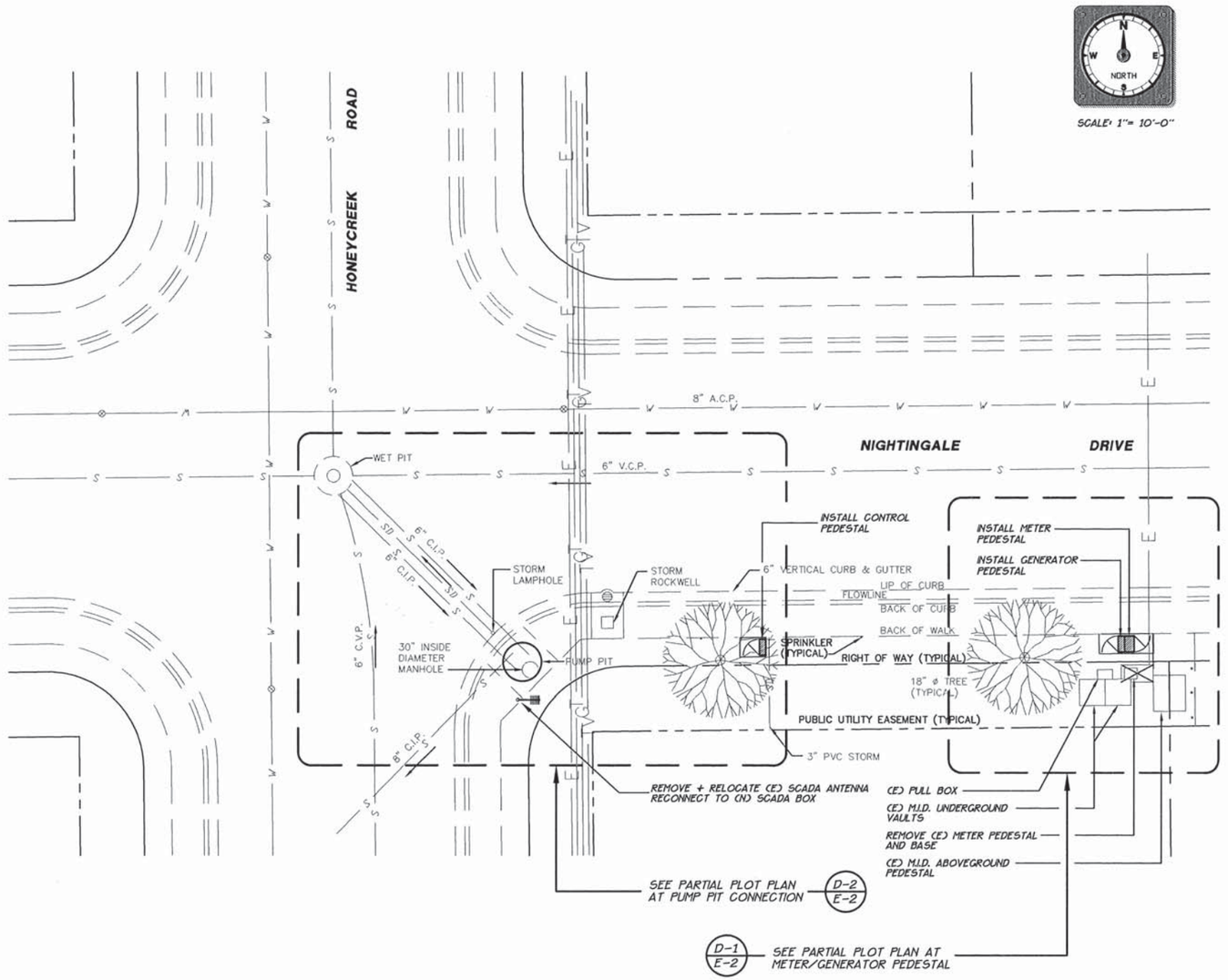
ELECTRICAL CONTRACTOR TO VERIFY EXACT LAYOUT AND ADJUST ACCORDINGLY. CONNECT ALL ELECT. EQUIP. AS SHOWN FOR A COMPLETE AND OPERATING SYSTEM.

COOR. WITH SUPPLIER FOR EXACT REQMTS. APPROX. SHOWN. CONNECT ALL ELECTRICAL EQUIPMENT TO PANELS IN PEDESTAL- INCLUDE ALL BREAKERS, DEVICES AND WIRING

LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. REPAIR ALL UTILITIES DAMAGED DURING CONSTRUCTION TO OWNER'S SATISFACTION.

ERECT AND MAINTAIN ALL REQUIRED SAFETY BARRICADES, PER CALIFORNIA STATE STANDARD SPECIFICATIONS, TITLE 8, TITLE 24, AND OSHA REQUIREMENTS.

SCHEDULE CONSTRUCTION WITH OWNER AND UTILITY COMPANY IN ADVANCE. SCHEDULE ALL ELECTRICAL OUTAGES WITH OWNER AND OBTAIN APPROVAL FOR THE SAME. INCLUDE ANY OVERTIME OR STANDBY GENERATORS AS REQUIRED IN THE BID.



D-1 E-1

SITE ELECTRICAL PLAN

SCALE: 1"= 10'-0"

NOTE:
VERIFY EXACT CONNECTION POINTS FOR POWER PRIOR TO CONSTRUCTION. APPROXIMATE ONLY LOCATIONS INDICATED FOR TRANSFORMER LOCATION, ETC. COMPLY WITH ALL UTILITY COMPANY REQUIREMENTS. PROVIDE ALL RELATED CONDUITS, PULL BOXES AND RISERS. COOR. OUTAGE W/ M.I.D.-MIKE JOHNSON

CALL "U.S.A." :
CONTRACTOR SHALL VERIFY ACTUAL DEPTH AND LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION . . . CALL UNDERGROUND SERVICE ALERT (TOLL FREE 800-642-2444) PRIOR TO TRENCHING, GRADING, EXCAVATION, DRILLING, PIPE PUSHING, PLANTING TREES, DIGGING FENCE POST HOLES, ETC. THEY WILL SUPPLY INFORMATION OR LOCATE AND MARK ANY UNDERGROUND FACILITIES.

REGISTERED PROFESSIONAL ENGINEER
GREGG E. MILLER
NO. 11128
ELECTRICAL
STATE OF CALIFORNIA
11/15/99

GREGG E. MILLER & ASSOC., INC
CONSULTING ELECTRICAL ENGINEERS
909 FIFTEENTH ST. SUITE 7 MODESTO, CA. 95354
(209) 575-0312 FAX: (209) 575-0813

DRAWN BY: GL	DATE: 1/12/99
CHECKED BY: G.E.M.	DATE: 1/12/99
ASBUILT BY: D. BECKER	DATE: 3.15.2000
ASBUILT PLOTTED: ED ESHOO	DATE: 4.11.2000
FIELD BOOK:	PAGE:

REFERENCE NO.

REVISED: DATE

APPROVED BY: Kevin Lee DATE: 1.25.99

801 11th STREET
P.O. BOX 642
MODESTO, CA. 95353
PHONE: (209) 577-5462
CITY of MODESTO
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

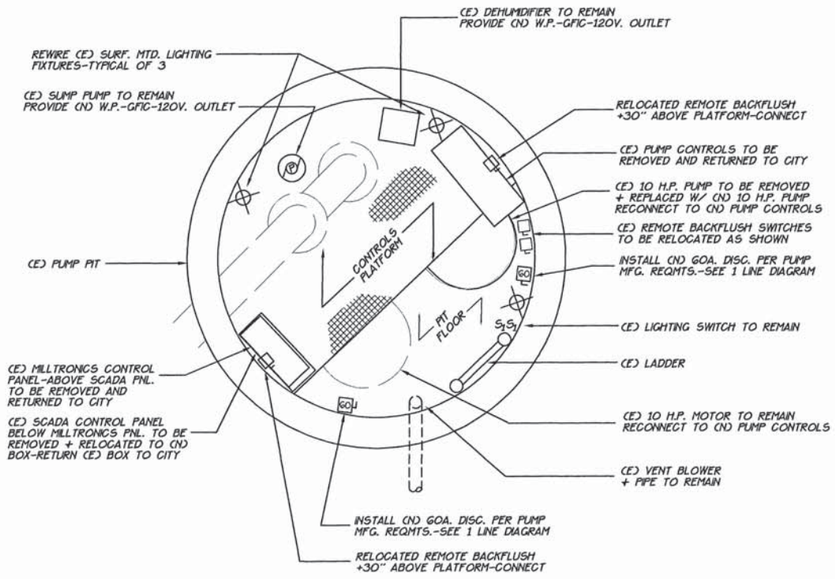
ELECTRICAL PLAN
HONEYCREEK ROAD AND NIGHTINGALE DRIVE
SEWER LIFT STATION

ACTIVITY NO.

