



ADDENDUM NO. 4

DATE: August 5th, 2020

TO: ALL PLAN HOLDERS AND PERSPECTIVE BIDDERS

FROM: CLIFF KNAUER P.E., DEWBERRY

CC: ALEX ROUCHALEAU, P.E., DEWBERRY
CHRIS LIGHTFOOT, SENIOR INSPECTOR, DEWBERRY
JERRY CONNOLLY, GOVERNMENT SERVICES GROUP

PROJECT NAME: SR 79 WASTE WATER AND WATERMAIN IMPROVEMENTS

PROJECT NUMBER: 50113689

A. Please note the following clarifications, corrections or supplemental information regarding the above-referenced project:

1. Please provide direction on the revised piping associated with the change from bypass pump to generator for the LS2 site.

Response:

Please see attached revised sheet LS-2

2. Please provide a revised site plan showing the desired location of the generator.

Response:

Please see attached revised sheet LS-2

3. Will there be specs for the generator? If not we will at least need to know the size desired for the fuel tank?

Response:

Please see attached specifications for the automatic transfer switch and generator. Fuel tank shall be sized to handle 48-hours of continuous usage.

4. Our take off indicates 6 ea. 12 gate valve not 3 as noted on the Basis of Bid.

Response:

Please see revised bid schedule (included with Addendum No. 3) and plans. Please note that this is a lump sum bid and the bid schedule may not reflect all items and quantities shown on the plans. The Contractor is responsible for verifying all quantities.

5. Our take off indicates 10 ea. Fire hydrants not 12 as noted on the Basis of Bid.

Response:





Please see revised bid schedule (included with Addendum No. 3). Please note that this is a lump sum bid and the bid schedule may not reflect all items and quantities shown on the plans. The Contractor is responsible for verifying all quantities.

6. There are no valves or hydrants shown on Thomas Drive. Are any required?

Response:

There are proposed valves on Thomas Dr. at ~Sta. 95+20 and Sta. 132+95. A 12-inch valve has been added at Sta. ~104+30 and 120+80. The bid schedule (included with Addendum No. 3) and plans have been revised. The existing watermain on Thomas Drive will remain active and has fire hydrants.

7. Bid item 15, Tie in existing water main at Thomas Dr. to proposed (tapping sleeve and valve) and Bid Item 17, 12"x 12" tapping sleeve and valve appear to refer to the same item. Is there a second tie in?

Response:

Please see revised bid schedule (included with Addendum No. 3). Please note that this is a lump sum bid and the bid schedule may not reflect all items and quantities shown on the plans. The Contractor is responsible for verifying all quantities.

8. On the lift stations where is the transition from HDPE to DIP on the pump discharge?
Please provide detail.

Response:

Please see revised plans for LS-1 and LS-2.

9. Please see revised lift station electrical plans. Please note the following clarifications:

- a. A generator and ATS is to be supplied and installed at LS-2 (northern lift station)
- b. No generator or ATS is to be provided at LS-1. The supplied electrical paneling, conduit, and misc. electrical appurtenances at LS-1 shall have the ability to incorporate a generator sized similar to that at LS-2 in the future.



Note: Please fax or email a notice of receipt back to Jerry Connolly at jconnolly@govmserv.com. Please also include a copy of the signed addendum in the Bid Package. Any bidders that fail to submit a signed copy of this addendum may have their bids rejected by the Highway 79 Corridor Authority.

RECEIPT OF ADDENDUM 4

ACCEPTED BY:

Signature of Bidder

Date

TYPE OR PRINT NAME OF BIDDER

SR 79 WASTEWATER AND WATER MAIN IMPROVEMENTS PROJECT # 50113689

SECTION 16200 – AUTOMATIC TRANSFER SWITCHES

PART 1 GENERAL

1.01 SCOPE:

Furnish a 3 pole, mechanically held, open transitions, Automatic Transfer Switches as shown on the drawings and specified herein. The Automatic Transfer Switches shall be housed in NEMA 4X 316 stainless steel enclosures.

1.02 CODES & STANDARDS:

The automatic transfer switches and controls shall conform to the requirements of:

- A. UL 1008 - Standard for Transfer Switch Equipment
- B. IEC 947-6-1 Low-voltage Switchgear and Control gear; Multifunction equipment; Automatic Transfer Switching Equipment
- C. NFPA 70 - National Electrical Code
- D. NFPA 110 - Emergency and Standby Power Systems
- E. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
- F. NEMA Standard ICS10-1993 (formerly ICS2-447) - AC Automatic Transfer Switches
- G. UL 508 Industrial Control Equipment

1.03 ACCEPTABLE MANUFACTURERS:

Automatic transfer switches shall be Russelectric, ASCO, or Zenith. Any alternate shall be submitted for approval to the consulting engineer at least 10 days prior to bid. Alternate bids must list any deviations from this specification.

PART 2 PRODUCTS

2.01 MECHANICALLY HELD TRANSFER SWITCH:

- A. The transfer switch shall be electrically operated and mechanically held. The electrical operator shall be a momentarily energized, single-solenoid mechanism. Main operators which include overcurrent disconnect devices, linear motors or gears shall not be acceptable. The switch shall be mechanically interlocked to ensure only two possible positions, normal or emergency.
- B. All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.

- C. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
- D. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.
- E. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 600 amps and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.
- F. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources, are not acceptable.
- G. Where neutral conductors must be switched as shown on the plans, the ATS shall be provided with fully rated overlapping neutral transfer contacts. The neutrals of the normal and emergency power sources shall be connected together only during the transfer and retransfer operation and remain connected together until power source contacts close on the source to which the transfer is being made. The overlapping neutral contacts shall not overlap for a period greater than 100 milliseconds. Neutral switching contacts which do not overlap are not acceptable.
- H. Where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.

2.02 MICROPROCESSOR CONTROLLER:

- A. The controller's sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through an optional serial communication module.
- B. A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to $\pm 1\%$ of nominal voltage. Frequency sensing shall be accurate to $\pm 0.2\%$. The panel shall be capable of operating over a temperature range of -20 to +60 degrees C and storage from -55 to +85 degrees C.
- C. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.

- D. All customer connections shall be wired to a common terminal block to simplify field-wiring connections.
- E. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
 - 1. EN 55011:1991 Emission standard - Group 1, Class A
 - 2. EN 50082-2:1995 Generic immunity standard, from which:
 - EN 61000-4-2:1995 Electrostatic discharge (ESD) immunity
 - ENV 50140:1993 Radiated Electro-Magnetic field immunity
 - EN 61000-4-4:1995 Electrical fast transient (EFT) immunity
 - EN 61000-4-5:1995 Surge transient immunity
 - EN 61000-4-6:1996 Conducted Radio-Frequency field immunity
 - 3. IEEE472 (ANSI C37.90A) Ring Wave Test.

2.03 ENCLOSURE:

- A. The ATS shall be furnished in a NEMA 4X 316 stainless steel enclosure, unless otherwise shown on the plans.
- B. All standard and optional door-mounted switches and pilot lights shall be 30.5-mm industrial grade type or equivalent for easy viewing & replacement. Door controls shall be provided on a separate removable plate, which can be supplied loose for open type units.

PART 3 OPERATION

3.01 CONTROLLER DISPLAY & KEYPAD:

- A. A four line, 20 character LCD display and keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and limited control through the serial communications input port. The following parameters shall only be adjustable via DIP switches on the controller:
 - 1. Nominal line voltage and frequency
 - 2. Single or three phase sensing
 - 3. Operating parameter protection
 - 4. Transfer operating mode configuration
(Open transition, Closed transition, or Delayed transition)

All instructions and controller settings shall be easily accessible, readable and accomplished without the use of codes, calculations, or instruction manuals.

3.02 VOLTAGE, FREQUENCY, & PHASE ROTATION SENSING:

- A. Voltage and frequency on both the normal and emergency sources (as noted below) shall be continuously monitored, with the following pickup, dropout and trip setting capabilities (values shown as % of nominal unless otherwise specified):

<u>Parameter</u>	<u>Sources</u>	<u>Dropout / Trip</u>	<u>Pickup / Reset</u>
Under voltage	N&E,3 ϕ	70 to 98%	85 to 100%
Over voltage	N&E,3 ϕ	102 to 115%	2% below trip
Under frequency	N&E	85 to 98%	90 to 100%
Over frequency	N&E	102 to 110%	2% below trip
Voltage unbalance	N&E	5 to 20%	1% below dropout

- B. Repetitive accuracy of all settings shall be within $\pm 0.5\%$ over an operating temperature range of -20°C to 60°C.
- C. Voltage and frequency settings shall be field adjustable in 1% increments, either locally with the display and keypad, or remotely via serial communications port access.
- D. The controller shall be capable (when activated by the keypad or through the serial port) of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or CBA).
- E. Source status screens shall be provided for both normal & emergency to provide digital readout of voltage on all 3 phases, frequency, and phase rotation.

3.03 TIME DELAYS:

- A. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 24 VDC power supply.
- B. A time delay shall be provided on transfer to emergency, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.
- C. Two time delay modes (which are independently adjustable) shall be provided on re-transfer to normal. One time delay shall be for actual normal power failures and the other for the test mode function. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.
- D. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.
- E. A time delay activated output signal shall also be provided to drive an external relay(s) for selective load disconnect control. The controller shall have the ability to activate an adjustable 0 to 5 minute time delay in any of the following modes:
1. Prior to transfer only.
 2. Prior to and after transfer.
 3. Normal to emergency only.

4. Emergency to normal only.
 5. Normal to emergency and emergency to normal.
 6. All transfer conditions or only when both sources are available.
- F. The controller shall also include the following built-in time delays for optional Delayed Transition operation:
1. 1 to 5 minute time delay on failure to synchronize normal and emergency sources prior to closed transition transfer.
 2. 0.1 to 9.99 second time delay on an extended parallel condition of both power sources during closed transition operation.
 3. 0 to 5 minute time delay for the load disconnect position for delayed transition operation.
- G. All time delays shall be adjustable in 1 second increments, except the extended parallel time, which shall be adjustable in .01 second increments.
- K. All time delays shall be adjustable by using the LCD display and keypad or with a remote device connected to the serial communications port.

3.04 ADDITIONAL FEATURES:

- A. A three position momentary-type test switch shall be provided for the *test / automatic / reset* modes. The test position will simulate a normal source failure. The reset position shall bypass the time delays on either transfer to emergency or retransfer to normal.
- B. A SPDT contact, rated 5 amps at 30 VDC, shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
- C. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact closed, when the ATS is connected to the emergency source.
- D. LED indicating lights (16 mm industrial grade, type 12) shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).
- E. LED indicating lights (16 mm industrial grade, type 12) shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal and emergency sources, as determined by the voltage sensing trip and reset settings for each source.
- F. Provide the ability to select “commit/no commit to transfer” to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.

- G. Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad or serial port.
- H. An In-phase monitor shall be provided in the controller. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The in-phase monitor shall be specifically designed for and be the product of the ATS manufacturer.
- I. The controller shall be capable of accepting a normally open contact that will allow the transfer switch to function in a non-automatic mode using an external control device.
- J. Engine Exerciser – The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to seven different exercise routines. For each routine, the user shall be able to:
1. Enable or disable the routine.
 2. Enable or disable transfer of the load during routine.
 3. Set the start time,
 - time of day
 - day of week
 - week of month (1st, 2nd, 3rd, 4th, alternate or every)
 4. Set the duration of the run.

At the end of the specified duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. A 10-year life battery that supplies power to the real time clock in the event of a power loss will maintain all time and date information.

- K. System Status – The controller LCD display shall include a “System Status” screen which shall be readily accessible from any point in the menu by depressing the “ESC” key a maximum of two times. This screen shall display a clear description of the active operating sequence and switch position. For example,

Normal Failed
Load on Normal
TD Normal to Emergency
2min15s

Controllers that require multiple screens to determine system status or display “coded” system status messages, which must be explained by references in the operator’s manual, are not permissible.

- L. Self Diagnostics – The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.

- M. Communications Interface – The controller shall be capable of interfacing, through an optional serial communication module, with a network of transfer switches, locally (up to 4000 ft.) or remotely through modem serial communications. Standard software specific for transfer switch applications shall be available by the transfer switch manufacturer. This software shall allow for the monitoring, control and setup of parameters.
- N. Data Logging – The controller shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory:
1. Event Logging
 1. Data and time and reason for transfer normal to emergency.
 2. Data and time and reason for transfer emergency to normal.
 3. Data and time and reason for engine start.
 4. Data and time engine stopped.
 5. Data and time emergency source available.
 6. Data and time emergency source not available.
 2. Statistical Data
 1. Total number of transfers.
 2. Total number of transfers due to source failure.
 3. Total number of days controller is energized.
 4. Total number of hours both normal and emergency sources are available.

PART 4 ADDITIONAL REQUIREMENTS

4.01 WITHSTAND & CLOSING RATINGS:

- A. The ATS shall be rated to close on and withstand the available RMS symmetrical short circuit current at the ATS terminals.
- B. The ATS shall be UL listed in accordance with UL 1008 and be labeled in accordance with that standard's 1½ and 3 cycle, ratings. ATS which are not tested and labeled with 1½ and 3 cycle (any breaker) ratings and have series, or specific breaker ratings only, are not acceptable.
- C. It shall be the ATS switch supplier's responsibility to obtain the circuit breaker data for the circuit breakers feeding the ATS and insure that the "specific breaker" ratings meet the project requirements for withstand and close. This shall apply to all ratings, i.e. short time, instantaneous, etc..

4.02 TEST & CERTIFICATION:

- A. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.

- B. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.
- C. The ATS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, and installation and servicing in accordance with ISO 9001.

4.03 SERVICE REPRESENTATION:

- A. The ATS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

END OF SECTION 16216

SECTION 16216- GENERATORS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

Furnish all labor, materials, equipment and incidentals required putting into operation and field test Generator units and appurtenances shown on the Drawings and specified herein. The units shall be rated to operate all motors shown on the drawings plus all auxiliary electrical equipment.

These Specifications are intended to give a general description of what is required, but do not cover all details which will vary in accordance with the requirements of the equipment as offered. It is, however, intended to cover the furnishing, the shop testing, and delivery and complete installation and field testing, of all materials, equipment and appurtenances as herein specified, whether specifically mentioned in these Specifications or not.

1.2 DESCRIPTION OF SYSTEMS:

The generator unit shall be arranged for automatic starting and stopping, and load transfer upon failure of the normal source of power. The unit controls shall provide for automatic exercising on a weekly basis.

1.3 QUALIFICATIONS:

The engine-generator set shall be the standard product, as modified by these Specifications, of Cummins (Onan), Caterpillar, Kohler, Generac. The unit to be furnished shall be of proven ability and shall be designed, constructed, and installed in accordance with the best practices and methods.

The unit must be of such physical dimensions as to make a good installation in the opinion of the Engineer, in the space provided as indicated on the Drawings.

The unit shall be assembled in the U.S. with over 50% of the components such as the engine, generator, auxiliary equipment, etc., manufactured in the U.S. by a manufacturer currently engaged in the production of such equipment.

An authorized distributor having a parts and service facility within a 250-mile radius of the job site shall ship the unit to the job site. In addition, and in order not to penalize the Owner for unnecessary or prolonged periods of time for service or repairs to the emergency system, the engine generator set supplier must have no less than eighty percent (80%) of all engine replacement parts locally available at all times. Certified proof of this replacement shall be furnished to the Engineer upon request.

All materials and parts comprising the units shall be new and unused, of current manufacture, and of the highest grade, free from all defects or imperfections. Equipment shall not have been in prior service except as required by factory tests. Workmanship shall conform to the best modern practices. Only new and current models will be considered. The units offered under these Specifications shall be the product of a firm regularly engaged in the production of engine-generator equipment and shall meet the requirements of the Specifications set forth herein. Major exceptions to Specifications will be considered sufficient cause for rejection of the machine. All equipment furnished under this Specification shall be the standard product of a manufacturer having a successful record of manufacturing and servicing the equipment and systems specified herein for of five (5) years minimum.

1.4 SUBMITTALS:

Submit to the Engineer for approval complete sets of installation drawings, schematics, and wiring diagrams which show details of installation and connections to the work of other Sections, including foundation drawing showing location and size of foundation bolts for the spring type vibration isolators and brochures covering each item of equipment.

In the event that it is impossible to conform to certain details of the Specifications due to different manufacturing techniques, describe completely all nonconforming aspects.

The submittal data for each unit shall include, but not necessarily be limited to, the following:

1. Installation drawings showing plan and elevations of the complete generator unit; weatherproof housing; foundation plan; exhaust silencer; starting battery; battery charger; fuel tank; and all other items requiring space for installation.
2. Certificate(s) within 30 days after award certifying that not less than two engines of identical number of cylinders and cylinder size, identical rotational speed, and identical or higher BMEP, and of the same basic configuration (in-line or "V") as the engine to be furnished, shall have driven generators which have produced in satisfactory operation not less than 1,000 kW hours of electricity within a two year period.
3. Construction drawings showing outline, general arrangement (setting Plan), and anchor bolt details. Drawings shall show the total weight and center of gravity of the assembled equipment on the mounting skid.
4. Piping schematics for fuel oil, lubricating oil, jacket water, and cooling water integral with the engine.
5. Battery sizes and cranking time calculations.
6. Battery charger and block heater electrical power requirements and connections.
7. Critical speed calculations.

Engine Data:

- a. Manufacturer
- b. Model
- c. Number of cylinders
- d. RPM
- e. Bore x stroke
- f. BMEP at full rated load
- g. Fuel consumption rate curves at various loads
- h. Gross engine horsepower to produce generator standby rating (including fan and all parasitic loads)

Generator Data:

- a. Manufacturer
- b. Model
- c. Rated KVA
- d. Rated kW
- e. Voltage
- f. Temperature rise above 40 degree C ambient:
 - (1) Stator by thermometer
 - (2) Field by resistance
 - (3) Class of insulation
- g. Generator efficiency including excitation losses and at 80 percent power factor:
 - (1) Full load
 - (2) 3/4 Load
 - (3) 1/2 Load

Generator Unit Control Data:

- a. Actual electrical diagrams including schematic diagrams, and interconnection wiring diagrams for all equipment to be provided.
- b. Legends for all devices on all diagrams.
- c. Sequence of operation explanations for all portions of all schematic-wiring diagrams.

8. Alternator Data Sheet

Furnish Manufacturer's certified shop test record of the complete engine driven generator unit.

1.5 OPERATING INSTRUCTIONS:

Operating and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operation and maintenance personnel unfamiliar with such equipment. At job closeout submit 3 copies of operation and maintenance manuals for equipment. Identification symbols for all replaceable parts and assemblies shall be included. Information in manuals shall be comprehensive and specific.

A factory representative of the generator unit manufacturer who has complete knowledge of proper operation and maintenance shall be provided for one day to instruct representatives of the Owner and the Engineer on proper operation and maintenance. With the Owner's permission, this work may be conducted in conjunction with the inspection of the installation and test run as provided under PART 3 - EXECUTION. If there are difficulties in operation of the equipment due to the manufacturer's design or fabrication, additional service shall be provided at no cost to the Owner.

1.6 SPECIAL TOOLS AND SPARE PARTS:

The manufacturer shall furnish any special tools required for normal operation and maintenance of the equipment being furnished.

The manufacturer shall furnish two (2) complete spare replacement sets of all filter elements required for the generator unit.

1.7 PRODUCT HANDLING:

All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

All equipment and parts must be properly protected against any damage during a prolonged period at the site.

Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

Finished surface of all exposed openings (exhaust, etc.) shall be protected by wooden blanks, strongly built and securely fastened thereto.

Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

Proper care shall be taken to protect parts from the entrance of water during shipment, storage and handling.

Each box or package shall be properly marked to show its net weight in addition to its contents.

1.8 WARRANTY:

The contractor and the equipment manufacturers shall warrant all equipment supplied under this section for a period of one (2) years. Warranty period shall commence on Final Completion Date.

The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine and the unit restored to service at no expense to the Owner.

The manufacturer's warranty period shall run concurrently with the Contractor's warranty period. No exception to this provision shall be allowed.

PART 2 - PRODUCTS

2.1 STANDARD COMMERCIAL PRODUCT:

Generator set shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product with any added features needed to comply with the requirements. Additional or better features which are not specifically prohibited by this Specification, but which are a part of the manufacturer's standard commercial product shall be included in the generator set being furnished. A standard commercial product is a product, which is or will be sold on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model(s).

2.2 RATINGS:

The rating of the generator set shall not exceed the manufacturer's published standby rating. The gross engine horsepower required to produce the standby rating shall not exceed the manufacturer's published continuous duty rating by more than 150 percent. The gross engine horsepower described shall include all parasitic demands such as generator inefficiencies, fuel pumps, water pumps, radiator fan (for fan cooled models) and all accessories necessary to the unit's proper operation while operating at rated load and at a rotational speed not to exceed 1800 rpm. Generator set shall have a net continuous standby rating as indicated on the Drawings. The net kW rating of the generator set shall be defined while operating the unit at 1800 RPM with the generator set equipped with all necessary operating accessories including alternating current generator and exciter, air cleaner(s), oil pump, fuel pump, fuel injection pump, jacket water pump, radiator fan, exhaust system, and battery charging alternator.

Note:

The above stated requirements may require a generating set with a larger than indicated nominal rating. Site conditions for this project are an elevation of not greater than 100 feet above mean sea level and an atmospheric temperature of 104 degrees F burning #2 diesel fuel oil or natural gas (see plans).

The generator set shall be capable of producing the specified standby kW rating for continuous electrical service during interruption of the normal utility source and shall be certified to this effect by the manufacturer for the actual unit supplied.

The Generator Unit kW rating shall be at 0.8 power factor.

Generator sets shall conform to the requirements of NFPA 37, 110, and NEMA MG1-22.40.

2.3 GENERATOR SET AND AUXILIARY EQUIPMENT:

The generator set shall consist of a diesel or natural gas engine connected to an alternating current generator with Permanent Magnet excitation system.

The generator set shall be arranged for automatic unattended starting.

Critical speeds: The complete generator set shall be free of critical speeds of either a major or minor order that will endanger satisfactory operation of the set. Satisfactory operation will be considered endangered if torsion vibration stresses exceed 5,000 psi within 10% above or below rated engine speed.

Rotating or reciprocating parts or other parts that may present a hazard to operating personnel shall be isolated or shielded to minimize danger. Design Characteristics shall limit operating temperatures at critical points of maximum wear at full-load operating conditions.

2.4 ENGINES:

The engine shall be a full compression ignition, four cycle, naturally aspirated, turbocharged, turbocharged-intercooled, single acting, solid injection engine, either vertical in-line or "V" type. Engine shall be designed and constructed so as to eliminate undue heating, vibration, and wear. Speed shall not exceed 1800 revolutions per minute at normal full load operation. The engine governor shall maintain frequency regulation not to exceed 3 percent (1.8 Hertz) from no load to full rated load and shall have a Vernier control with positive locking mechanism for manual operation and adjustment. Engine shall be constructed adequately to withstand sudden changes from no load to rated load, and to preserve alignment of integral components under all conditions of operation. Engine shall be neat in appearance and shall permit easy access to various parts for maintenance purposes.

Assembly: Completely factory assemble engine. Mount turbocharger, intercooler if provided, and all piping integral with the engine, on the engine.

Radio-Interference Suppression: The engine shall comply with MIL-I-16165 relative to radiated radio interference.

Generators and other devices capable of producing radio interference shall comply with

MIL-STD-461 relative to radiated and conducted radio interference.

Engine Speed Governing System: Governing system shall be suitable for controlling the speed of the generator set within the requirements specified herein without intermediate adjustment and shall maintain the specified stability without hunting or cycling.

Overspeed Shutdown Device: The overspeed shutdown device shall be entirely independent of the engine speed governing system and shall be positive engaged so that engine speed shall not exceed 110 percent of synchronous speed, and shall react to shut off the engine's air and fuel supply. The overspeed device shall require manual resetting after emergency tripping.

The engine shall be capable of satisfactory performance on No. 2 fuel oil (ASTM Designation D396) (diesel units). Diesel engines requiring a premium fuel will not be considered.

The engine shall be capable of operating at light loads for extended periods of time and shall provide a means to reduce carbonization (wet stacking). This is especially important for this project because the generator is sized for a future upgrade of loads.

The engine shall be equipped with fuel filters, lube oil filters, intake air filters, lube oil cooler, fuel transfer pump, fuel priming pump, service meter, engine driven water pump, and unit mounted instruments. Unit mounted instruments shall include a fuel pressure gauge, water temperature gauge, and lubrication oil pressure gauge. The engine shall be provided with low oil pressure, high water temperature and overspeed safety shutdowns of the manual reset type.

A mechanical fuel injection system shall be employed. Injection pumps and injection valves shall be a type not requiring adjustment in service and shall be of a design allowing quick replacement by ordinary mechanics without special experience. The engines shall have an individual mechanical injection pump and injection valve for each cylinder, any one of which may be removed and replaced from parts stock. Fuel injection pumps shall be positive action, constant-stroke pumps, activated by a cam driven by gears from the engine crankshaft. Fuel lines between injection pumps and valves shall be of heavy seamless tubing.

The fuel system shall be equipped with fuel filters having replaceable elements. Filter elements shall be easily removable from their housing for replacing without breaking any fuel line connections, or disturbing the fuel pump, or any other part of the engine. All fuel filters shall be conveniently located in an accessible housing, ahead of the injection pumps so that the fuel will have been thoroughly filtered before it reaches the pump. No screens or filters requiring cleaning or replacement shall be used in the injection pump or injection valve assemblies. The engines shall be equipped with a built-in gear-type, engine-driven fuel transfer pump, capable of supplying fuel through the filters to the injection pump at constant pressure.

In addition to the standard fuel filters provided by the engine manufacturer, there shall also be installed a primary fuel filter and a water separator in the fuel inlet line to the engine.

The engine shall be provided with removable wet-type cylinder liners of close grained alloy iron,

heat treated for proper hardness as required for maximum liner life.

The engine shall have a gear-type lubricating oil pump for supplying oil under pressure to main bearings, crank pin bearings, pistons, piston pins, timing gears, camshaft bearings, valve rocker mechanism and governor. Effective lubricating oil filters shall be provided and so located and connected that all oil being circulated is continuously filtered and cleaned. The engine shall have a suitable water-cooled lubricating oil cooler. The crankshaft shall incorporate drilled passages for pressure lubrication of bearings. And the journals shall be hardened or chromium plated to provide a hard shock resistant surface with ductile core. Crankshaft and connecting rod bearings shall be replaceable precision sleeve type.

The piston rings shall be constructed of heat-resistant alloy steel or chromium plated cast iron. Camshafts shall be gear or chain driven, and shall have higher wear resistance at cams and journals. Timing marks shall be clearly indicated on the crankshaft and gears. The flywheel shall be balanced, and shall be capable of being rotated 50 percent above the maximum rated engine rotational speed without danger of breaking or exploding. Flywheel housing shall be provided with a drain hole at the lowest point. Means for turning the crankshaft manually shall be provided.

The engineer shall be provided with one or more engine mounted dry type air cleaners of sufficient capacity to protect effectively the working parts of the engine from dust and grit.

2.5 ENGINE LUBRICATING OIL SYSTEM:

Provide unit with a full pressure lubricating system arranged to distribute oil to all moving parts of the engine and to cool the pistons. System shall include an engine-driven positive displacement pump, pressure regulating valves, oil filter, oil pressure indicator, and the necessary piping and fittings. The pump shall have ample capacity to circulate the lubricating oil required for engine lubrication and to cool the pistons. All necessary stop, check, pressure relief, and pressure control valves shall be provided.

Lubricating Oil Filters: Shall be the full-flow type (throwaway type) and shall be capable of filtering the full rate of oil flow of the oil pump at maximum engine speed. Means shall be provided to ensure delivery of lubricating oil to vital wearing surfaces regardless of the condition of the filter. Filters shall be accessible, easily removed and cleaned and shall be equipped with a spring-loaded by-pass valve as an insurance against stopping of lubricating oil circulation in the event the filters become clogged.

Lubricating Oil Coolers: Provide to maintain the lubricating oil within the temperature limits recommended by the manufacturer. Oil cooler shall utilize the engine jacket cooling water from the radiator as the cooling medium.

2.6 COOLING SYSTEMS:

The engine shall be furnished with a unit mounted radiator-type cooling system. The radiator fan shall direct the airflow from the engine outward through the radiator, with horizontal air discharge.

The fan shall be driven directly from the engine crankshaft or through V-belt drive. The radiator shall have sufficient capacity to dissipate not less than the total British Thermal Units per hour rejected by the engine to the cooling system at 110 percent rated load in 110°F ambient, and against a static restriction of 0.5 inch of water. The cooling section shall have a tube and fin type core which shall consist of copper or copper base alloy tubes with nonferrous fins. The radiator filler cap shall be designed for pressure relief prior to removal. A coolant overflow container shall be provided.

A modulating thermostatic control valve shall be installed in the jacket water system of the engine to maintain the water system optimum temperature of the engine. The valve shall be capable of passing the water flow as determined by the manufacturer without excessive pressure drop across the valve. The valve shall be designed so that if the thermostatic element fails, water will be able to flow through the engine.

One unit mounted thermal circulation type water heater incorporating an adjustable thermostatic switch shall be furnished to maintain engine jacket water at 70 to 100 degrees F. The heater shall be at the specified voltage on the plans and single phase.

Engine shall be delivered with adequate antifreeze for protection at 0°F. Closed circuit jacket water systems shall be treated with a rust inhibitor as recommended by the engine manufacturer.

2.7 ENGINE FUEL SYSTEM:

The engine shall be provided with all necessary equipment, including piping, fittings, valves, filters (throwaway type), strainers and appurtenances.

Provide a Double Wall Base mounted fuel tanks for diesel units, with capacity in gallons to operate the unit at full load for 24 hours, complete with fuel level gauge and screw on fuel filler cap. Provide Tank Level indicator with two low level switches for remote tank level indication. Tank shall be primed and painted with two heavy coats of enamel. Tank shall meet all requirements of the Florida Administrative Code Chapter 62-762.

The Contractor shall fill fuel tank with #2 fuel oil after testing.

2.8 EXHAUST SYSTEMS:

Provide a complete exhaust system, including exhaust flexible connection and silencer.

Exhaust silencer shall be provided for the engine of the size recommended by the manufacturer. Silencer shall be suitable for residential silencing. Silencer shall be furnished and mounted by the manufacturer.

All exhaust equipment must be rated to withstand temperatures of approximately 1,000 degrees F. A flexible stainless steel pipe connection shall be provided between the engine exhaust stack and exhaust piping. One silencer rain cap with counter weight shall be provided for the unit.

2.9 ENGINE AIR INDUCTION SYSTEM:

The air induction system shall be equipped with heavy-duty dry type air cleaners of adequate capacity to effectively remove the dirt and abrasives from the combustion air to the engine.

Turbocharger shall be a combination centrifugal blower driven by an exhaust gas turbine, with the air blower directly connected to the intake air manifold. Systems that require cooling of the intake air below ambient air temperature ahead of the turbocharger or scavenger air blower will not be acceptable. A reliable Lubrication System for the turbocharger shall be provided. All necessary supports and connections shall be provided.

2.10 AUTOMATIC STARTING SYSTEM:

NEMA ICS 1 and NEMA ICS 2. A DC electric positive engagement type cranking system shall be furnished, capable of rotating the engine at a speed sufficient for rapid starting in an ambient temperature of 10°F. The system shall be arranged to permit starting of the engine automatically upon signal from the automatic transfer switch.

Cranking: The electric cranking system shall utilize a 24 volt direct current (dc) electrical circuit, with the negative polarity grounded, energized by storage batteries. The cranking motor shall be of the heavy-duty type with adequate capacity to crank the engine continuously to start the engine in an ambient temperature of 10 degrees F.

The drive mechanism for engaging the starting motor with the engine flywheel shall be designed to inherently engage and release without binding. When the engine starts, a "stop cranking" switch, which is engine speed actuated, shall cause disengagement of the starting gearing and the shutdown of the starting motor. If the engine fails to crank after three consecutive cranking cycles lockout shall occur. On lockout an alarm shall sound and an "OVERCRANK" light shall illuminate which shall remain lighted until it is manually reset.

Starting Aids: A 120VAC jacket water heating system shall be provided to ensure starting. The heater shall be thermostatically controlled at the temperature recommended by the engine manufacturer. Power leads shall be brought to a junction box. The junction box shall be mounted on the engine base.

Storage Battery: The engine cranking battery shall be S.A.E. Type "D", diesel engine starting type (for diesel units) and of sufficient size and capacity in a fully charged condition to start the engine-generator six consecutive times at 10 degrees F without recharging between cranks

Battery Charger: The battery charger shall be enclosed, mounted in the weatherproof housing, automatic, dual rate, solid-state, constant voltage type having ac voltage compensation, dc voltage regulation, and current limiting. The charger shall employ transistor-controlled magnetic amplifier circuits to provide continuous taper charging. Charger shall have two ranges, float and equalize, with 0-24 hour equalizer time, dc cranking relay, silicon diode full-wave rectifiers, automatic surge

suppressors, dc ammeter, dc voltmeter, and fused inputs and outputs. Charger shall have a continuous rated output of not less than 10 amps and be rated for a 120VAC input. Battery charger shall conform to UL 1236.

Battery Charging Alternator: Provide a V-belt driven, from the engine, 35amp minimum-rated battery-charging alternator complete with a solid- state voltage regulator.