PAGE NO. E-1

FILE NO. 1735

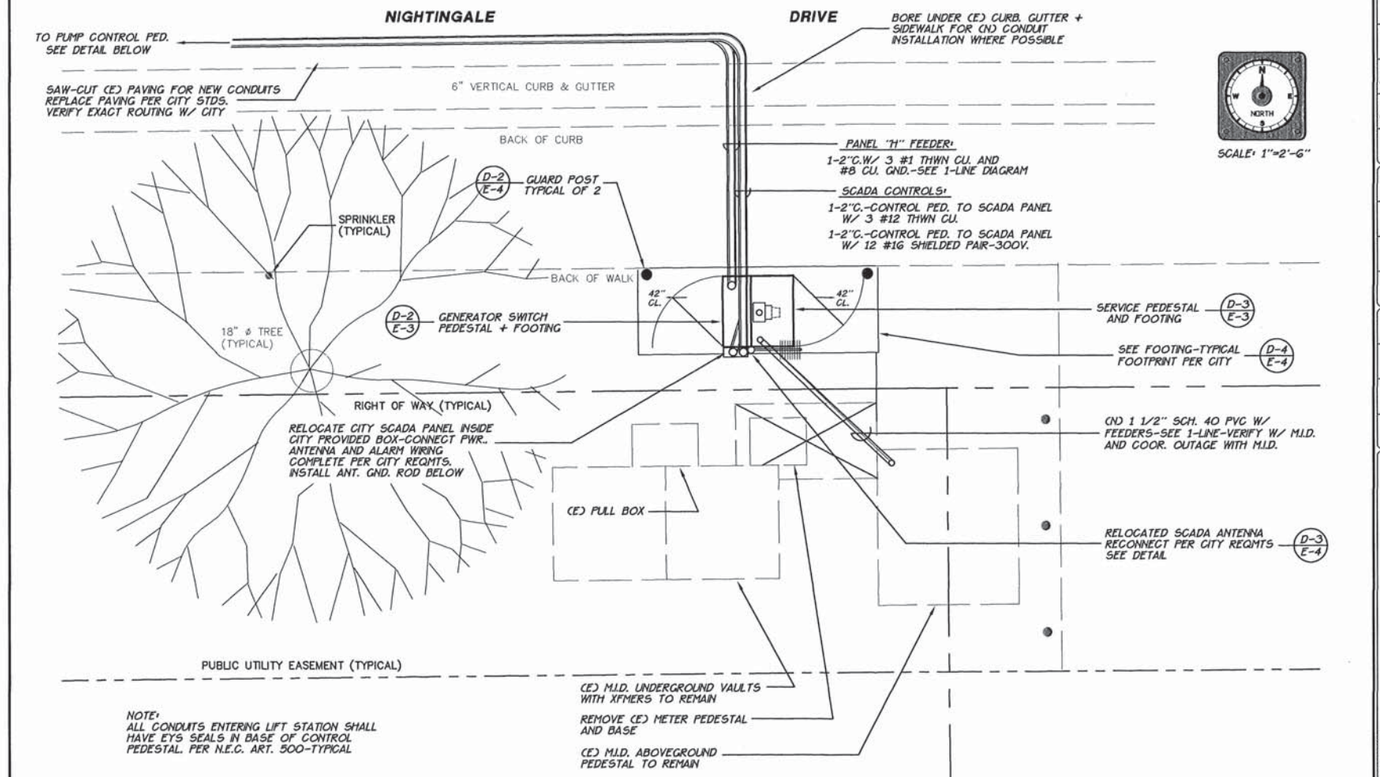
12-D-458



D-2 / E-2

PUMP PIT - PLAN VIEW

SCALE: 3/4"=1'-0"



D-1 / E-2

PARTIAL ELECTRICAL PLOT PLAN - SERVICE CONNECTION

SCALE: 1"=2'-6"

DRAWN BY: QL	DATE: 1/12/99
CHECKED BY: G.E.M.	DATE: 1/12/99
ASBUILT BY: D.BECKER	DATE: 3.15.2000
ASBUILT PLOTTED: (E) ESH00	DATE: 4.11.2000
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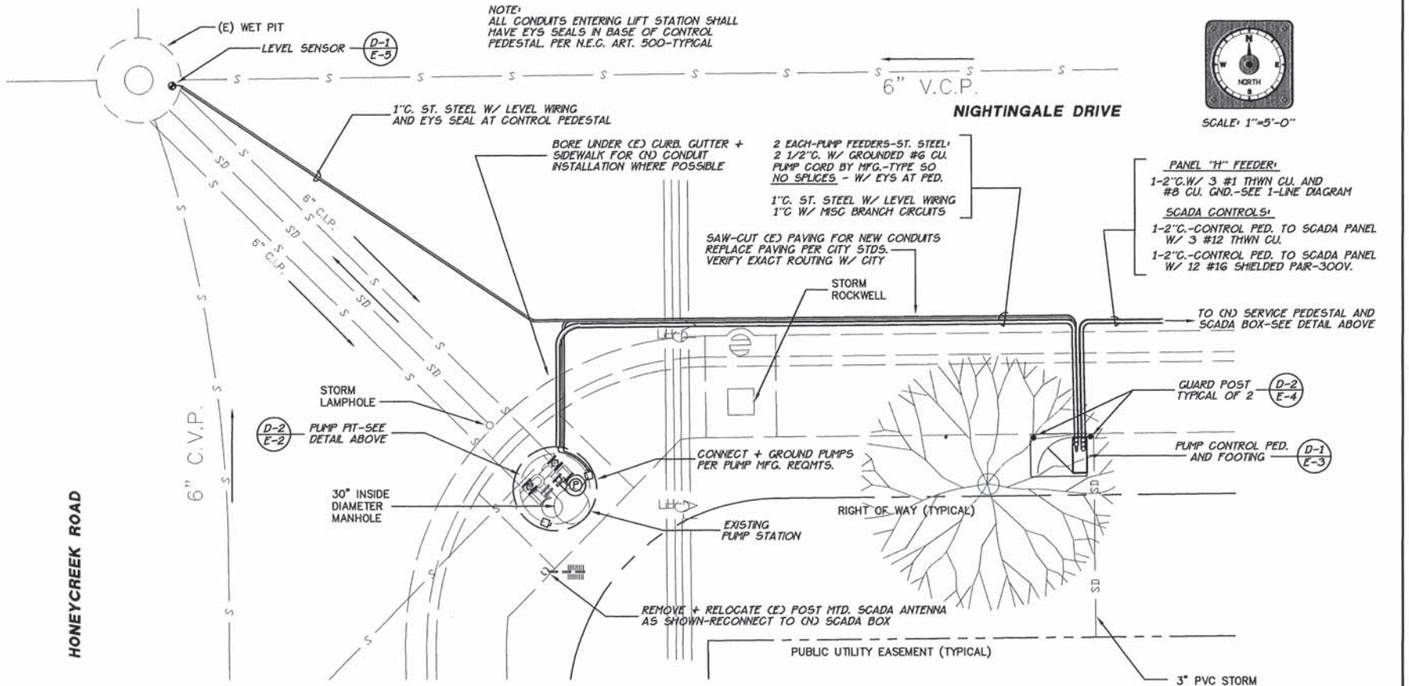
APPROVED BY: Richard Lee DATE: 1.25.99



D-3 / E-2

PARTIAL ELECTRICAL PLOT PLAN - PUMP PIT CONNECTION

SCALE: 1"=5'-0"

GENERAL NOTES:

ELECTRICAL CONTRACTOR TO VERIFY EXACT LAYOUT AND ADJUST ACCORDINGLY. CONNECT ALL ELECT. EQUIP. AS SHOWN FOR A COMPLETE AND OPERATING SYSTEM.

COOR. WITH SUPPLIER FOR EXACT REQMTS. APPROX. SHOWN. CONNECT ALL ELECTRICAL EQUIPMENT TO PANELS IN PEDESTAL- INCLUDE ALL BREAKERS, DEVICES AND WIRING

LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. REPAIR ALL UTILITIES DAMAGED DURING CONSTRUCTION TO OWNER'S SATISFACTION.

ERECT AND MAINTAIN ALL REQUIRED SAFETY BARRICADES. PER CALIFORNIA STATE STANDARD SPECIFICATIONS, TITLE 8, TITLE 24, AND OSHA REQUIREMENTS.

SCHEDULE CONSTRUCTION WITH OWNER AND UTILITY COMPANY IN ADVANCE. SCHEDULE ALL ELECTRICAL OUTAGES WITH OWNER AND OBTAIN APPROVAL FOR THE SAME. INCLUDE ANY OVERTIME OR STANDBY GENERATORS AS REQUIRED IN THE BID.

CALL "U.S.A." :

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NOTE:

VERIFY EXACT CONNECTION POINTS FOR POWER PRIOR TO CONSTRUCTION. APPROXIMATE ONLY LOCATIONS INDICATED FOR TRANSFORMER LOCATION, ETC. COMPLY WITH ALL UTILITY COMPANY REQUIREMENTS. PROVIDE ALL RELATED CONDUITS, PULL BOXES AND RISERS.

REGISTERED PROFESSIONAL ENGINEER
GREGG E. MILLER
NO. 11128
EXP. 6/30/00
ELECTRICAL
STATE OF CALIFORNIA
1/31/99

GREGG E. MILLER & ASSOC., INC
CONSULTING ELECTRICAL ENGINEERS
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(209) 575-0312 FAX: (209) 575-0813

801 11th STREET
P.O. BOX 642
MODESTO, CA. 95353
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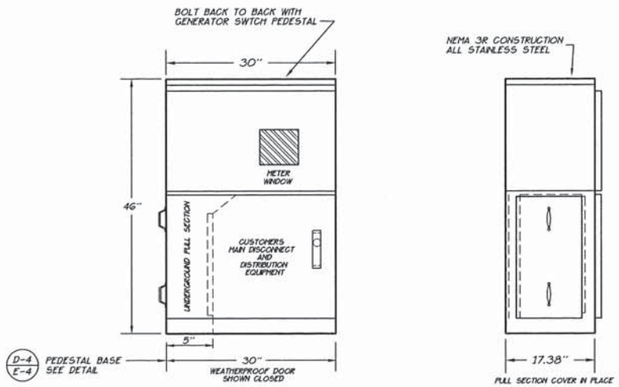
CITY of MODESTO
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

ELECTRICAL PLAN
HONEYCREEK ROAD AND NIGHTINGALE DRIVE
SEWER LIFT STATION

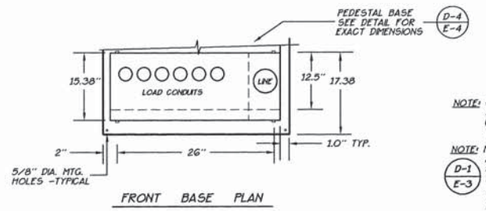
ACTIVITY NO.	
PAGE NO.	E-2
FILE NO.	1735

12-D-458



FRONT ELEVATION

SIDE VIEW



FRONT BASE PLAN

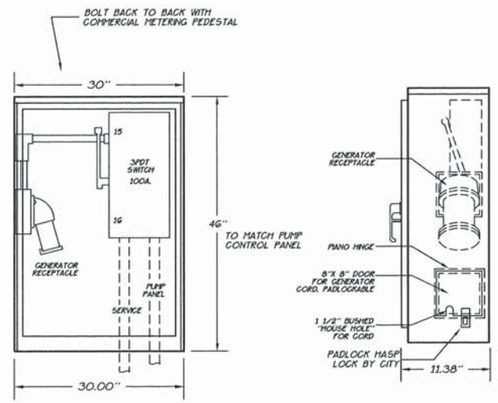
NOTE: COMPLY W/ ALL UTILITY CO. STDS. + REQMTS. OBTAIN UTIL. CO. APPROVAL PRIOR TO FABRICATION

NOTE: NEMA 3R CONSTRUCTION ALL STAINLESS STEEL SEE CONST. NOTES WHICH APPLY
D-1 E-3

SEE CONSTRUCTION NOTES FOR ADDITIONAL REQMTS.

BOLT BACK TO BACK WITH GENERATOR SWITCH PEDESTAL

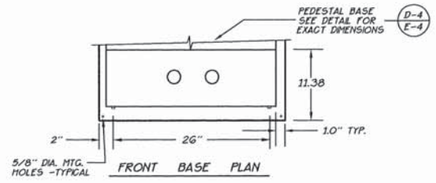
D-3 E-3 **COMMERCIAL METERING PEDESTAL** NO SCALE



FRONT ELEVATION

OUTER WEATHERPROOF DOOR REMOVED

SIDE VIEW



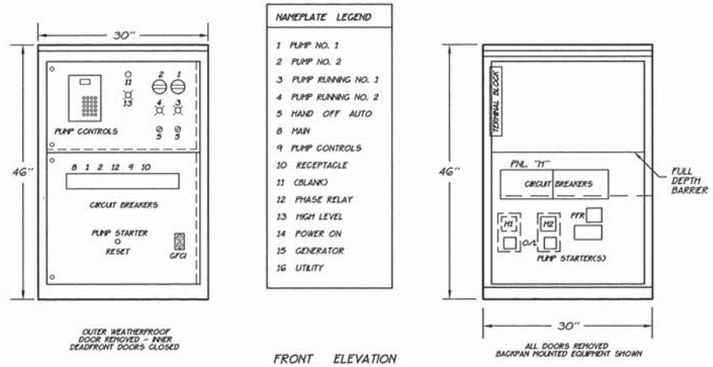
FRONT BASE PLAN

NOTE: NEMA 3R CONSTRUCTION ALL STAINLESS STEEL SEE CONST. NOTES WHICH APPLY
D-1 E-3

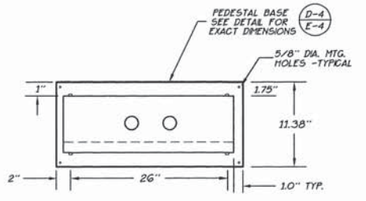
NOTE: BOLT BACK TO BACK WITH COMMERCIAL METERING PEDESTAL

SEE CONSTRUCTION NOTES FOR ADDITIONAL REQMTS.