2.11 SAFETY SHUTDOWN CONTROLS AND ALARMS:

Control shall be provided that will function to immediately shut off delivery of fuel to the engine cylinders when actuated by a condition of low lubricating oil pressure, high water temperature, overspeed, or low water level. The values at which the controls for low lubricating oil pressure and high water temperature are actuated shall be as recommended by the manufacturer, and the overspeed governor shall be set to actuate at the value specified herein. The low lubricating oil pressure shutdown control shall be provided with a means to make it inoperative during the period of low oil pressure when the engine is started. Each shutdown shall initiate its individual light, close a 120VAC rated contact and sound an alarm within the cranking panel, and shall require manual reset. Normal start-up and shutdown shall not actuate the safety shutdown and alarm indicator system.

Remote Audible Annunciator: Provide remote audible annunciators mounted on the genset for engine-generator sets with light emitting diode (LED) indicators. Annunciators shall include the following:

1. Control switch not in Auto position
2. Overcrank
3. Low lube oil pressure
4. High coolant temperature
5. Low coolant temperature
6. Overspeed
7. Low fuel main tank
8. High coolant temperature pre-alarm
9. Low lube oil pressure pre-alarm

2.12 GENERATORS AND EXCITATION SYSTEMS:

Generators: The generator shall be three-phase, 60 hertz alternating-current type with revolving field. The speed of the generator shall be 1800 rpm. Enclosures shall be sound attenuating weatherproof aluminum and wind rated to 150 mph. The generator shall conform to ANSI C50.10, and to NEMA MG-1. The generator shall have form-wound stator and rotor coils with Class F insulation. The rotor and stator shall have a maximum temperature rise, as measured by the resistance method, suitable for Class F insulation in accordance with NEMA Standard MG1-22.4. The generator and flywheel shall have sufficient flywheel effect to meet the requirements of regulation and operation as specified. The generator rotor shall be coupled directly to the engine flywheel through a flexible drive disc. Impellers shall be mounted on the rotor for cooling the

generator. The rotor shall be capable of safe operation at a speed 25 percent in excess of its rated synchronous speed. The generator armature, field, and ground leads shall have clamp or crimp-type lugs or connectors for electrical connections. Terminal markings shall conform to NEMA MG-1.

Excitation and Voltage Regulation System: The excitation system shall be the Permanent Magnet type. The system shall serve as an individual excitation and regulation system for the generator specified herein, and there is no requirement for parallel operation with other exciters. The excitation system shall have a continuous current rating of not less than the generator excitation current required when the generator operates at 105 percent rated voltage under the condition of continuous rating requiring maximum field current. The voltage rating of the system shall be as required to match the generator field requirements. The exciter insulation shall be Class F. The excitation system response ratio shall be not less than 0.5 and the ceiling voltage shall be not less than 120 percent of rated voltage.

Voltage Regulator: The voltage regulator shall be a completely solid-state type for control of generator voltage by control of the exciter field. The regulator shall control the generator exciter field as required to maintain a constant and stable generator output voltage within plus or minus 2 percent of nominal for all steady-state loads from no load to full load, including a 5 percent variation in frequency and the effects of field heating. Electromagnetic interference suppression shall be an integral part of the regulator. Thermal protection for power semiconductors, inherent over voltage protection, and fuse protection shall be provided internally in the regulator. No electrolytic capacitors, vacuum tubes, or electromechanical relays shall be used in the voltage regulator.

2.13 GENERATOR CONTROL PANEL:

Engine-Generator Instruments and Controls: NEMA ICS 1, 2, 3, 4, and 6.

Engine Instruments: Include the following as minimum components:

1. Lubricating Oil Pressure Gauge: Shall be indicating dial type accurate to within 2 percent of full-scale reading.
2. Coolant Temperature Indicators: Shall be indicating dial type accurate to within 2 percent of full-scale reading.
3. Running Time Meter: Totalize engine running time to 9999.9 hours total.
4. Generator Controls and Instruments: NEMA ICS 1, 2, 3, and 4 and shall include the components listed below. Instruments shall comply with ANSI c39.1.
 - a. Voltmeter, Ammeter and Frequency Meters: Shall be indicating dial type, not less than 3-1/2 inch nominal round or square with accuracy of 2 percent of full scale.
 - b. Control Switches: Voltage and ampere ratings suitable for the intended use.
 - c. Voltage adjustment rheostat.

- d. Panel lights and control switch.
- e. Alarm indicating panel.

An output Circuit Breaker shall be installed for the generator unit and sized per the output of the generator or as noted on the plans.

2.14 TREATMENT AND PAINTING:

All parts, including engine subject to high temperature, shall be treated and painted in accordance with manufacturer's standards.

The generator and all associated electrical equipment shall be thoroughly cleaned and treated prior to painting. Color shall be manufacturer's standard.

2.15 BASE ASSEMBLY:

Engine-Generator: Shall be mounted on a fabricated steel Double Wall Base Tank suitable for supporting, transporting, and skidding engine and generator without damage to equipment or alignment for diesel units.

Note:

Furnish a work platform for units with operating controls located higher than 6' above the final grade due to the height of the base tank.

Vibration Isolators: The engine-generator shall be provided with suitable spring-type vibration isolators between the engine and its concrete foundation.

2.16 OUTDOOR WEATHER PROTECTIVE SOUND ATTENUATED ENCLOSURE:

The generator set shall be provided with an outdoor enclosure, with the entire package listed under UL2200. The package shall comply with the requirements of the National Electrical Code for all wiring materials and component spacing. The total assembly of generator set, enclosure, and sub-base fuel tank (when used) shall be designed to be lifted into place using spreader bars.

Housing shall provide ample airflow for generator set operation at rated load in an ambient temperature of 104F.

Housing shall be rated for minimum 150 mph wind gust or as required by the Florida Building Code for the installed location if higher requirement.

The housing shall have hinged access doors as required to maintain easy access for all operating and service functions. All doors shall be lockable, and include retainers to hold the door open during service. Enclosure roof shall be cambered to prevent rainwater accumulation.

Openings shall be screened to limit access of rodents into the enclosure.

All electrical power and control interconnections shall be made within the perimeter of the enclosure.

All sheet metal shall be primed for corrosion protection and finish painted with the manufacturers' standard color using a two step electro coating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. The painting process shall result in a coating that meets the following requirements:

Primer thickness, 0.5-2.0 mils. Top coat thickness, 0.8-1.2 mils.

Gloss, per ASTM D523-89, 80% plus or minus 5%. Gloss retention after one year shall exceed 50%.

Crosshatch adhesion, per ASTM D3359-93, 4B-5B.

Impact resistance, per ASTM D2794-93, 120-160 inch-pounds.

Salt Spray, per ASTM B117-90, 1000+ hours.

Humidity, per ASTM D2247-92, 1000+ hours.

Water Soak, per ASTM D2247-92, 1000+ hours.

Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work.

Enclosure shall be constructed of aluminum. All hardware and hinges shall be stainless steel.

A factory-mounted exhaust silencer shall be installed inside the enclosure. The exhaust shall exit the enclosure through a rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections.

The enclosure shall include the following maintenance provisions:

Flexible coolant and lubricating oil drain lines that extend to the exterior of the enclosure, with internal drain valves

External radiator fill provision.

The generator set shall be provided with a sound-attenuated housing which allows the generator set to operate at full rated load in an ambient temperature of up to 104F.

The enclosure shall reduce the sound level of the generator set while operating at full rated load to a maximum of 75 dBA at any location 7 meters from the generator set in a free field environment.

The enclosure shall be insulated with non-hydroscopic materials.

PART 3 - EXECUTION

3.1 INSTALLATION:

Installation shall conform to the requirements of NFPA 70.

Install generator unit as indicated on Drawings.

The generator manufacturer shall supply the services of a factory representative to check over the completed generator installation, who will provide certification that the installation meets the approval of the manufacturer.

3.2 INSPECTION AND TESTING:

Prior to acceptance of the installation, equipment shall be tested to show it is free of any defects and will start automatically to be subjected to full load test through the use of portable dry type load banks supplied for this purpose at the job site by the generator set factory representative.

The generator set factory representative shall perform all field tests and trial operations, and conduct all field inspections. The Contractor shall provide all labor, equipment, and incidentals required for the tests performed by the generator set supplier, including water, fuel, and lubricants. The only exception is the load banks, which are to be furnished by the generator set supplier.

The Owner and/or Owner's representative shall witness all field tests and trial operations, and conduct final field inspections. The Contractor shall give the Owner ample notice of the dates and times scheduled for tests, trial operations, and inspections requiring the presence of the Owner. All deficiencies found shall be rectified and work affected by such deficiencies shall be completely re-tested at the Contractor's expense. A qualified Factory Representative shall assist the Contractor with the field checkout, start-up, and test. Field tests shall include the following:

1. Demonstrate proper operation of all systems.
2. Simulate power failure and demonstrate complete automatic start, load, unload, by-pass, and stop sequence.
3. Conduct 3-hour load test using generator supplier furnished portable load banks as follows:
 - a. 1/2 load--1 hour
 - b. Full load--2 hours

The load bank shall be capable of definite and precise incremental loading and shall not be dependent on the generator control instrumentation to read amperage and voltage of each phase. The test instrumentation will serve as a check of the generator set meters. Readings will be taken and recorded at no longer than 30-minute intervals during the test and at each occurrence of a load change.

Load bank testing shall be done in the presence of the Owner and the Engineer only after the unit is permanently installed in accordance with the plans and Specifications.

3.3 JOB CLOSE-OUT:

At job closeout, perform the following:

1. Clean all equipment and accessories thoroughly.
2. Touchup all scratches and nicks with paint provided by the manufacturer for that purpose.
3. Top off fuel tank (diesel units).

END OF SECTION 16216

SYMBOLS & ABBREVIATIONS:

= NUMBER

L.B. = LICENSED BUSINESS

INV. = INVERT

PVC = POLYVINYL CHLORIDE

CMP = CORRUGATED METAL PIPE

CPP = CORRUGATED PLASTIC PIPE

RCP = REINFORCED CONCRETE PIPE

☆ = LAMP POLE

→ = TRAFFIC SIGN

⊕ = WATER VALVE

⊞ = WATER METER

SV = SANITARY SEWER VALVE

Ⓢ = SANITARY SEWER MANHOLE

⊛ = IRRIGATION CONTROL VALVE

⊕ = GAS VALVE

⊙ = STUBOUT

✉ = MAILBOX

● = CONCRETE/WOOD BOLLARD

→ = GUY ANCHOR

↗ = UTILITY POLE

Ⓛ = ELECTRIC BOX

Ⓣ = TELEPHONE BOX

⊕ = TEMPORARY BENCHMARK

0' — = CONTOUR ELEVATION AT 1' INTERVALS

⊕ = EXISTING PINE TREE (DIAMETER SHOWN IN INCHES)

⊕ = EXISTING OAK TREE (DIAMETER SHOWN IN INCHES)

⊕ = EXISTING MAGNOLIA TREE (DIAMETER SHOWN IN INCHES)

⊕ = EXISTING TREE, TYPE UNKNOWN (DIAMETER SHOWN IN INCHES)

HU — = OVERHEAD UTILITY LINE

▒ = EXISTING ASPHALT PAVEMENT

▒ = EXISTING BRICK PAVERS

▒ = EXISTING GRAVEL

GENERAL NOTES

1. ALL GRADES ARE FINISHED GRADES.
2. ALL STATIONING AND OFFSETS ARE FROM, AND PERPENDICULAR OR RADIAL TO THE THE BASELINE OF SURVEY UNLESS OTHERWISE NOTED.
3. FOR STABILIZING AT INTERSECTIONS, TURNOUTS AND GRADED CONNECTIONS, SEE FOOT STD. PLANS NO. 000-515.
4. ALL GRASSED AREAS DISTURBED AS A RESULT OF CONSTRUCTION SHALL BE RESODDED "IN KIND" UNLESS OTHERWISE NOTED IN THE PLANS.
5. UNSUITABLE MATERIALS SHALL BE REMOVED FROM THE CONSTRUCTION AREAS AND BACKFILLED WITH SUITABLE MATERIALS.
6. CONSTRUCTION SHALL INCLUDE REPLACING, WITH MATCHING MATERIALS: ANY DRIVEWAYS, WALKS, CURBS, SOD, STRIPING ETC. THAT ARE DAMAGED OR REMOVED DUE TO CONSTRUCTION. THIS WORK SHALL BE COORDINATED WITH THE PROPERTY OWNERS. PAYMENT FOR THIS WORK SHALL BE INCIDENTAL TO THE OTHER CONTRACT ITEMS.
7. ALL PERSONAL PROPERTY WITHIN THE RIGHT-OF-WAY SHALL BE RELOCATED BY THE PROPERTY OWNER. THE CONTRACTOR SHALL COORDINATE WITH THE PROPERTY OWNERS TO PROVIDE NOTIFICATION AND A REASONABLE TIME FRAME TO RELOCATE ITEMS. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER PRIOR TO REMOVING THE ITEMS NECESSARY TO CONSTRUCT THE PROJECT IN ACCORDANCE WITH THE PLANS UNLESS OTHERWISE STATED IN THE PLANS.
8. ALL PUBLIC AND PRIVATE PROPERTY AFFECTED BY THE CONSTRUCTION WORK SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THE PRE-CONSTRUCTION CONDITION.
9. ALL EXISTING DRAINAGE STRUCTURES WITHIN THE LIMITS OF CONSTRUCTION SHALL REMAIN IN PLACE UNLESS OTHERWISE NOTED.
10. ALL EXISTING UTILITIES ARE TO REMAIN IN PLACE UNLESS OTHERWISE NOTED.
11. SPECIAL ATTENTION IS DIRECTED TO THE FACT THAT PORTIONS OF SOME DRAINAGE STRUCTURES MAY EXTEND INTO THE STABILIZED PORTION OF THE ROADWAY AND EXTREME CAUTION WILL BE NECESSARY IN STABILIZATION OPERATIONS AT THESE LOCATIONS. ALL STORM SEWER LINES AND INLETS SHALL BE CLEANED OF DEBRIS AND ERODED MATERIALS AT THE LAST STAGE OF CONSTRUCTION.
12. ANY DRAINAGE PROBLEMS EXISTING BEFORE CONSTRUCTION COMMENCES SHALL BE BROUGHT TO THE ATTENTION OF FDOT AND ENGINEER OF RECORD PRIOR TO BEGINNING OF CONSTRUCTION.
13. TEMPORARY DRAINAGE SHALL BE PROVIDED DURING CONSTRUCTION TO PREVENT ANY FLOODING OF PRIVATE PROPERTY.
14. THE EROSION CONTROL MEASURES PER FDOT EROSION AND SEDIMENT CONTROL MANUAL AND SPECIFICATION 104 ARE THE MINIMUM REQUIRED. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED DUE TO FIELD CONDITIONS AS DETERMINED BY THE NWFWMO'S AUTHORIZED REPRESENTATIVE AND THE REGULATORY AGENCIES.
15. BENCHMARK DATUM IS N.A.V.D. 1988 (NAVD 88). ANY MONUMENT WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED. IF IN DANGER OF DAMAGE, THE CONSTRUCTION MANAGER SHALL NOTIFY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP), BUREAU OF SURVEY AND MAPPING, 3900 COMMONWEALTH BOULEVARD, M.S. 100, TALLAHASSEE, FLORIDA 32399. TELEPHONE (850) 245-2555.
16. ANY PUBLIC LAND CORNER, GPS, CITY, COUNTY OR STATE MONUMENT WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED. IF A CORNER OR MONUMENT IS IN DANGER OF BEING DESTROYED AND HAS NOT BEEN PROPERLY REFERENCED, THE CONTRACTOR'S CONSTRUCTION MANAGER SHALL NOTIFY THE PROJECT ENGINEER WITHOUT DELAY BY TELEPHONE.
17. ALL SURVEY CORNERS INDICATED ON THE PLANS SHALL BE REFERENCED AND CERTIFIED BY A REGISTERED PROFESSIONAL LAND SURVEYOR PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL CORNERS DESTROYED OR OBLITERATED BY CONSTRUCTION SHALL BE RESET AND SO CERTIFIED BY THE LAND SURVEYOR PRIOR TO COMPLETION OF THE PROJECT.
18. UPON COMPLETION OF THE CONSTRUCTION, THE FDEP AND THE PROJECT ENGINEER SHALL BE NOTIFIED FOR FINAL INSPECTION.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR LITTER REMOVAL (TRASH, TREE LIMBS, BRUSH PILES, AND OTHER MAN MADE DEBRIS) ALONG ENTIRE PROJECT, TO PROVIDE A LITTER FREE CORRIDOR AT COMPLETION OF CONSTRUCTION.
20. THE LOCATION OF THE EXISTING UTILITIES SHOWN IN THE PLANS ARE APPROXIMATE ONLY. PRIOR TO CONSTRUCTION, ALL EXISTING UTILITIES, PUBLIC OR PRIVATE, SHALL BE LOCATED IN THE AREA OF CONSTRUCTION AND OWNERS OF SAID UTILITIES NOTIFIED PRIOR TO COMMENCING WORK. THE EXACT LOCATION SHALL BE DETERMINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
21. THE CONTRACTOR IS TO CONTACT (811) THE SUNSHINE STATE ONE CALL OF FLORIDA, INC. CENTER (1-800-432-4770). WWW.CALLSUNSHINE.COM AT LEAST TWO (2) BUSINESS DAYS (48 HOURS) PRIOR TO THE START OF CONSTRUCTION (PER CHAPTER 556 OF THE FLORIDA STATUTES).
22. ALL GRADES AND CROSS SLOPES SHALL COMPLY WITH THE LATEST AMERICANS WITH DISABILITIES ACT (A.D.A.) STANDARDS FOR ACCESSIBLE DESIGN. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY IN THE CASE THAT A.D.A. REQUIREMENTS MAY NOT BE MET AS DESIGNED, SO THAT CORRECTIVE ACTION MAY BE PROVIDED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL ENSURE SUFFICIENT CROSS SLOPE TO PROVIDE ADEQUATE DRAINAGE OF THE PROPOSED FACILITIES.
23. IN ADDITION TO THE TURBIDITY AND EROSION CONTROL MEASURES SPECIFIED ON THE PLANS, BEST MANAGEMENT PRACTICES FOR EROSION AND TURBIDITY CONTROL SHALL BE UTILIZED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS, INCLUDING REGULATIONS OF THE NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT (NWFWMO), U.S. ARMY CORPS OF ENGINEERS (USACE), FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) AND THE NPDES PERMIT REQUIREMENTS. THESE PRACTICES SHALL INCLUDE THE USE AND MAINTENANCE OF STAKED SILT FENCE FILTER CLOTH AND OTHER SUITABLE MEANS SURROUNDING ALL CONSTRUCTION AREAS TO PREVENT EROSION AND SEDIMENTATION, AS WELL AS THE USE OF FLOATING AND/OR STAKED TURBIDITY BARRIERS WHERE APPROPRIATE TO ISOLATE CONSTRUCTION AREAS FROM ADJACENT SURFACE WATERS. THESE TURBIDITY CONTROL DEVICES SHALL BE INSPECTED AND MAINTAINED ON A DAILY BASIS TO ENSURE THAT CONSTRUCTION GENERATED TURBIDITY IS CONTAINED WITHIN THE WORK AREAS AND THAT THE TURBIDITY CONTROL DEVICES REMAIN IN PLACE UNTIL ALL CONSTRUCTION IS COMPLETE, AND WORK AREAS HAVE BEEN STABILIZED.
24. LOCATION OF SILT FENCE AND STAKED OR FLOATING TURBIDITY BARRIERS (IF) SHOWN ON CONSTRUCTION PLANS ARE FOR GRAPHIC PURPOSES IDENTIFYING THAT EROSION CONTROL FEATURES WILL BE PRESENT. LOCATIONS OF SILT FENCE ARE APPROXIMATE AND ARE TO BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS AS DIRECTED BY THE PROJECT ENGINEER.
25. THE CONTRACTOR SHALL REVIEW ALL PERMITS, PERMIT EXEMPTIONS, AND REPORT LOGS LOCATED IN THE CONTRACT DOCUMENTS PRIOR TO BIDDING ON THE PROJECT AND BECOME FAMILIAR WITH ALL OF THE CONDITIONS OF THESE DOCUMENTS. THE CONTRACTOR SHALL VERIFY THAT THE CONSTRUCTION ACTIVITIES ARE IN COMPLIANCE WITH THESE PERMITS.
26. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF THE PAVEMENT SURFACE. ALL DEFICIENCIES WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. NO EDGE PATCHES, POTHOLE AND GOUGE PATCHES OR PARTIAL SURFACE WIDTH PATCHES SHALL BE PERMITTED IN THE FINISHED ASPHALT OR CONCRETE SURFACE OF THE PAVEMENT AND ITS AMENITIES. ALL PATCHING OF THE FINISHED SURFACE SHALL BE FULL WIDTH OF THE SURFACE BEING REPAIRED AND EXTEND AT A MINIMUM ONE (1') FOOT IN LENGTH BEYOND THE IRREGULARITY EDGES. ASPHALT PAVEMENT PATCHING SHALL RECEIVE THERMOPLASTIC STRIPING. THE COST FOR ALL WORK AND MATERIALS NECESSARY TO REPAIR THE PAVEMENT SURFACE TO ITS REQUIRED SURFACE PROFILE SHALL BE INCIDENTAL TO THE OTHER CONTRACT PAY ITEM BID COSTS WITH NO ADDITIONAL CHARGE TO THE CITY.
27. ALL STAKING OF PROPOSED CONSTRUCTION TO ALLOW FOR PROPER INSTALLATION/RELOCATION OF UTILITY FEATURES, AS MAY BE INDICATED WITHIN THESE PLANS, SHALL BE PERFORMED BY THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER OF THE IMPACTED UTILITY AND STAKE THE ITEMS REQUESTED. THIS STAKING SHALL BE SEPARATE AND IN ADDITION TO THE NORMAL STAKING FOR THE PROJECT. THE COST OF THIS STAKING SHALL BE INCIDENTAL TO AND INCLUDED IN THE COST OF THE PROJECT.
28. EXISTING IRRIGATION LINES/SYSTEMS IN CONFLICT WITH PROPOSED IMPROVEMENTS SHALL BE ADJUSTED AS NECESSARY TO RELOCATE OUTSIDE OF THE PROPOSED CONSTRUCTION AREA, COST OF WHICH SHALL BE INCIDENTAL TO THE PAYMENT OF ASSOCIATED CONSTRUCTION. IRRIGATION SYSTEMS SHALL BE CAPPED AND SHALL REMAIN FUNCTIONAL UNTIL CONSTRUCTION AND REPAIRS ARE COMPLETE.
29. CONTRACTOR MAY REQUEST SUBSTITUTING FUSIBLE PVC PIPE (SDR 21 PRESSURE RATING) IN LIEU OF PE 4710 SDR 11 HDPE. SUBSTITUTION APPROVAL SHALL BE AT THE SOLE DISCRETION OF THE OWNER AND MUST BE IN WRITING PRIOR TO PROCEEDING. THE PRICE PAID PER LINEAL FOOT SHALL INCLUDE FULL COMPENSATION FOR FURNISHING ALL MATERIALS (INCLUDING PIPE, FITTINGS, COUPLINGS, TRACER WIRE, ETC), TOOLS, LABOR, AND EQUIPMENT AND DOING ALL THE WORK NECESSARY FOR THE INSTALLATION OF THE FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILLING, INCLUDING BUT NOT LIMITED TO: EXCAVATING DRILL PITS AND RECEIVING PITS; DRILLING; PULPING PIPE; BACKFILLING; THRUST BLOCKS; TRACER WIRE; COMPACTION; PRESSURE AND LEAKAGE TESTING; ETC. AS SHOWN AND AS SPECIFIED.



877 CR 393 North
Santa Rosa Beach, FL 32459
850.267.0759

**SR 79 WASTE WATER AND WATERMAIN
IMPROVEMENTS
SR 79 CORRIDOR AUTHORITY
HOLMES AND WASHINGTON COUNTY
FLORIDA**

SEAL

CLIFFORD L. KNAUER, P.E. 53930
EB 0008794

BID SET
(NOT FOR CONSTRUCTION)

SCALE

REVISIONS

[illegible]

NO.	DESCRIPTION	DATE
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DRAWN BY K. SPELL

APPROVED BY C. KNAUER

- CHECKED BY A. ROUCHALEAU

DATE MARCH 2020

TITLE

GENERAL NOTES

PROJECT NO.	50113689
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G1

SHEET NO

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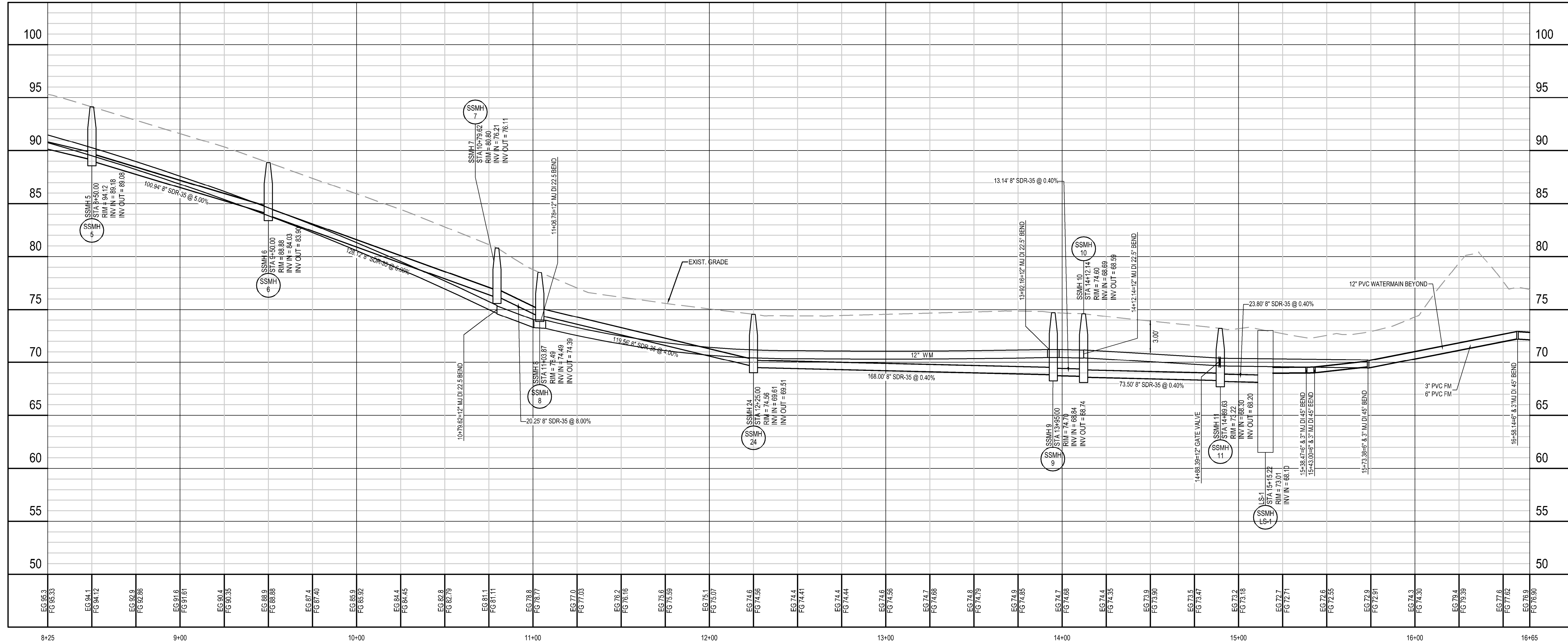
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Dewberry Engineers Inc.

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Santa Rosa Beach, FL 32459
850.267.0759

SR 79 WASTE WATER AND WATERMAIN
IMPROVEMENTS
SR 79 CORRIDOR AUTHORITY
HOLMES AND WASHINGTON COUNTY
FLORIDA

SEAL

CLIFFORD L. KNAUER, P.E. 53930
EB 0008794

BID SET
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SCALE



REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY K. SPELL
APPROVED BY C. KNAUER
CHECKED BY A. ROUCHALEAU
DATE MARCH 2020

TITLE

PLAN AND PROFILE

PROJECT NO. 50113689

PP2

SCALE:
1"=30' HORIZ
1"=5' VERT

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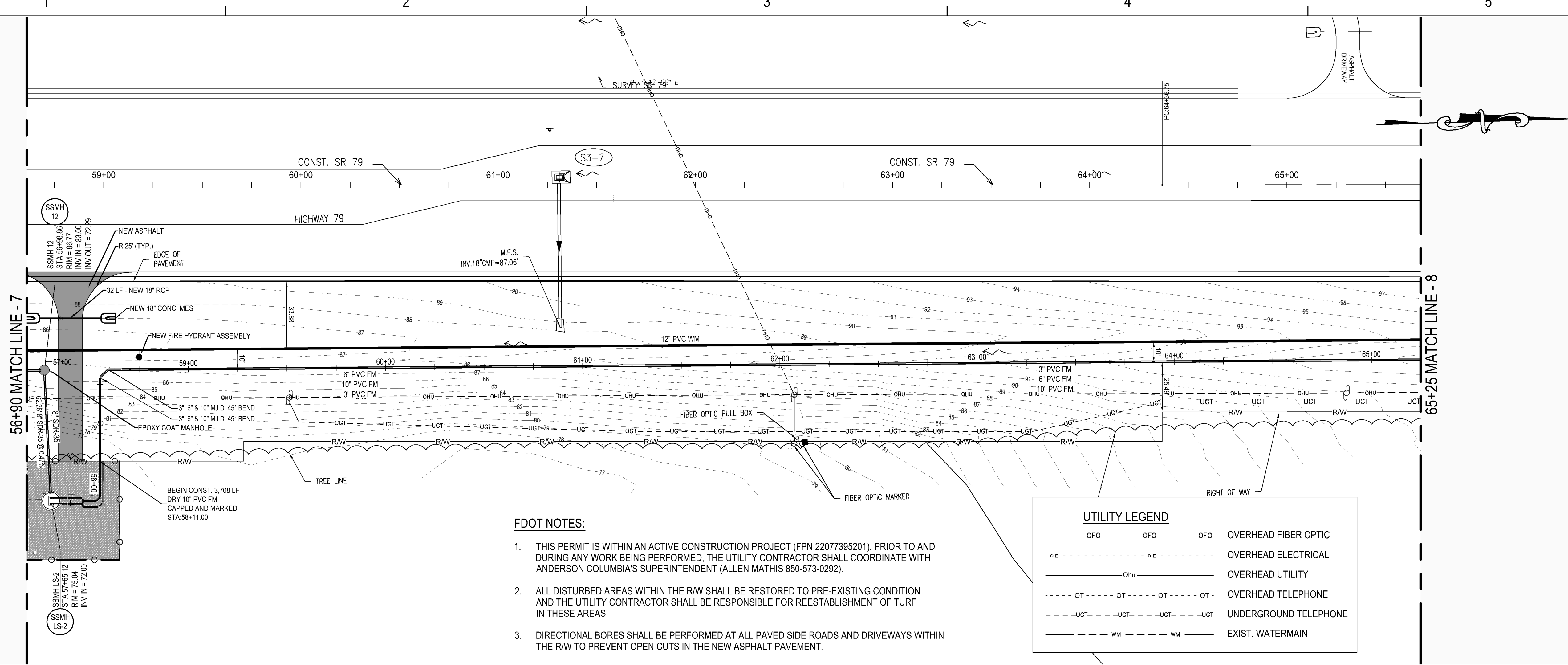
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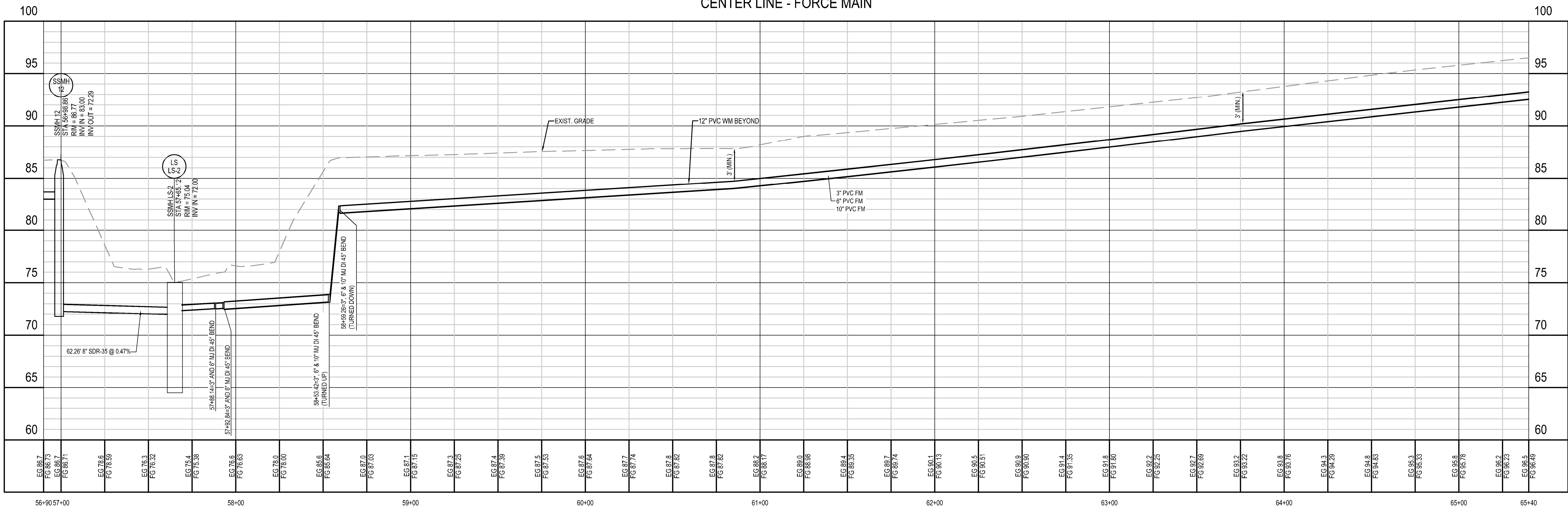
FDOT NOTES:

1. THIS PERMIT IS WITHIN AN ACTIVE CONSTRUCTION PROJECT (FPN 22077395201). PRIOR TO AND DURING ANY WORK BEING PERFORMED, THE UTILITY CONTRACTOR SHALL COORDINATE WITH ANDERSON COLUMBIA'S SUPERINTENDENT (ALLEN MATHIS 850-573-0292).
2. ALL DISTURBED AREAS WITHIN THE R/W SHALL BE RESTORED TO PRE-EXISTING CONDITION AND THE UTILITY CONTRACTOR SHALL BE RESPONSIBLE FOR REESTABLISHMENT OF TURF IN THESE AREAS.
3. DIRECTIONAL BORES SHALL BE PERFORMED AT ALL PAVED SIDE ROADS AND DRIVEWAYS WITHIN THE R/W TO PREVENT OPEN CUTS IN THE NEW ASPHALT PAVEMENT.