D-2 E-3 **GENERATOR SWITCH PEDESTAL** NO SCALE



FRONT ELEVATION



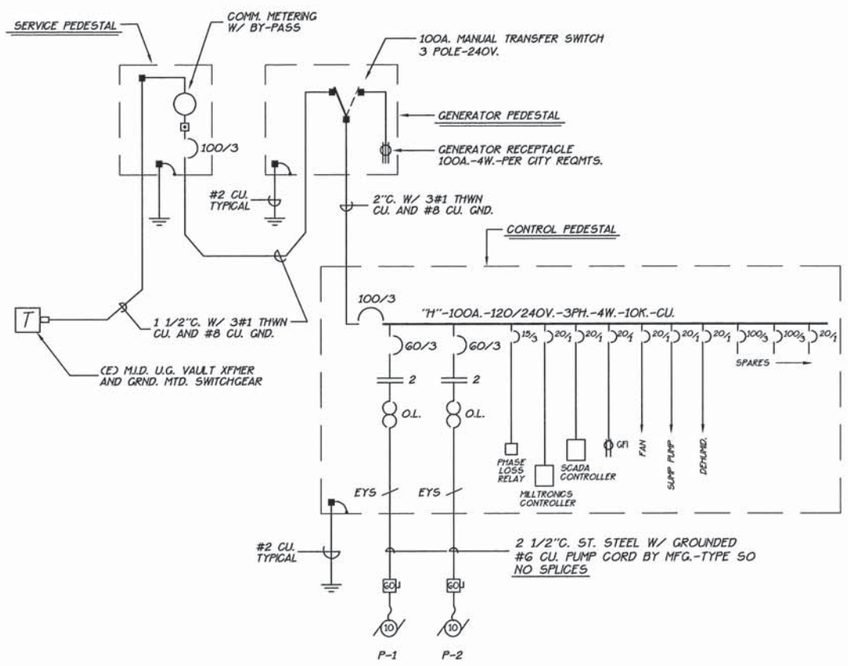
FRONT BASE PLAN

REFER TO SUBMITTAL DRAWINGS

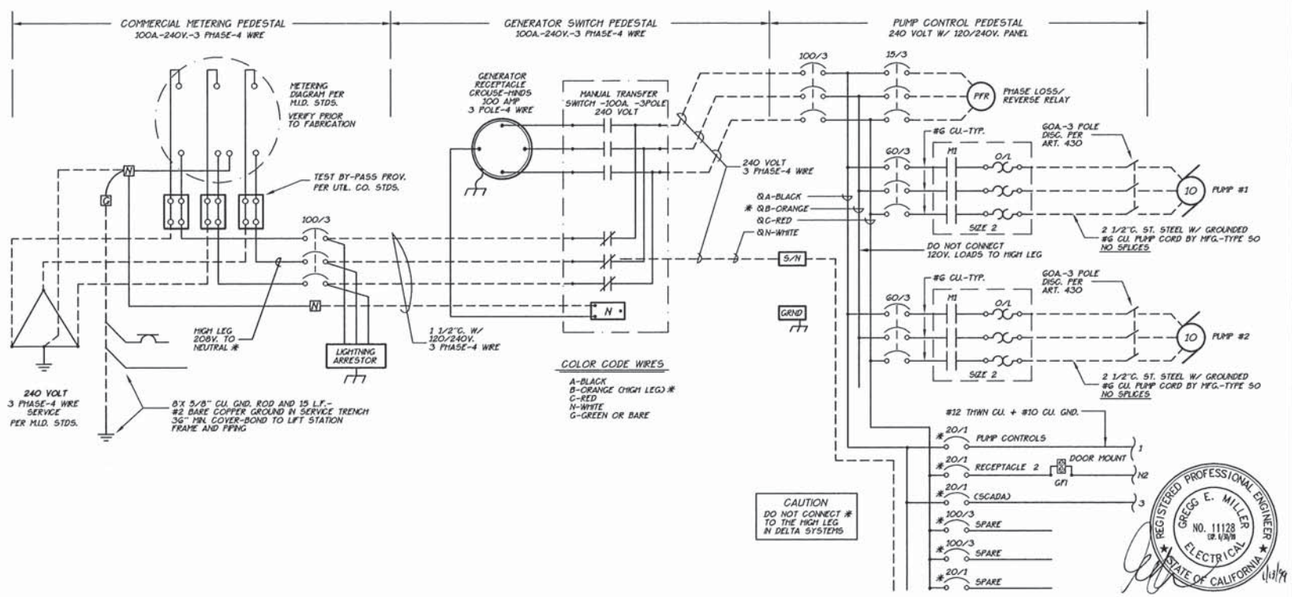
PEDESTAL CONSTRUCTION NOTES -TYPICAL

1. CABINET CONSTRUCTED OF # 304 STAINLESS STEEL, 14 GA. EXTERIOR ELECTRICALLY WELDED AND REINFORCED WHERE REQUIRED.
2. CONSTRUCTION SHALL BE NEMA 3R AND 12, RAINTIGHT AND DUST TIGHT.
3. ALL NUTS, BOLTS, SCREWS AND HINGES SHALL BE STAINLESS STEEL.
4. NUTS, BOLTS AND SCREWS SHALL NOT BE VISIBLE FROM OUTSIDE OF PEDESTAL.
5. PHENOLIC NAMEPLATES SHALL BE PROVIDED AS SPECIFIED.
6. CONTROL WIRING WILL BE MARKED AT BOTH ENDS BY PERMANENT WIRE MARKERS. STICK ON WIRE MARKERS ARE NOT ACCEPTABLE.
7. A PLASTIC COVERED WIRING DIAGRAM WILL BE ATTACHED TO THE INSIDE OF THE FRONT DOOR.
8. PEDESTAL SHALL BE FACTORY WIRED AND CONFORM TO NEMA STANDARDS.
9. PEDESTAL IS UNPAINTED. MOUNTING PANS, BARRIERS + INTERNAL DEADFRONT DOORS + COVERS ARE PAINTED HOSPITAL WHITE.
10. BACK PANS AND CONTACTOR BRACKETS WILL BE 12 GA. HOT DIPPED GALV. STEEL.
11. ALL METERING AND SERVICE EQUIPMENT SHALL MEET EUSERC AND LOCAL UTILITY COMPANY STANDARDS - UL LISTED.
12. PEDESTALS SHALL BE TESCO OR EQUAL.

D-1 E-3 **PUMP CONTROL PEDESTAL** NO SCALE



D-5 E-3 **BLOCK POWER DIAGRAM**



D-4 E-3 **POWER DISTRIBUTION SINGLE LINE DIAGRAM**

GREGG E. MILLER & ASSOC., INC
CONSULTING ELECTRICAL ENGINEERS
909 FIFTEENTH ST. SUITE 7 MODESTO, CA. 95354
(209) 575-0312 FAX: (209) 575-0813

DRAWN BY: QL	DATE: 1/12/99
CHECKED BY: G.E.M.	DATE: 1/12/99
ASBUILT BY: D. BECKER 3.15.2000	
ASBUILT PLOTTED: ED ESHOO 4.11.2000	DATE:
FIELD BOOK:	PAGE:
REFERENCE NO.	
REVISED:	DATE

APPROVED BY: [signature] DATE: 1.25.99

801 11th STREET
P.O. BOX 642
MODESTO, CA 95353
PHONE: (209) 577-5462

CITY of MODESTO
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

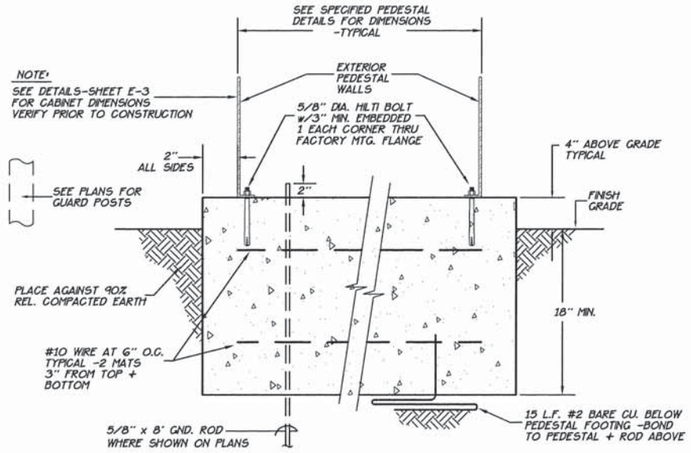
ELECTRICAL PLAN
HONEYCREEK ROAD AND NIGHTINGALE DRIVE
SEWER LIFT STATION

ACTIVITY NO.

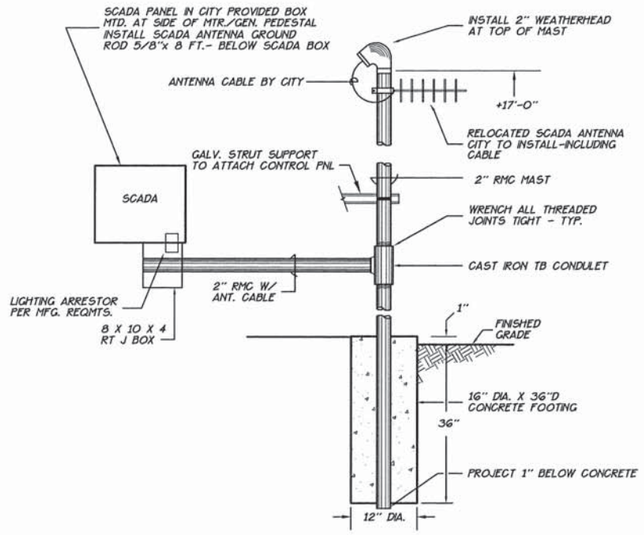
PAGE NO. E-3

FILE NO. 1735

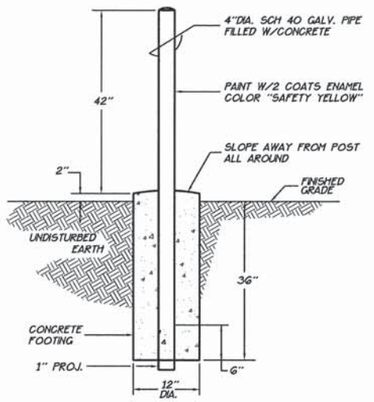
12-D-458



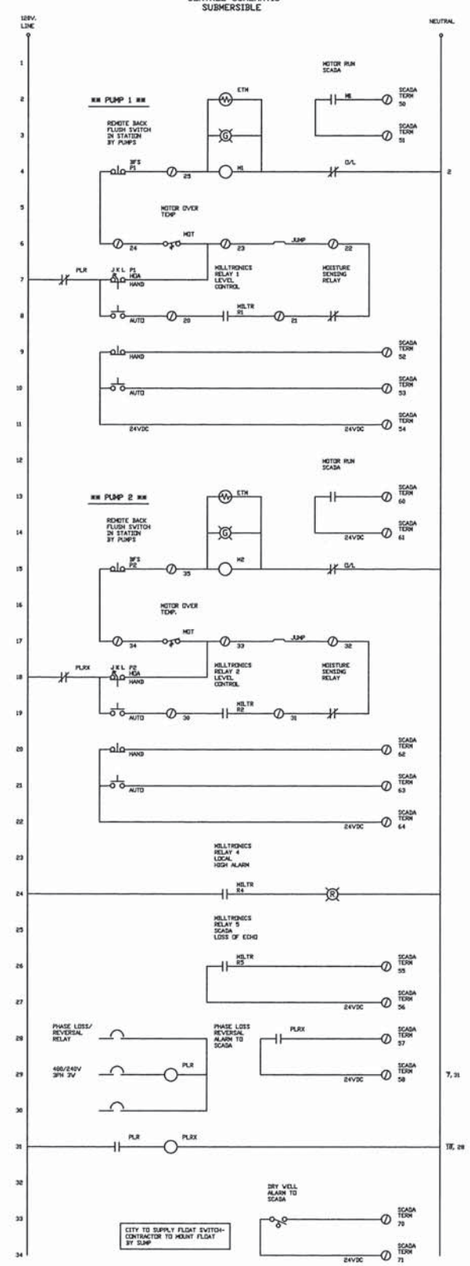
D-4 / E-4 **CONCRETE PEDESTAL BASE - TYPICAL** NO SCALE



D-3 / E-4 **ANTENNA MOUNTING POST** NO SCALE



D-2 / E-4 **NON-REMOVEABLE GUARD POST - TYPICAL** NO SCALE



Name: PHH	Date: 11/5/98
Company: CITY OF MODESTO	Revision: 1
Drawn by: PHH	Drawing number: 9557-01

D-1 / E-4 **ELEMENTARY CONTROL DIAGRAM**

REGISTERED PROFESSIONAL ENGINEER GREGG E. MILLER NO. 11128 EXP. 6/30/99 ELECTRICAL STATE OF CALIFORNIA

1/12/99

GREGG E. MILLER & ASSOC., INC
CONSULTING ELECTRICAL ENGINEERS
909 FIFTEENTH ST. SUITE 7 MODESTO, CA. 95354
(209) 575-0312 FAX: (209) 575-0813

DRAWN BY: GL	DATE: 1/12/99
CHECKED BY: G.E.M.	DATE: 1/12/99
ASBUILT BY: D. BECKER 3.15.2000	DATE:
ASBUILT PLOTTED: ED ESH00 4.11.2000	DATE:
FIELD BOOK:	PAGE:
REFERENCE NO.	
REVISED:	DATE:

R.C.E. EXP. DATE:

APPROVED BY: DATE: 1.25.99

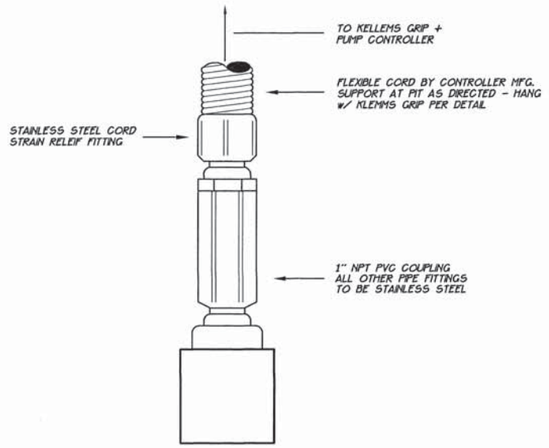
801 11th STREET
P.O. BOX 642
MODESTO, CA 95353
PHONE: (209) 577-5462

CITY of MODESTO
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

ELECTRICAL PLAN
HONEYCREEK ROAD AND NIGHTINGALE DRIVE
SEWER LIFT STATION

ACTIVITY NO.
PAGE NO. E-4
FILE NO. 1735

12.D.458

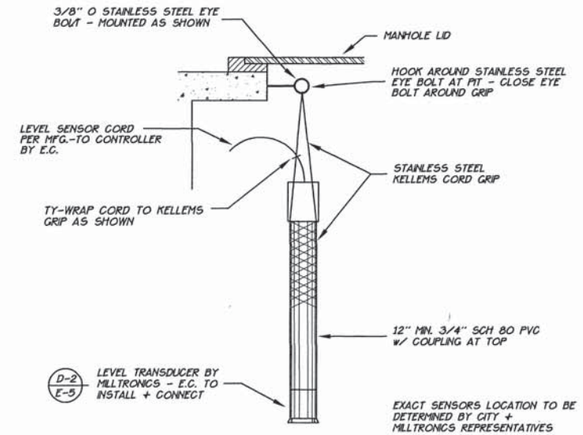


TRANSDUCER MOUNTING - LIQUID APPLICATIONS

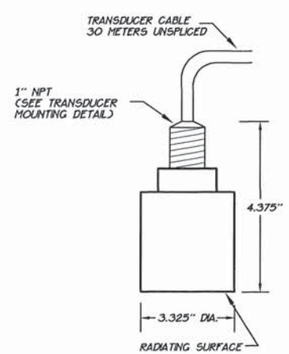
GENERAL RULES

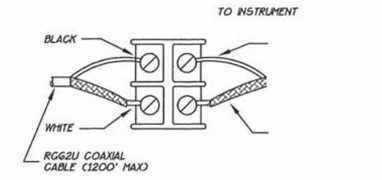
1. DO NOT MOUNT TRANSDUCER DIRECTLY TO METAL. USE PVC COUPLING AND NIPPLE AS PROVIDED.
2. DO NOT OVERTIGHTEN MOUNTING. HAND TIGHTENING OF NYLON BOLTS AND NUTS OR PVC COUPLING AND NIPPLE IS SUFFICIENT.
3. IN LIQUID APPLICATIONS, TRANSDUCER MOUNT (FLANGE BRACKET, CONDUIT OR PLYWOOD) MUST KEEP TRANSDUCER PERPENDICULAR TO LIQUID SURFACE.
4. TRANSDUCER INSTALLATION WHETHER IN NON-HAZARDOUS (AS SHOWN) OR HAZARDOUS AREAS, MUST BE DONE IN CONJUNCTION WITH APPROVED CONDUIT BOXES AND FITTINGS AND TO PROCEDURES IN ACCORDANCE WITH ALL GOVERNING REGULATIONS.
5. LIQUID TRANSDUCER - MILLTRONICS # XPS-15

D-2 / E-5 **TRANSDUCER MOUNTING** NO SCALE



D-1 / E-5 **LEVEL SENSOR MOUNTING** NO SCALE





STANDARD - POLYURETHANE
OPTIONAL - PVC (FOR HIGHLY CORROSIVE APPLICATIONS)
- TEFLON (FOR HIGHLY CORROSIVE APPLICATIONS)

NOTES: DO NOT ROUTE CABLES IN RACEWAYS
-CABLE MUST BE RUN IN A GROUNDED METAL CONDUIT. GROUND SHIELD ONLY AT INSTRUMENT END. INSULATE SHIELD AT JUNCTION BOX TO PREVENT INADVERTENT GROUNDING.
-TRANSDUCER WIRING MUST BE DONE IN CONJUCTION WITH APPROVED CONDUIT, BOXES AND FITTINGS AND TO PROCEDURES IN ACCORDANCE WITH ALL GOVERNING REGULATIONS.