UTILITY LEGEND

---	OFO---	OFO---	OFO---	OVERHEAD FIBER OPTIC
o e	-----	o e	-----	OVERHEAD ELECTRICAL
---	OHU---	---	---	OVERHEAD UTILITY
---	OT---	OT---	OT---	OVERHEAD TELEPHONE
---	UGT---	UGT---	UGT---	UNDERGROUND TELEPHONE
---	WM---	WM---	---	EXIST. WATERMAIN

CENTER LINE - FORCE MAIN



SCALE:
1"=30' HORIZ
1"=5' VERT



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**SR 79 WASTE WATER AND WATERMAIN
IMPROVEMENTS
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HOLMES AND WASHINGTON COUNTY
FLORIDA**

SEAL

CLIFFORD L. KNAUER, P.E. 53930
EB 0008794

**BID SET
(NOT FOR CONSTRUCTION)**

SCALE



REVISIONS

NO.	DESCRIPTION	DATE
	ADDENDUM	8/3/2020

DRAWN BY K. SPELL
APPROVED BY C. KNAUER
CHECKED BY A. ROUCHALEAU
DATE APRIL 2020

TITLE

PLAN AND PROFILE

PROJECT NO. 50113689

PP8

SHEET NO.

SR 79 WASTE WATER AND WATERMAIN
IMPROVEMENTS
SR 79 CORRIDOR AUTHORITY
HOLMES AND WASHINGTON COUNTY
FLORIDA

SEAL

CLIFFORD L. KNAUER, P.E. 53930
EB 0008794

BID SET
(NOT FOR CONSTRUCTION)

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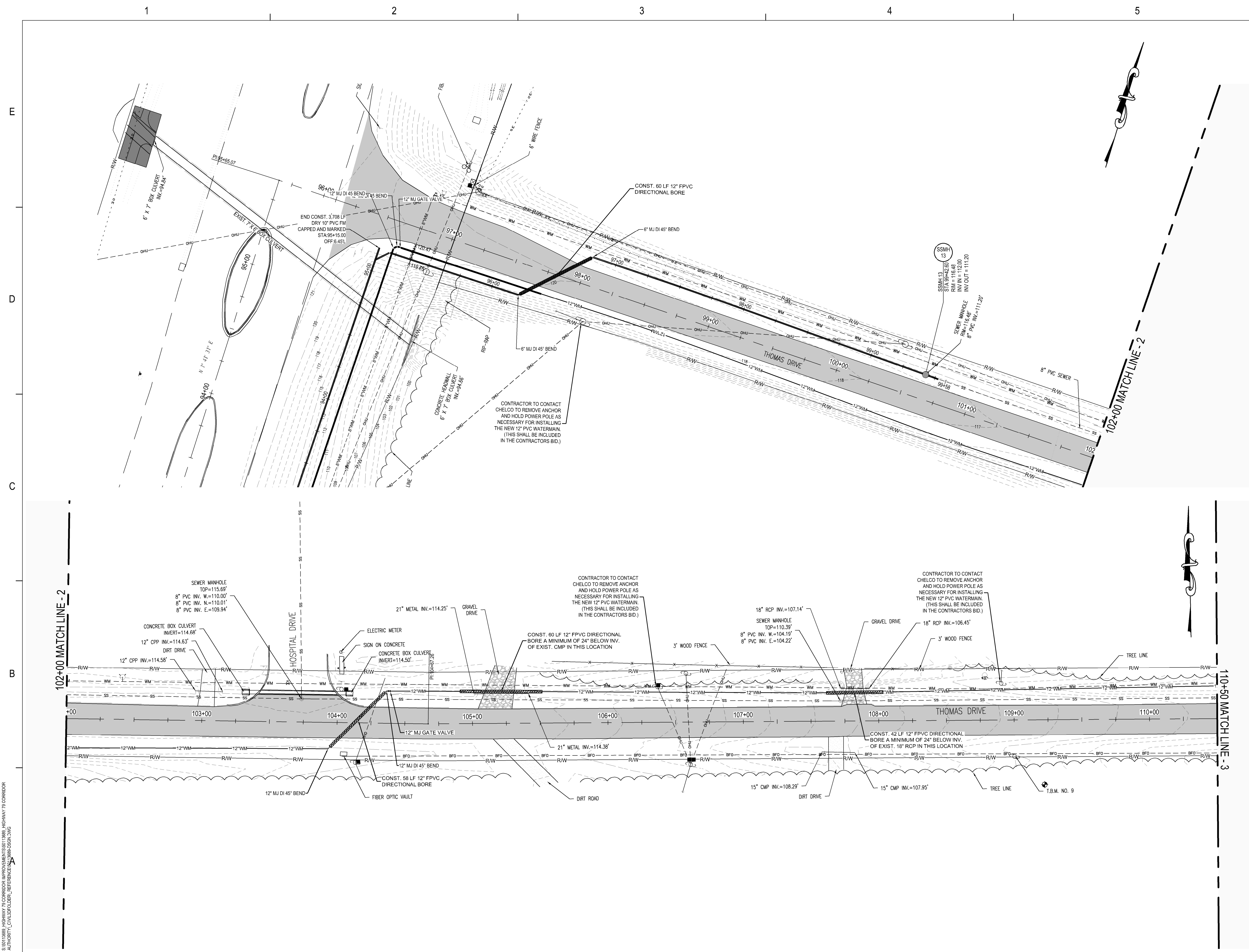
DRAWN BY	K. SPELL
APPROVED BY	C. KNAUFER
CHECKED BY	A. ROUCHALEAU
DATE	APRIL 2020

TITLE
UTILITY PLAN - NEW
12" WM

PROJECT NO.	50113689
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U1

SHEET NO.



SR 79 WASTE WATER AND WATERMAIN
IMPROVEMENTS
SR 79 CORRIDOR AUTHORITY
HOLMES AND WASHINGTON COUNTY
FLORIDA

SEAL

CLIFFORD L. KNAUER, P.E. 53930
EB 0008794

BID SET
(NOT FOR CONSTRUCTION)

SCALE



REVISIONS

[illegible]

NO.	DESCRIPTION	DATE
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DRAWN BY K. SPELL

APPROVED BY C. KNAUER

— CHECKED BY A. ROUCHALEAU

DATE APRIL 2020

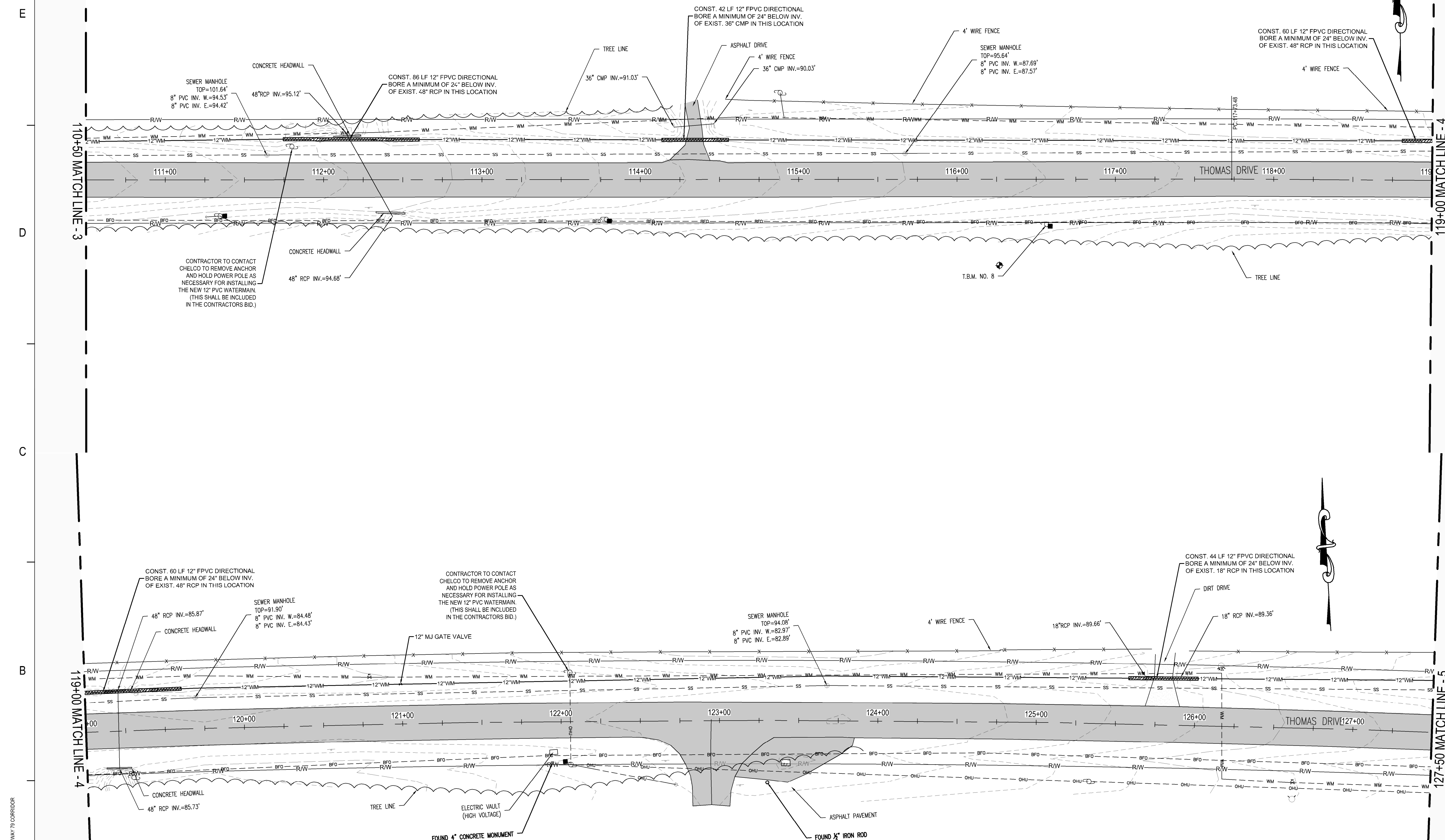
TITLE	
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UTILITY PLAN - NEW
12" WM

PROJECT NO.	501136
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U2

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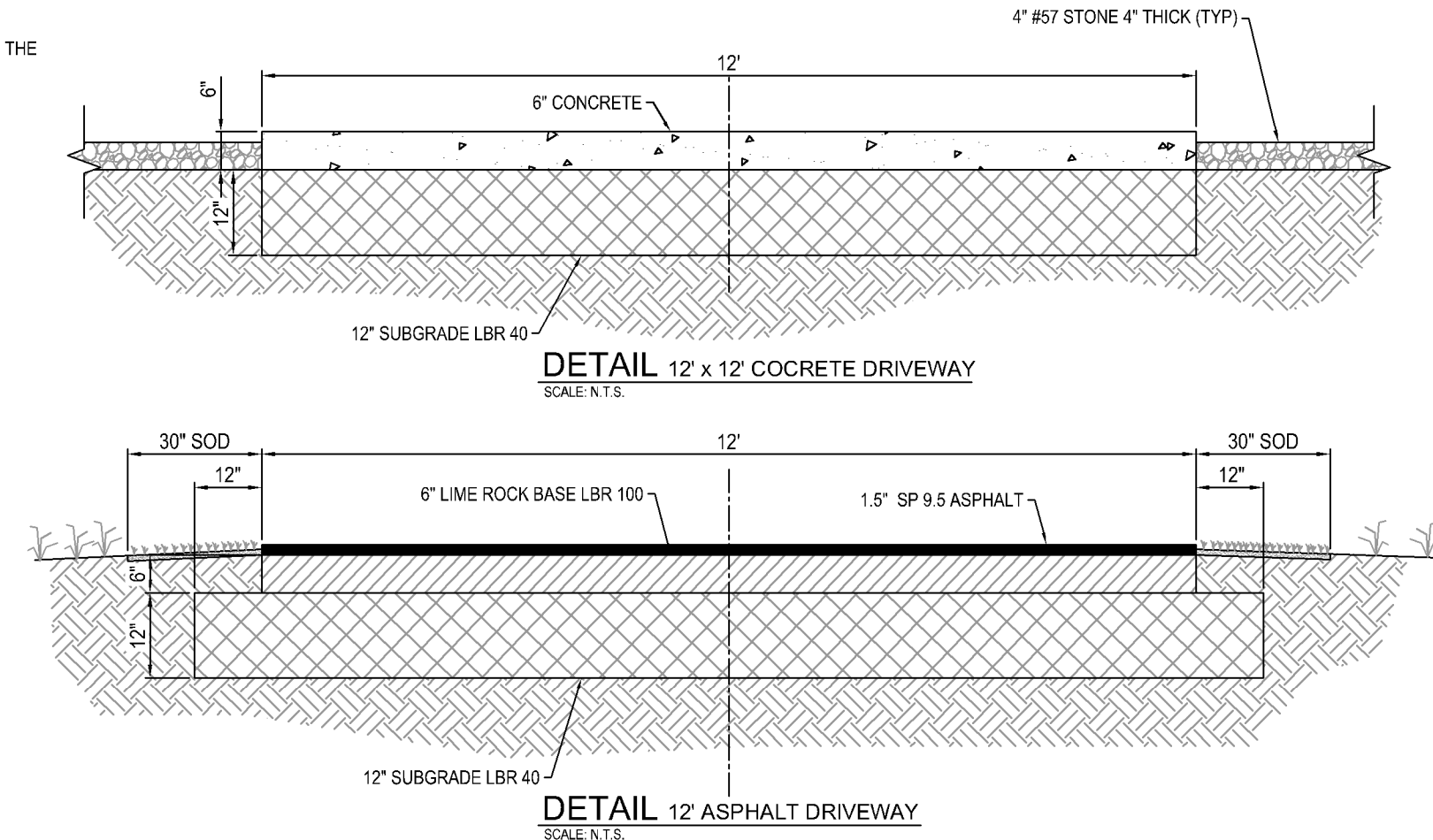
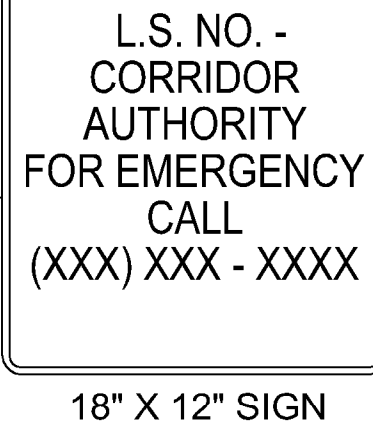
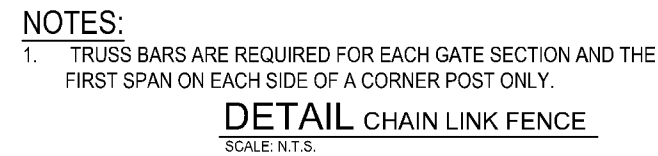


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PROJECT NAME	FREEPORT FORCE MAIN
PUMP MODEL	DAVIS EMU / FLYGT / MYERS / KSB
CURVE NUMBER	
IMPELLER SIZE	
VOLTAGE	3 PHASE 460 VOLT
HP	TBD
RPM	
DESIGN FLOW, GPM	55 GPM INITIAL 100 GPM MAX
TDH, FEET	72-FT INITIAL; 146-FT AT MAX FLOW
EFFICIENCY	
TOP OF WETWELL / VALVE BOX (ELEV. "A")	73.50'
FINISH GRADE (ELEV. "B")	73.00'
INFLUENT (GRAVITY) (ELEV. "C")	68.00'
HIGH LEVEL ALARM (ELEV. "D")	63.00'
LAG 1 PUMP ON (ELEV. "F")	62.00'
LEAD PUMP ON (ELEV. "G")	61.50'
ALL PUMPS OFF (ELEV. "H")	60.50'
LOW LEVEL ALARM (ELEV. "I")	60.00'
BOTTOM OF WETWELL (ELEV. "J")	58.50'
FORCEMAIN DIAMETER	3" DIA. WITH 8.0" HOLE
WETWELL DIAMETER	8.0'

LIFT STATION SPECIFICATIONS

1. ALL EXPOSED METAL SHALL BE PAINTED WITH 2 COATS OF EXTERIOR ENAMEL PAINT, EXCEPT STAINLESS.
2. WETWELL SHALL BE COATED WITH COAL TAR OUTSIDE EXCEPT TOP SURFACE OF COVERS (TWO COATS, 9 MILS EACH), EXCEPT HOPE.
3. WET WELL SHALL HAVE HOPE PROTECTIVE LINER.
4. BASE AND FIRST RISER UPE TO BE CAST MONOLITHIC.
5. VALVE VAULT SHALL HAVE SEALED FLOOR AND DRAIN.
6. ALL LOCATIONS WHERE PIPES ENTER OR LEAVE THE WET WELL OR VALVE VAULT SHALL BE MADE WATERTIGHT WITH WALL SLEEVE OR NON-SHRINK GROUT.
7. THERE SHALL BE NO VALVES OR ELECTRICAL JUNCTION BOXES IN WET WELL.
8. WET WELL AND VALVE VAULT COVERS SHALL BE ALUMINUM WITH 316 S.S. HARDWARE AND LOCK BRACKET. SIZE AS REQUIRED BY PUMP MANUFACTURER AND APPROVED BY THE CORRIDOR AUTHORITY.
9. FLEXIBLE COUPLING SHALL BE SLEEVE TYPE.
10. OPERATING CONDITIONS FOR PUMPS SHALL BE 200 GPM AT 56 FEET TDH.
11. ALL NUTS, BOLTS, WASHERS, ETC. IN WET WELL AND VALVE BOX TO BE 316 STAINLESS STEEL.
12. CONTRACTOR SHALL RECEIVE BIDS FROM PUMP MANUFACTURERS AND SHALL SUPPLY BIDS TO THE ENGINEER PRIOR TO AWARD OF CONTRACT.
13. WET WELL FLOORS SHALL HAVE A MINIMUM SLOPE OF 1:10 TO HOPPER BOTTOM AND THE HORIZONTAL AREA OF THE HOPPER BOTTOM TO BE NO GREATER THAN NECESSARY FOR PROPER INSTALLATION, AND FUNCTION OF THE INLET.
14. PROVIDE MOTOR OVERLOADING AND PHASE PROTECTION.
15. PROVIDE LIGHTNING PROTECTION.
16. PROVIDE FLUSH VALVE TO AUTOMATICALLY FLUSH THE SUMP DURING INITIAL OPERATION OF THE PUMP.
17. CHECK VALVES SHALL BE MUELLER, CLOW, MH, OR KENNEDY.



NEW FIRE HYDRANT ASSEMBLY

SSMH 11
STA 14+88.63
RM = 7.52
INV IN = 68.30
INV OUT = 68.20

SSMH 11

154.00
23.80' SOR-35 @ 0.40%

6" PVC FM

3" PVC FM

6" MJ DI 45° BEND

3" 45° BEND

6" MJ DI 45° BEND

3" 45° BEND

4" x 6" MJ DI INCREASER

4" MJ GATE VALVE

4" x 3" MJ DI REDUCER

4" MJ GATE VALVE

1" BACKFLOW PREVENTER

1" WATER METER

1" WATER LINE w/ FREEZE PROOF HOSE BIB

NEW LIGHT POLE

SSMH LS-1
STA 14+88.63
RM = 7.52
INV IN = 68.30
INV OUT = 68.20

SSMH LS-1

ELECTRICAL CONTROL PANELS

LIFT STATION SITE PLAN
SCALE: 1" = 5'

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LIFT STATION DATA

PROJECT NAME	FREEPORT FORCE MAIN
PUMP MODEL	DAVIS EMU / FLYGT / MYERS / KSB
CURVE NUMBER	
IMPELLER SIZE	
VOLTAGE	3 PHASE 480 VOLT
HP	TBD
RPM	1755
DESIGN FLOW, GPM	55 GPM INITIAL 100 GPM MAX
TDH, FEET	100-FT INITIAL / 180-FT FINAL
EFFICIENCY	
TOP OF WETWELL / VALVE BOX (ELEV. "A")	75.50
FINISH GRADE (ELEV. "B")	75.00
INFLUENT (FORCE MAIN) (ELEV. "C")	71.00
HIGH LEVEL ALARM (ELEV. "D")	59.10
LAG 1 PUMP ON (ELEV. "F")	58.60'
LEAD PUMP ON (ELEV. "G")	58.10'
ALL PUMPS OFF (ELEV. "H")	57.50'
LOW LEVEL ALARM (ELEV. "I")	57.00'
BOTTOM OF WETWELL (ELEV. "J")	55.50'
FORCEMAIN DIAMETER	8.0" GRAVITY SEWER
WETWELL DIAMETER	10.0'

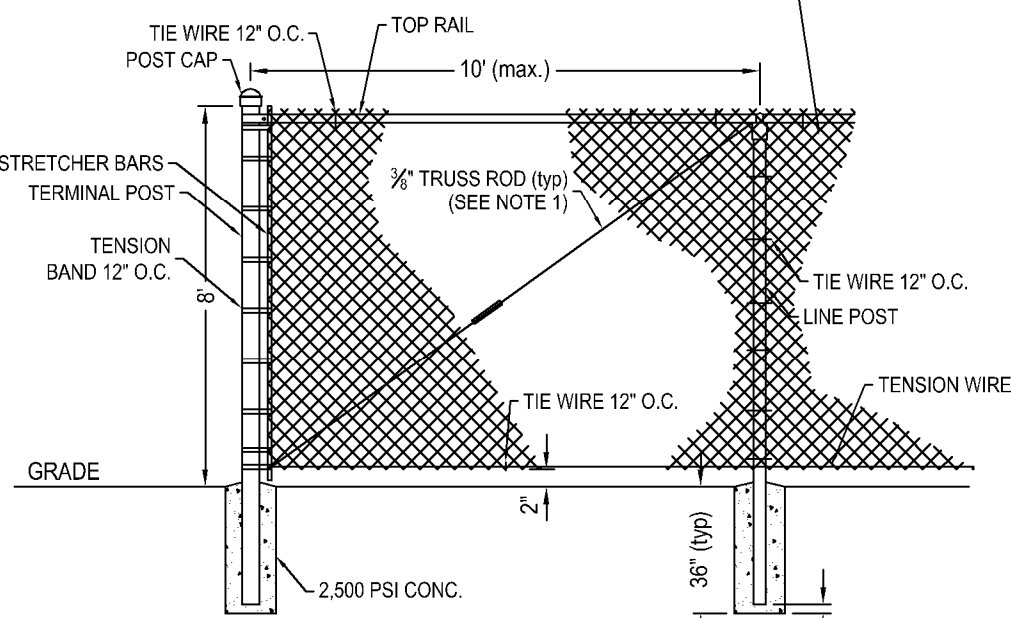
* DIMENSIONS "K" THRU "O" PER MANUFACTURER'S REQUIREMENTS

LIFT STATION SPECIFICATIONS

GENERAL NOTES:

- ALL EXPOSED METAL SHALL BE PAINTED WITH 2 COATS OF EXTERIOR ENAMEL PAINT, EXCEPT STAINLESS.
- WETWELL SHALL BE COATED WITH COAL TAR OUTSIDE EXCEPT TOP SURFACE OF COVERS (TWO COATS, 9 MILS EACH), EXCEPT HDPE.
- WET WELL SHALL HAVE HDPE PROTECTIVE LINER.
- BASE AND FIRST RISER UNIT TO BE CAST MONOLITHIC.
- ALL LOCATIONS WHERE PIPES ENTER OR LEAVE THE WET WELL OR VALVE VAULT SHALL BE MADE WATERTIGHT WITH WALL SLEEVE OR NON-SHRINK GROUT.
- THERE SHALL BE NO VALVES OR ELECTRICAL JUNCTION BOXES IN WET WELL.
- WET WELL SHALL BE ALUMINUM WITH 316 S.S. HARDWARE AND LOCK BRACKET. SIZE AS REQUIRED BY PUMP MANUFACTURER AND APPROVED BY THE CITY.
- FLEXIBLE COUPLING SHALL BE SLEEVE TYPE.
- ALL NUTS, BOLTS, WASHERS, ETC. IN WET WELL AND VALVE BOX TO BE 316 STAINLESS STEEL.
- CONTRACTOR SHALL RECEIVE BIDS FROM PUMP MANUFACTURERS AND SHALL SUPPLY BIDS TO THE ENGINEER PRIOR TO AWARD OF CONTRACT.
- WET WELL FLOORS SHALL HAVE A MINIMUM SLOPE OF 1 TO 1 HOPPER BOTTOM AND THE HORIZONTAL AREA OF THE HOPPER BOTTOM TO BE NO GREATER THAN NECESSARY FOR PROPER INSTALLATION, AND FUNCTION OF THE INLET.
- PROVIDE MOTOR OVERLOADING AND PHASE PROTECTION.
- PROVIDE LIGHTENING PROTECTION.
- CHECK VALVES SHALL BE MUELLER, CLOW, MH, OR KENNEDY.

PROVIDE FIBERGLASS GREEN SLATS TO SERVE AS PRIVACY FENCE ON ALL FENCE AROUND LIFT STATION. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO INSTALLATION

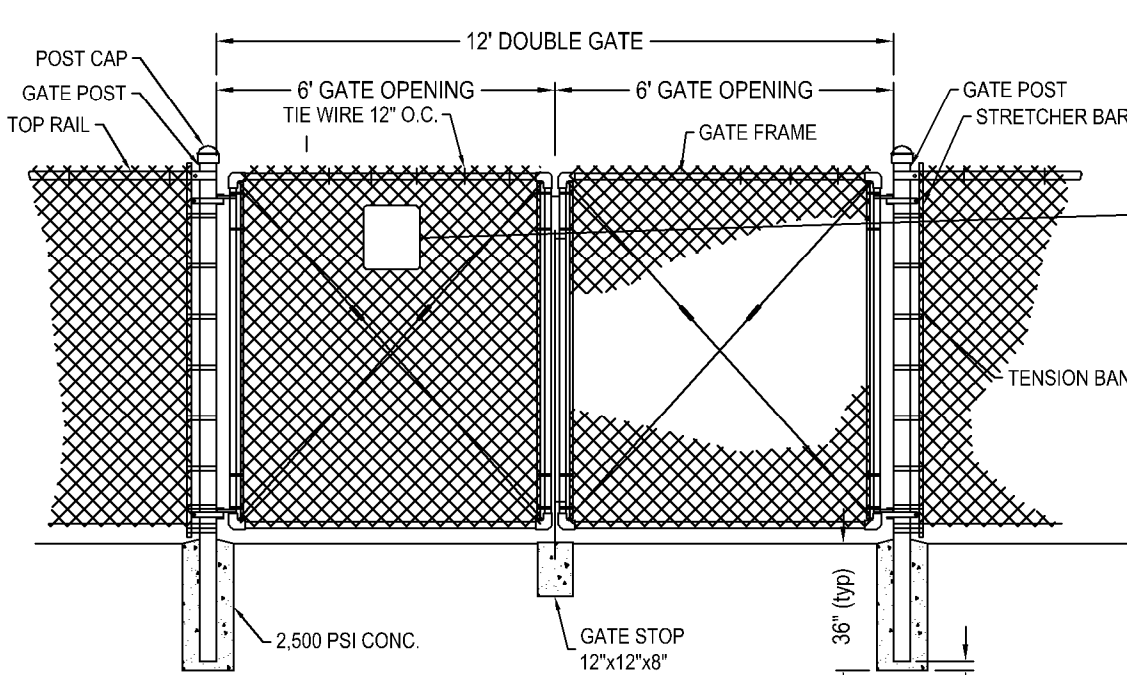


NOTES:

- TRUSS BARS ARE REQUIRED FOR EACH GATE SECTION AND THE FIRST SPAN ON EACH SIDE OF A CORNER POST ONLY.

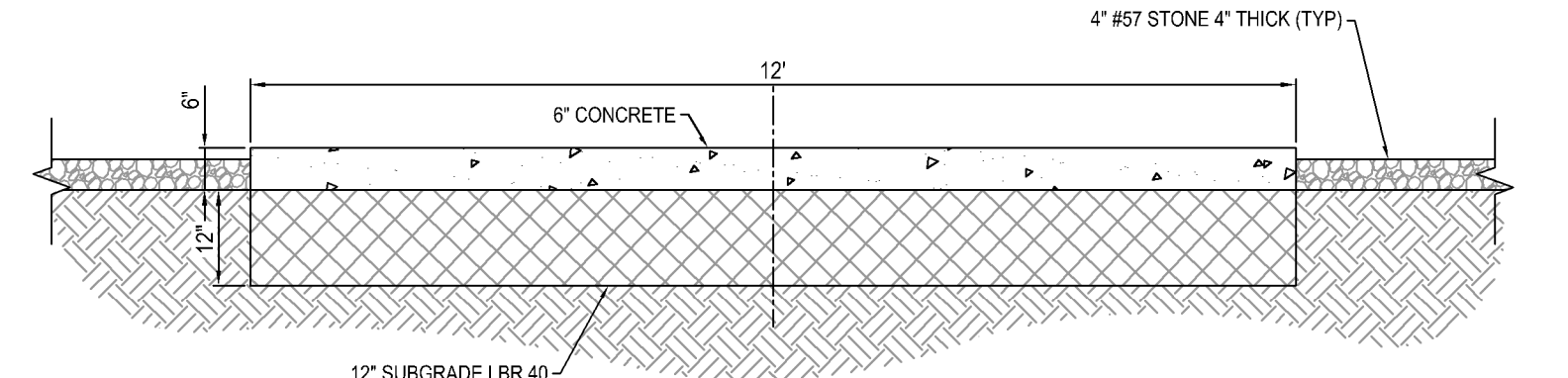
DETAIL CHAIN LINK FENCE

SCALE: N.T.S.



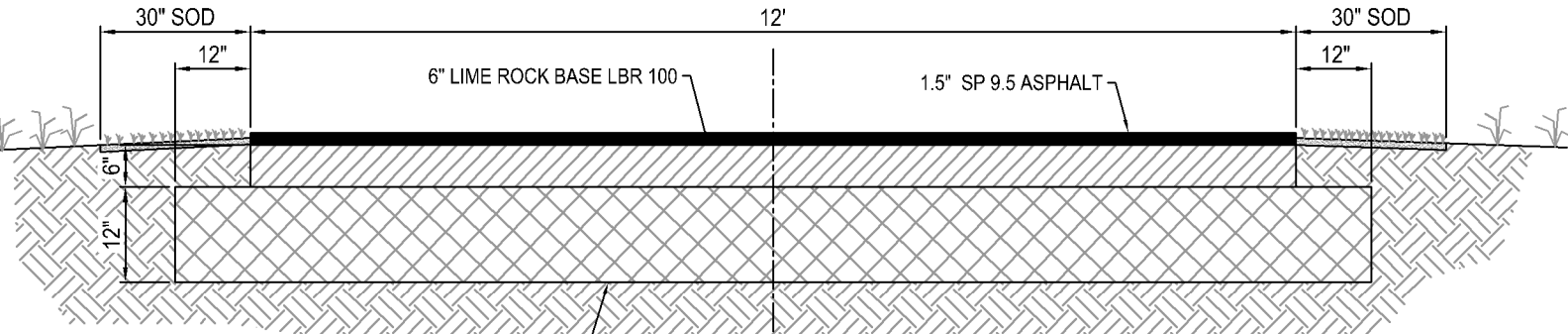
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CORRIDOR
AUTHORITY
FOR EMERGENCY
CALL
(XXX) XXX - XXXX

18" X 12" SIGN



DETAIL 12' x 12' CONCRETE DRIVEWAY

SCALE: N.T.S.