D-3 / E-5 **LEVEL TRANSDUCER** NO SCALE

REGISTERED PROFESSIONAL ENGINEER GREGG E. MILLER NO. 11128 EXP. 6/30/01 ELECTRICAL STATE OF CALIFORNIA

GREGG E. MILLER & ASSOC., INC
CONSULTING ELECTRICAL ENGINEERS
909 FIFTEENTH ST. SUITE 7 MODESTO, CA. 95354
(209) 575-0312 FAX: (209) 575-0813
NO SCALE

DRAWN BY: GL	DATE: 1/12/99
CHECKED BY: G.E.M.	DATE: 1/12/99
ASBUILT BY: D. BECKER	DATE: 3-15-2000
ASBUILT PLOTTED: ED ESHOO	DATE: 4-11-2000
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APPROVED BY: DATE: 1-25-99

801 11th STREET
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CITY of MODESTO
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

ELECTRICAL PLAN
HONEYCREEK ROAD AND NIGHTINGALE DRIVE
SEWER LIFT STATION

ACTIVITY NO.
PAGE NO. E-5
FILE NO. 1735

12.D-458

1"=40'

LOCATION MAP
NO SCALE

HONEY CREEK

Exist. M.H.
Rim 81.5
Inv. 75.80 (15" S. out)
Inv. 76.05 (12" Stub, N.)

20' Easement (Exist.)

240'~8" C.I.P. (Forced Main)

76.35
8" Inv.

MH & 6" V.C.P. (By Others)

8" x 45° Bend

T.C. 79.16

76.85
8" Inv.

LIFT STATION
& Appurtenances
(See Detail Dwgs.)

1¼" Electrical Rigid Metal Conduit w/ 4 ~ #4 AWG THW (30" min. cover)

Exist. M.I.D. TRANSFORMER (Underground)

TESCOFLEX SERVICE PEDESTAL
w/ 3 ~ Phase Metering & Main Disconnect Fused 70 Amps
Service Connection to M.I.D. Requirement.
Exact Location of Pedestal to be determined by the Engineer.

12" Plug
Inv. 86.42
T.C. 78.64

135'~12" V.C.P. @ .0015

DR.

Rim 79.30
Inv. 54.20 (12" W.)
Inv. ~~61.60~~ (10" N.) 60.01
Inv. 70.41 (6" E.)
Inv. 73.76 (6" SW.)
Inv. 69.20 (2~6" C.I.P. Suction)

260'~10" V.C.P. @ .002

Inv. 61.80 (1.00)

HUMMINGBIRD LN.

6" V.C.P. (By Others)

Rim 79.30
Inv. 62.11 (10" N. & S.)
Inv. 69.95 (6" W.)
Inv. 74.13 (6" E.)

170'~10" V.C.P. @ .002

RD.

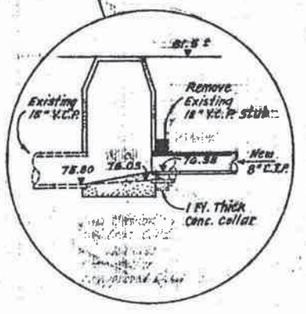
10" Plug
Inv. 62.45

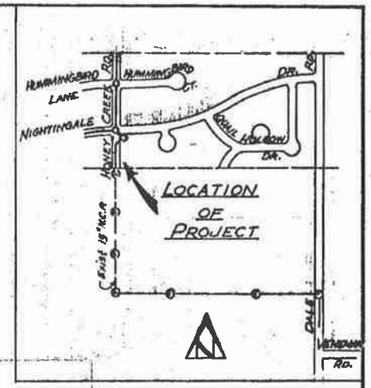
NIGHTINGALE

HUMMINGBIRD CT.

6" V.C.P. (By Others)

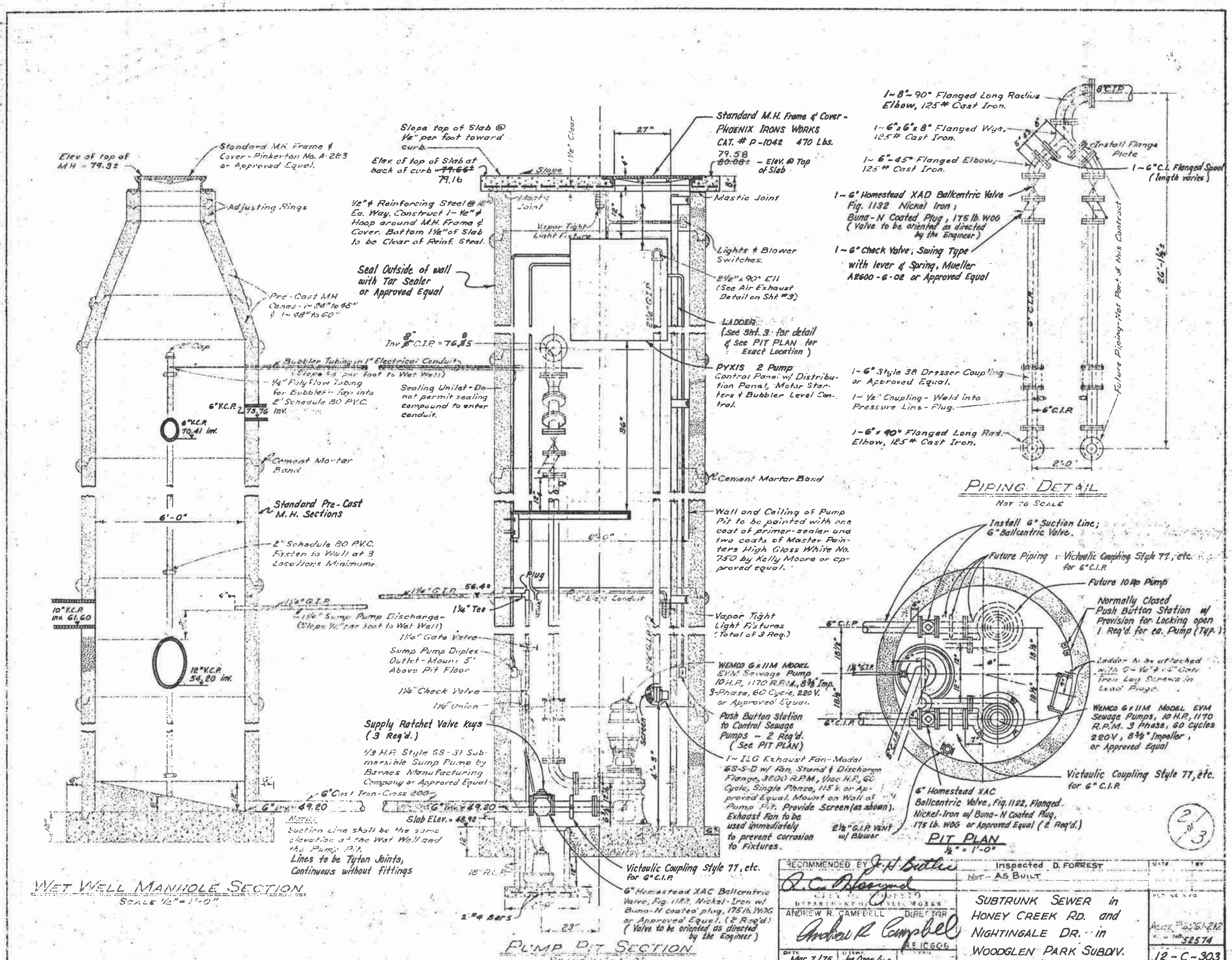
705'





1/3

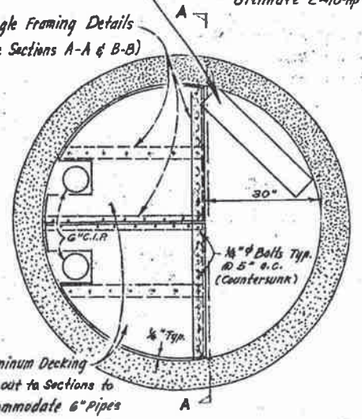
RECOMMENDED BY: R. C. Hayward, CITY OF MODESTO, DEPARTMENT OF PUBLIC WORKS, ANDREW R. CAMPBELL DIRECTOR, Andrew R. Campbell, R.E. 10606	Inspected D. FORREST	DATE	BY
	Mst'y Asbuilt		
	Revised T.C. @ Lift Station as per N. PRICHARD	5-7-76	ROGERS
	SUBTRUNK SEWER in HONEY CREEK RD. and NIGHTINGALE DR. in WOODGLEN PARK SUBDIV.	FLD. BK. & PG. Acct.#6561-212	
		W. O. NO. 52574	
DATE Feb. 24, 1975 / DRAWN Joe Ozoa / CHECKED		FILE NUMBER 12-C-303	