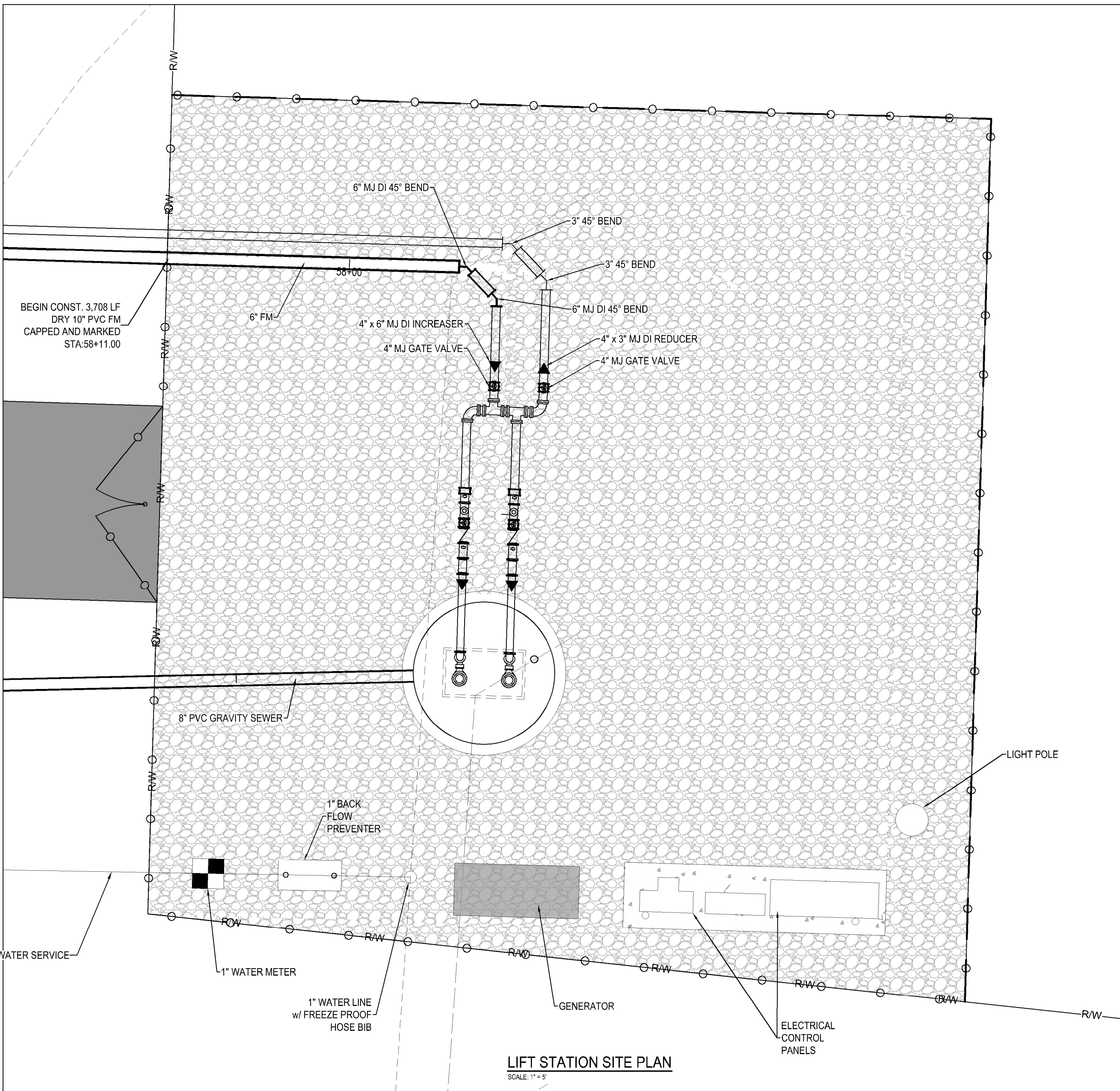
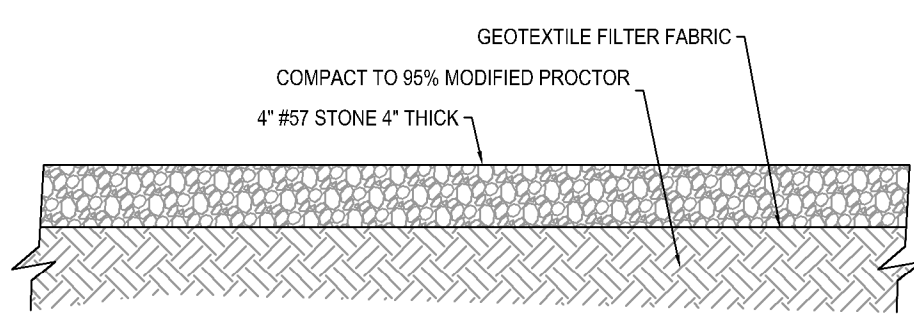


DETAIL 12' ASPHALT DRIVEWAY

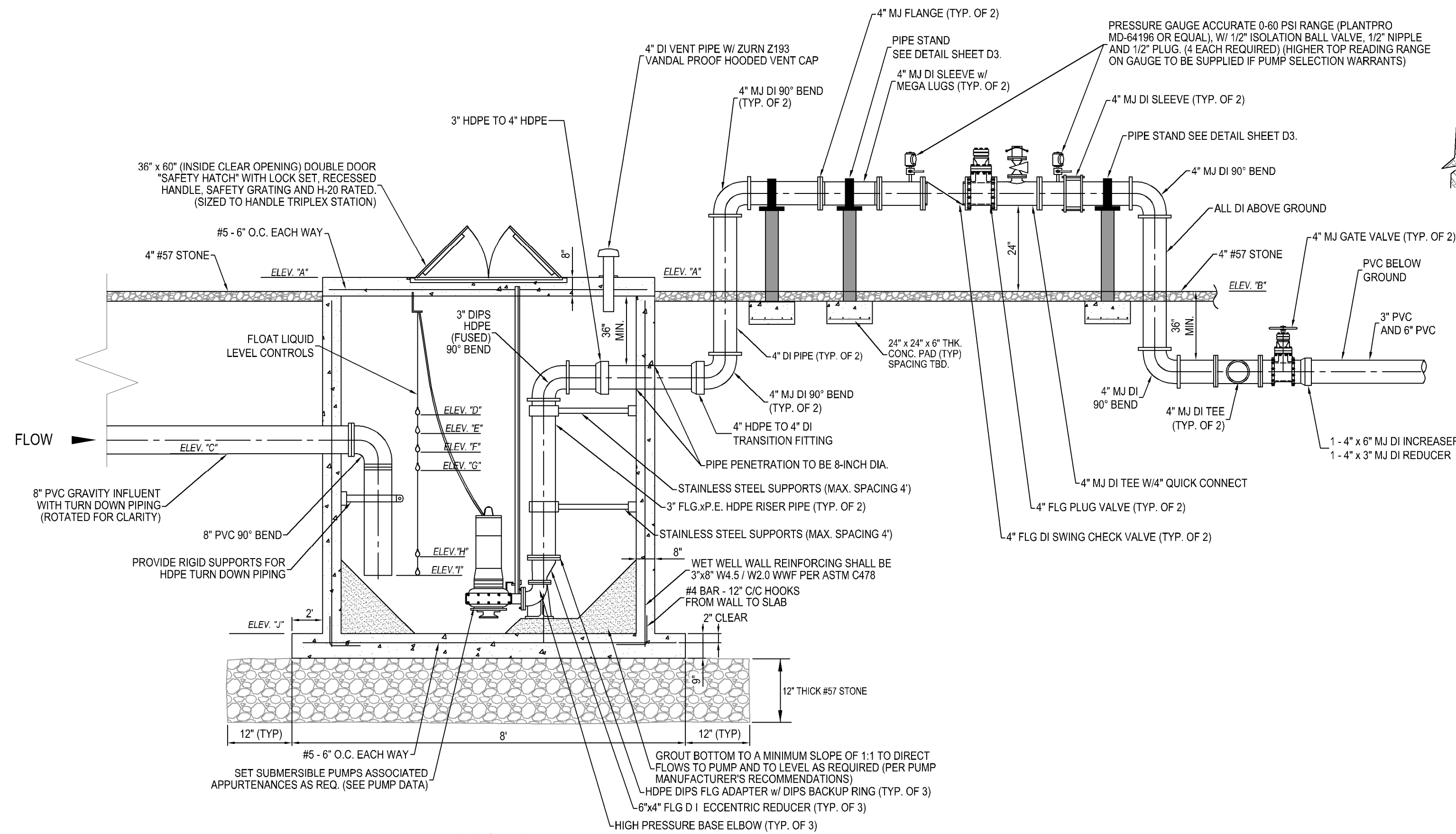
SCALE: N.T.S.

DETAIL GRAVEL SURFACE

SCALE: N.T.S.

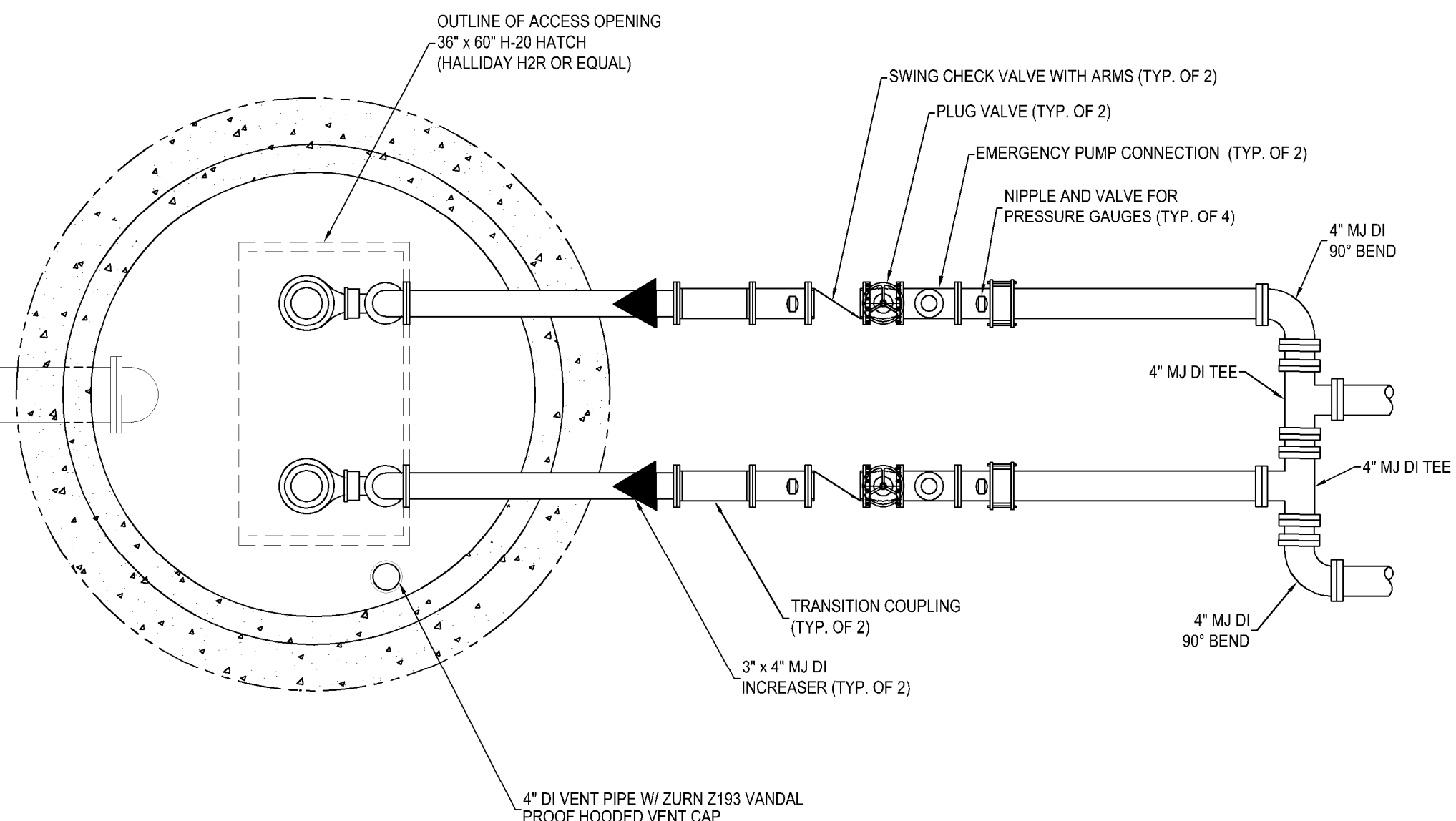


SECTION VIEW



PLAN VIEW

DETAIL LIFT STATION
SCALE: N.T.S.



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SR 79 WASTE WATER AND WATERMAIN
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HOLMES AND WASHINGTON COUNTY
FLORIDA

SEAL

CLIFFORD L. KNAUER, P.E. 53930
EB 0008794

BID SET
(NOT FOR CONSTRUCTION)

SCALE

0' 2.5' 5' 10'
SCALE: 1" = 5'

REVISIONS

NO.	ADDENDUM	DATE

NO. DESCRIPTION DATE

DRAWN BY K. SPELL
APPROVED BY C. KNAUER
CHECKED BY A. ROUCHALEAU
DATE MARCH 2020

TITLE

PROPOSED LIFT
STATION 2

PROJECT NO. 50113689

LS2

SHEET NO.