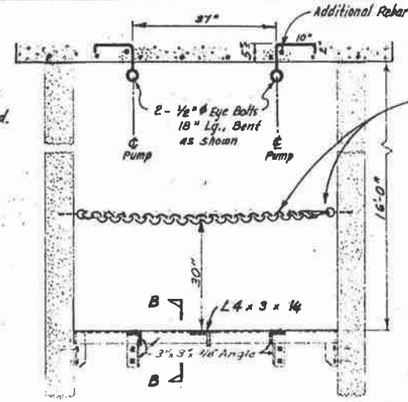
Elev. of top of M.H. = 79.3±
Standard M.H. Frame & Cover - Pinkerton No. A-283 or Approved Equal.
Adjusting Rings
Pre-Cast MH Cones - 1~84" to 48" & 1~48" to 60"
2" Cap
Bubbler Tubing in 1" Electrical Conduit (Slope ¼" per foot to Wet Well)
¼" Polyflow Tubing for Bubbler - Tap into 2" Schedule 80 P.V.C.
6" V.C.P. 73.76 Inv.
6" V.C.P. 70.41 Inv.
Cement Mortar Band
Standard Pre-Cast M.H. Sections
6'-0"
2" Schedule 80 P.V.C. Fasten to Wall at 3 Locations Minimum
10" V.C.P. Inv. 61.60
1½" G.I.P.
1½" Sump Pump Discharge (Slope ¼" per foot to Wet Well)
12" V.C.P. 54.20 Inv.
6" Cast Iron-Class 200
49.20
Note:
Suction Line shall be the same elevation at the Wet Well and the Pump Pit.
Lines to be Tyton Joints, Continuous without fittings
WET WELL MANHOLE SECTION
SCALE ½" = 1'-0"
Slope top of Slab @ ½" per foot toward curb.
Elev. of top of Slab at back of curb 79.16
½" Reinforcing Steel @ 8" Ea. Way. Construct 1-½" Hoop around M.H. Frame & Cover. Bottom 1½" of Slab to be Clear of Reinf. Steel.
Seal Outside of wall with Tar Sealer or Approved Equal
Inv. 8" C.I.P. = 76.85
Sealing Unilet - Do not permit sealing compound to enter conduit.
Slope
Mastic Joint
Vapor Tight Light Fixture
27"
Standard M.H. Frame & Cover - PHOENIX IRONS WORKS CAT. # P-1042 470 Lbs.
79.58 - Elev. @ Top of Slab
Mastic Joint
Lights & Blower Switches.
2½" x 90° Ell (See Air Exhaust Detail on Sht. #3)
LADDER (See Sht. 3 for detail & See PIT PLAN for Exact Location)
PYXIS 2 Pump Control Panel w/ Distribution Panel, Motor Starters & Bubbler Level Control.
36"
Cement Mortar Band
Wall and Ceiling of Pump Pit to be painted with one coat of primer-sealer and two coats of Master Painters High Gloss White No. 750 by Kelly Moore or approved equal.
6'-0"
1¼" G.I.P. 56.4±
Plug
1¼" Tee
1½" Gate Valve
Sump Pump Duplex Outlet - Mount 5' Above Pit Floor
1½" Check Valve
1½" Union
Supply Ratchet Valve Keys (3 Req'd.)
1/3 H.P. Style SS-31 Submersible Sump Pump by Barnes Manufacturing Company or Approved Equal
Vapor Tight Light Fixtures (Total of 3 Req.)
WEMCO 6x11M MODEL EVM Sewage Pump 10 H.P., 1170 R.P.M., 8⅜" Imp. 3-Phase, 60 Cycle, 220 V. or Approved Equal.
Push Button Station to Control Sewage Pumps ~ 2 Req'd. (See PIT PLAN)
1~ ILG Exhaust Fan - Model 6S-S-D w/ Fan Stand & Discharge Flange, 3200 R.P.M., ½ H.P., 60 Cycle, Single Phase, 115 V. or Approved Equal. Mount on Wall of Pump Pit. Provide Screen (as shown). Exhaust Fan to be used immediately to prevent corrosion to Fixtures.
Screen
4'-3"
6" Inv. 49.20
Slab Elev. = 48.92
18" R.C.P.
2-#4 Bars
23"
Victaulic Coupling Style 77, etc. for 6" C.I.P.
6" Homestead XAC Ballcentric Valve, Fig. 1122, Nickel-Iron w/ Buna-N coated plug, 175 lb. WOG or Approved Equal. (2 Req'd) (Valve to be oriented as directed by the Engineer)
PUMP PIT SECTION
SCALE ½" = 1'-0"
1~8"-90° Flanged Long Radius Elbow, 125# Cast Iron.
8" C.I.P.
1~6" x 6" x 8" Flanged Wye, 125# Cast Iron.
Install Flange Plate
1~6"-45° Flanged Elbow, 125# Cast Iron.
1~6" C.I. Flanged Spool (length varies)
1~6" Homestead XAC Ballcentric Valve Fig. 1132 Nickel Iron; Buna-N Coated Plug, 175 lb. WOG (Valve to be oriented as directed by the Engineer)
1~6" Check Valve, Swing Type with lever & Spring, Mueller A2600-6-02 or Approved Equal
26'-1½"
Future Piping - Not Part of this Contract
1~6" Style 38 Dresser Coupling or Approved Equal.
1~½" Coupling - Weld into Pressure Line - Plug.
6" C.I.P.
1~6" x 90° Flanged Long Rad. Elbow, 125# Cast Iron.
2'-0"
PIPING DETAIL
NOT TO SCALE
Install 6" Suction Line; 6" Ballcentric Valve.
Future Piping
Victaulic Coupling Style 77, etc. for 6" C.I.P.
Future 10 Hp Pump
Normally Closed Push Button Station w/ Provision for Locking open 1 Req'd. for ea. Pump (Typ.)
Ladder to be attached with 4~½" φ x 6" Gate Iron Lag Screws in Lead Plugs.
WEMCO 6x11M MODEL EVM Sewage Pumps, 10 H.P., 1170 R.P.M. 3 Phase, 60 cycles 220V, 8⅜" Impeller, or Approved Equal
Victaulic Coupling Style 77, etc. for 6" C.I.P.
6" Homestead XAC Ballcentric Valve, Fig. 1122, Flanged. Nickel-Iron w/ Buna-N Coated Plug, 175 lb. WOG or Approved Equal (2 Req'd.)
2½" G.I.P. VENT w/ Blower
6" C.I.P.
PIT PLAN
½" = 1'-0"
2 of 3
RECOMMENDED BY J. H. Butler
Inspected D. FORREST
AS BUILT
ANDREW R. CAMPBELL DIRECTOR
Andrew R. Campbell
RE 10606
DATE Mar. 7/75
Joe Ozoa/SLC
SUBTRUNK SEWER in HONEY CREEK RD. and NIGHTINGALE DR. in WOODGLEN PARK SUBDIV.
52574
12-C-303

Install 2 Pump Control Panel and Bubbler Control (as manufactured by Pyxis Co.); and Additional Circuit Breakers for Lights, Blower Fan, Sump Pump, Convenience Outlet and Control Circuit shall be provided, Pump Alternator is not required. Service shall be 120/240, 4 Wire, 3-Phase. Care must be taken not to install single pole breakers on power leg. Controls and Wiring shall be for Ultimate 2-10-Hp Pump Operation.

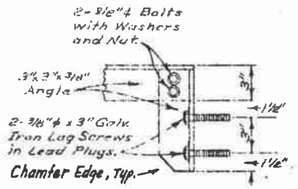
Angle Framing Details (See Sections A-A & B-B)



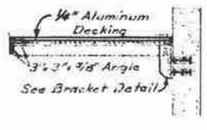
LAYOUT PLAN



PARTIAL SECTION A-A

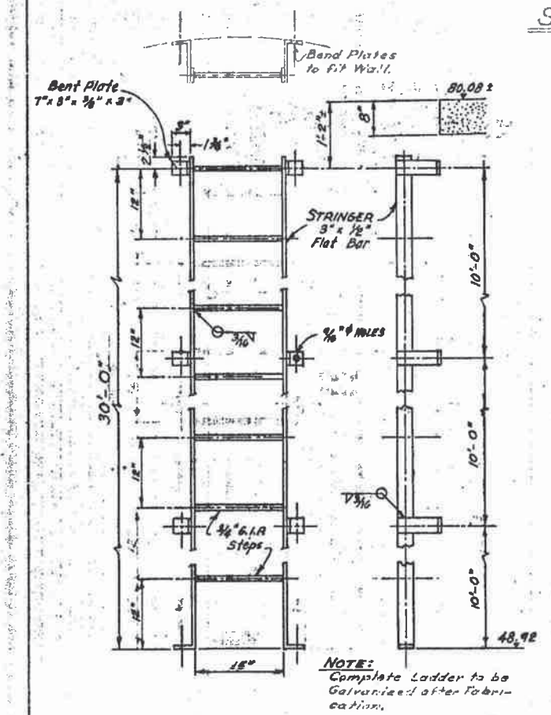


BRACKET
(4 REQ'D)



SECTION B-B

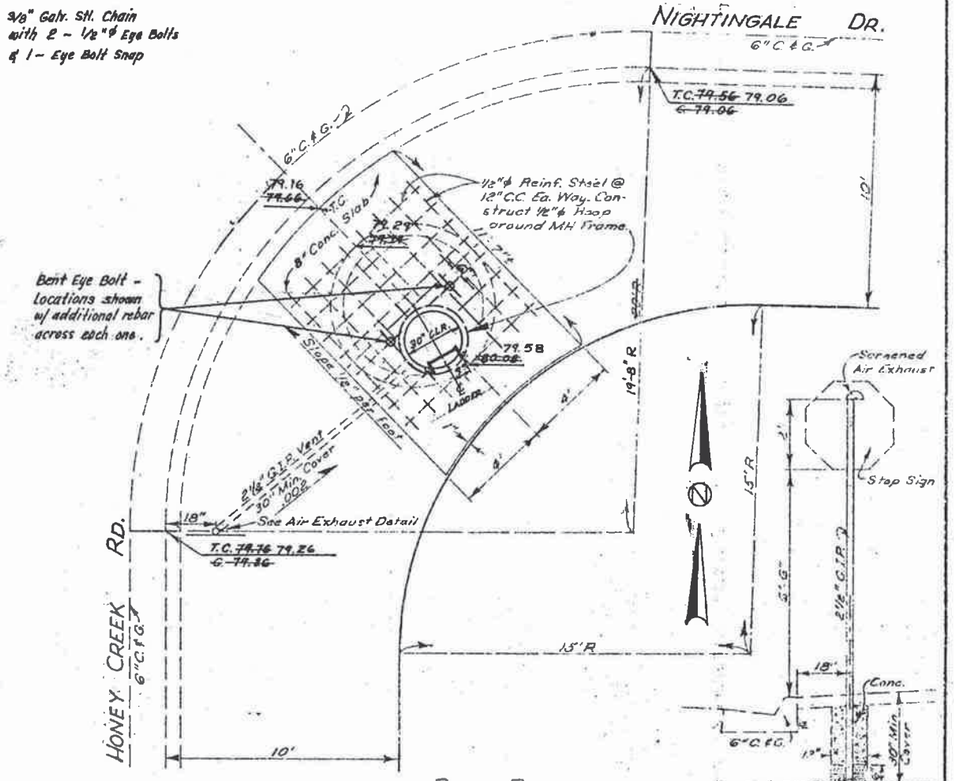
SAFETY DECK



NOTE: Complete Ladder to be Galvanized after Fabrication.

LADDER DETAIL
3/4"=1'-0"

GENERAL NOTE:
All Bolts and Metal, except Aluminum Decking shall be Galvanized.
Bolts shall be coated with "Never-Seize" or approved equal.



PLOT PLAN
1/16"=1'-0"

AIR EXHAUST DETAIL
No Scale

3 of 3

RECOMMENDED BY J.H. Butler
R. A. Bryant
CITY OF SANTA ANA
DEPARTMENT OF PUBLIC WORKS
ANDREW R. CAMPBELL DIRECTOR
Andrew R. Campbell
R.E. 10606
DATE Mar. 6/75 DRAWN Joe Ozan/J.L.C. CHECKED

Inspected D. Forrest
Not - As Built

DATE | BY

SUBTRUNK SEWER "M" IN HONEY CREEK RD. and NIGHTINGALE DR. in WOODGLEN PARK SUBDIV.

F.D. BK. & PG.
Acct. #6861-212
W.O. NO. 62574
FILE NUMBER 12-C-303

SCALE: 1"=40'

Construct 28 L.F. 8"x4" D.F. headerboard & standard barricade

BLOCK 13632

BLOCK 13633

NIGHTINGALE DRIVE

BLOCK 13631

SCALE: 1"=40'

Construct 37 L.F. 8"x4" D.F. headerboard & std. barricade

BLOCK 13633

HUMMINGBIRD ST.

BLOCK 13633

NIGHTINGALE DRIVE

BLOCK 13630

Lift Station & Appurtenances by others

Const. 37 L.F. 8"x4" D.F. headerboard & std. barricade

BLOCK 13638

HUMMINGBIRD LANE

BLOCK 13637

BLOCK 13634

HONEY CREEK ROAD

SCALE: 1"=40'

PEACOCK LANE

SCALE: 1"=40'

Existing Average Ground

Proposed Top of 4" Vert. Curb

Proposed Top of 6" Vert. Curb

MH by others 79.9 Rim

TMH-2 79.9 Rim

8" C.I.P. Force Main

168'-6" VCP @ S=.008

LIFT STATION BY OTHERS

TMH-1 79.5 Rim

MH-3 79.4 Rim

212'-6" VCP @ S=.008

18" VCP @ S=.008 by others

18" VCP @ S=.008 by others

SCALE: HORIZ. 1"=40', VERT. 1"=5'

SCALE: HORIZ. 1"=40', VERT. 1"=5'

Revision B Approved by the City Engineer

by _____ date: MAR 13 1975

Revision A Approved by the City Engineer

by _____ date: OCT 15 1975

Approved by the City Engineer
City of Modesto, California

Date: DEC 12 1974

by _____

MID VALLEY ENGINEERING

- PLANNING AND ZONING
- CIVIL ENGINEERING
- LAND SURVEYING

MODESTO, CALIFORNIA (209) 526-4214

PLAN & PROFILE

PEACOCK LANE
HONEY CREEK ROAD

WOODGLEN PARK No 1

Drawn RCT
Date NOV. '74
Scale AS SHOWN
Job No. 40589
Checked
File No.

ROY A. GALLI RCE 10026
EDISON S. AYER L.S. 2093

Roy A. Galli

Mark	Date	Revisions	Appd
A	3-14-75	Changed 6" VCP	
B	9-8-75	Revised Lift Station	

SHEET 10 OF 14

9-C-43

SCALE: 1"=40'

MATCH LINE - SEE SHEET 7

NIGHTINGALE DRIVE

SCALE: 1"=40'

SCALE: HORIZ. 1"=40', VERT. 1"=2'

Revision 2 approved by the City Engineer
By _____ Date MAR 19 1975

Revision 1 approved by the City Engineer
By _____ Date OCT 17 1974

Approved by the City Engineer, City of Modesto, California.
Date: DEC 19 1974
By _____

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• LAND SURVEYING
MODESTO, CALIFORNIA (209) 526-4214

PLAN & PROFILE
NIGHTINGALE DRIVE
WOODGLEN PARK NO 1

Drawn AST
Date NOV '74
Scale AS SHOWN
Job No 0688
Checked
File No

ROY A GALLI RCE 16026
EDISON S AYER LS 3883
Roy A. Galli

Symb	Date	REVISIONS Description	Appd
1	5-14-75	REVISED 6" VCP	
2	3-3-75	REVISED CITY STATION	

SHEET 8 OF 14

9-C-498