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D
C
B
A

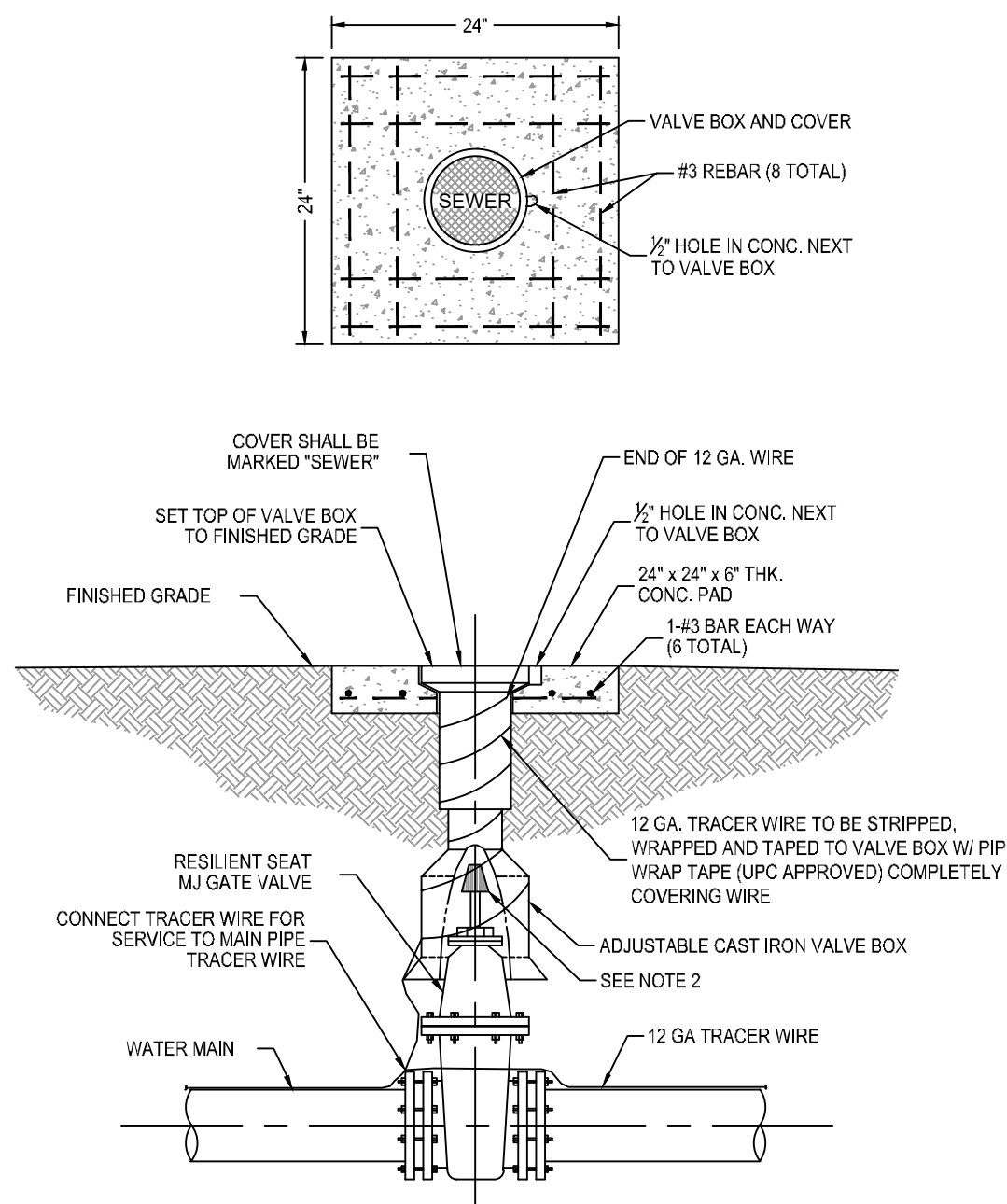
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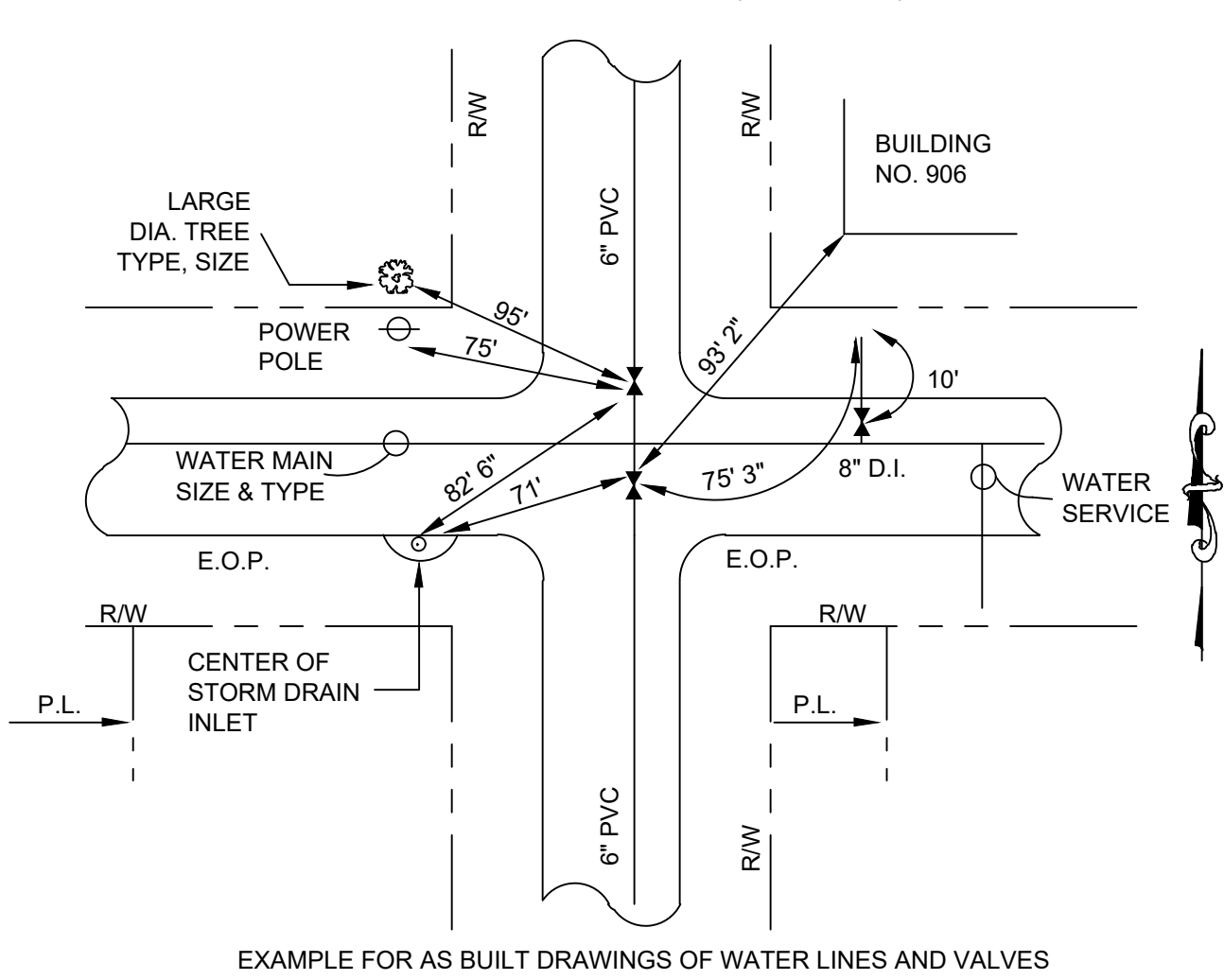
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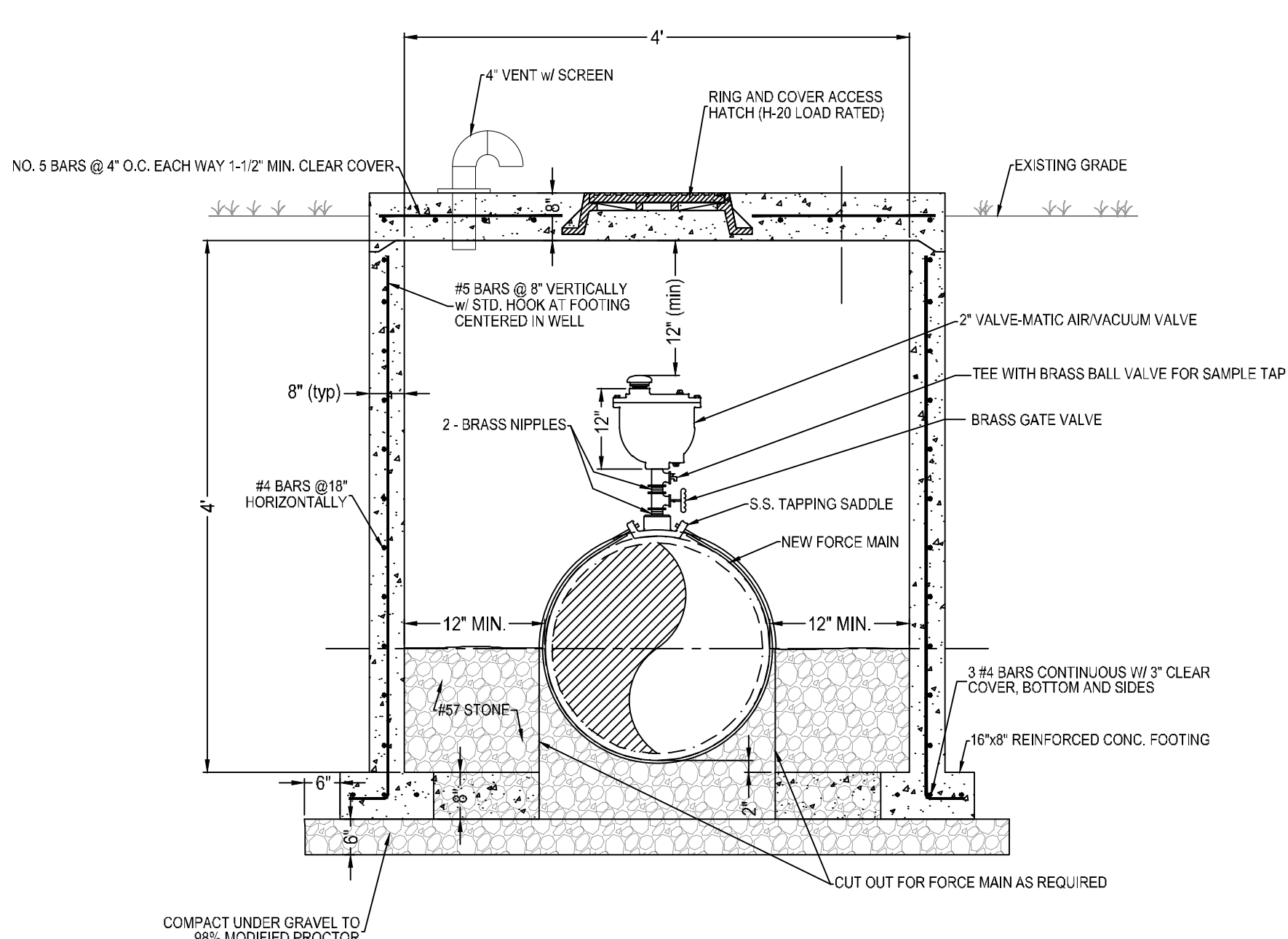
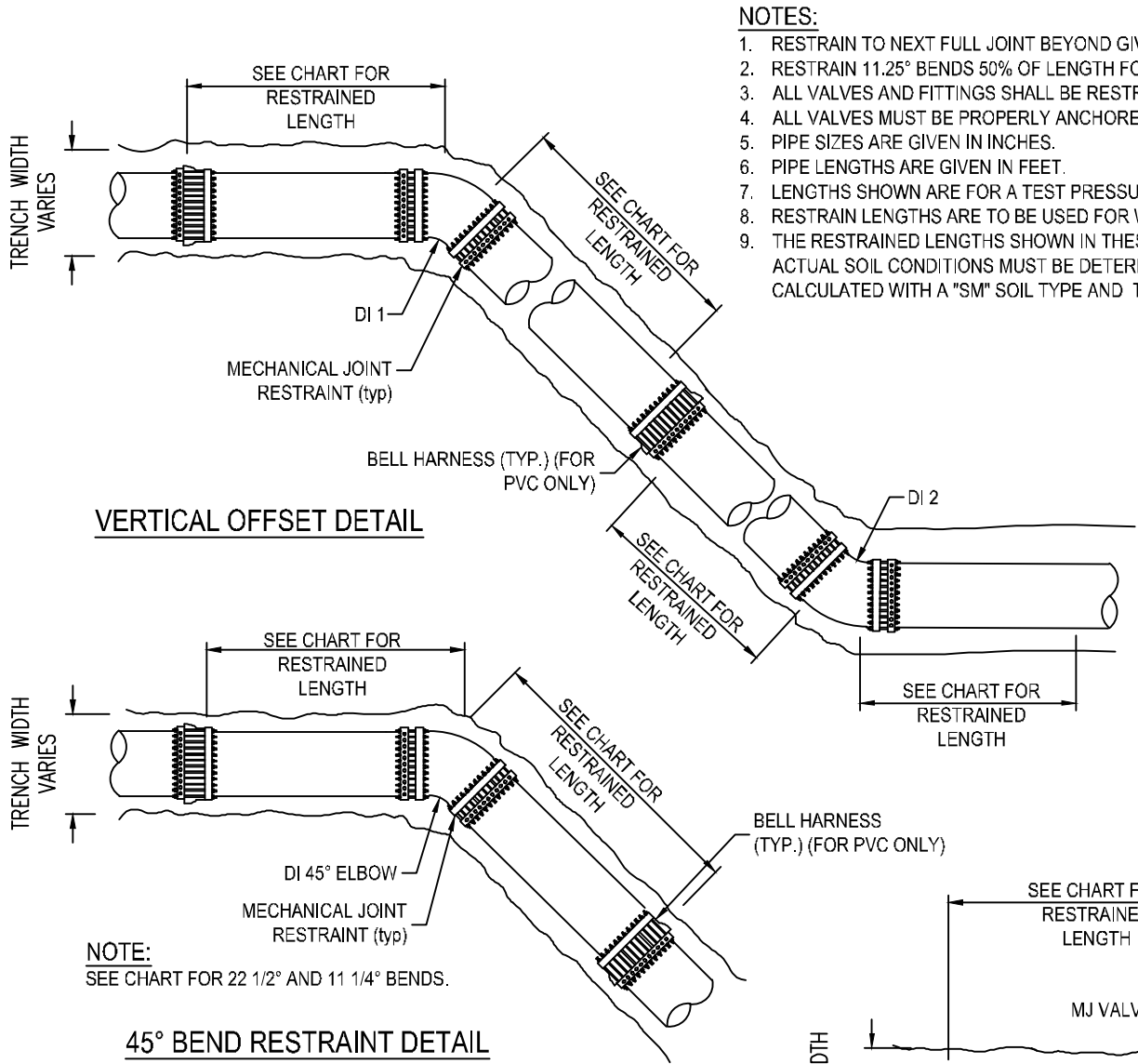
- NOTES:
1. PVC EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
 2. THE ACTUATING NUT FOR DEEPER VALVES SHALL BE EXTENDED TO COME UP TO 4 FOOT DEPTH BELOW FINISHED GRADE.

DETAIL TYPICAL FORCE MAIN GATE VALVE
SCALE: N.T.S.

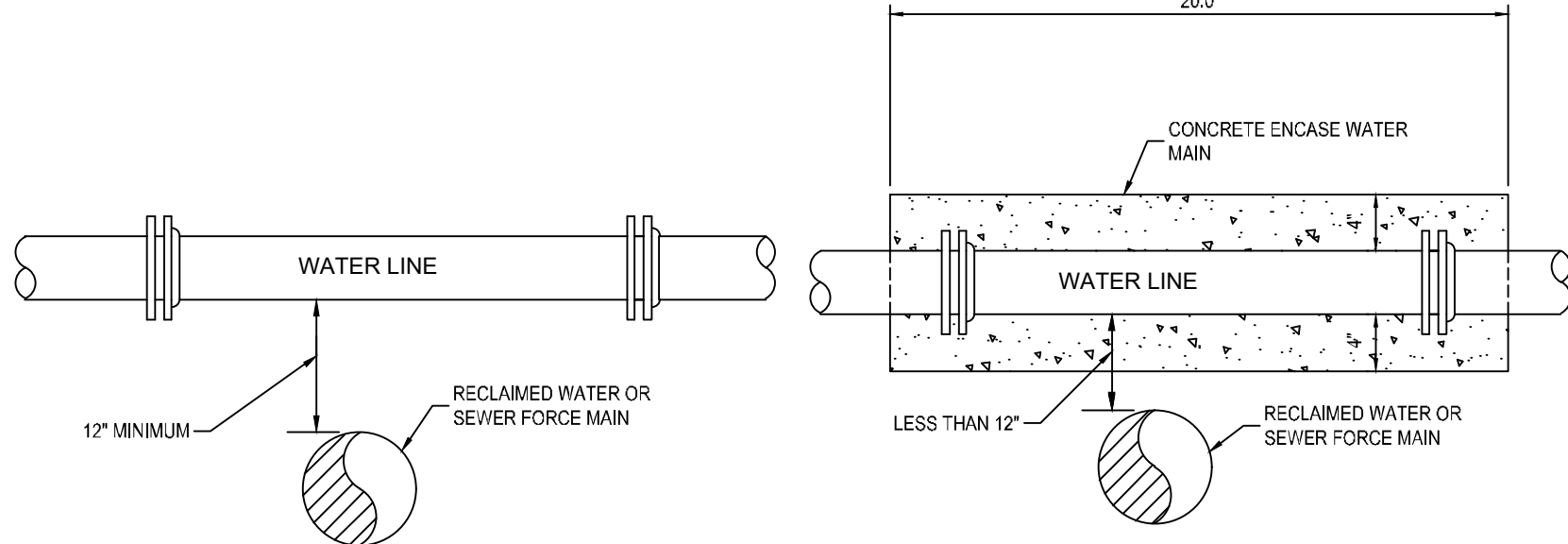


1. AS BUILT DRAWINGS WILL BE PREPARED INDICATING LOCATIONS OF ALL SERVICES, LOCATIONS AND TYPES OF ALL FITTINGS, WITH RESPECT TO LOT CORNERS, LOCATIONS OF ALL VALVE AND DEAD END RUNS WITH THREE (3) TIES TO PHYSICAL FEATURES (BUILDING CORNERS, MAN HOLES, EXISTING STRUCTURES, POWER POLES, STORM DRAIN INLETS, CENTER OF FIRE HYDRANTS, FACE OF LARGE DIAMETER TREES >18").
2. AS BUILT DRAWINGS MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL BEFORE A LETTER OF ACCEPTANCE WILL BE ISSUED.
3. CONTRACTOR SHALL ALSO PROVIDE CERTIFIED AS-BUILTS BY A P.S.M. REGISTERED IN THE STATE OF FLORIDA IN DIGITAL AND HARD COPY SIGNED AND SEALED. THE AS-BUILTS SHALL BE IN STATE PLANE COORDINATES.

DETAIL AS-BUILT REQUIREMENTS
SCALE: N.T.S.



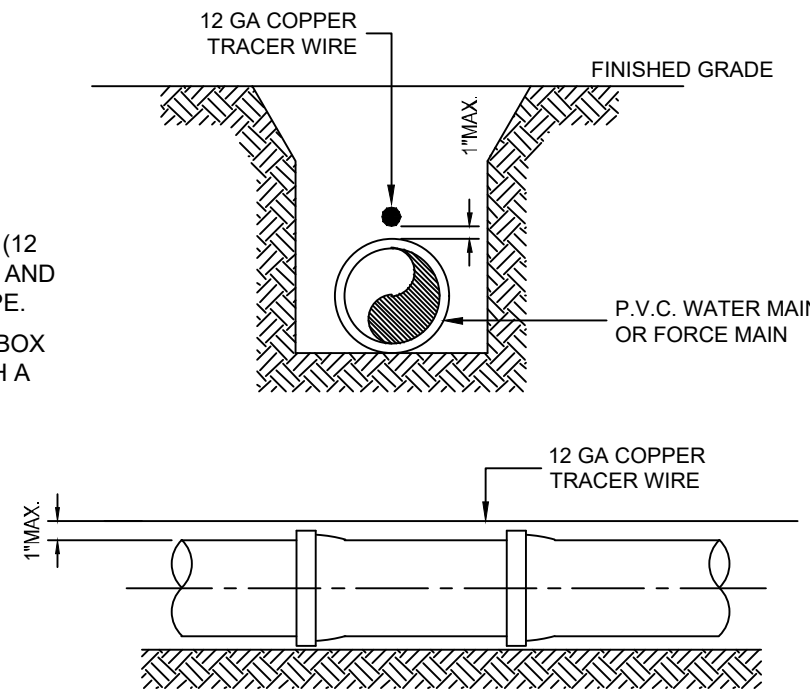
DETAIL 2" COMBINATION AIR/VACUUM VALVE ASSEMBLY
SCALE: N.T.S.



DETAIL CONCRETE ENCASEMENT
SCALE: N.T.S.

NOTES:

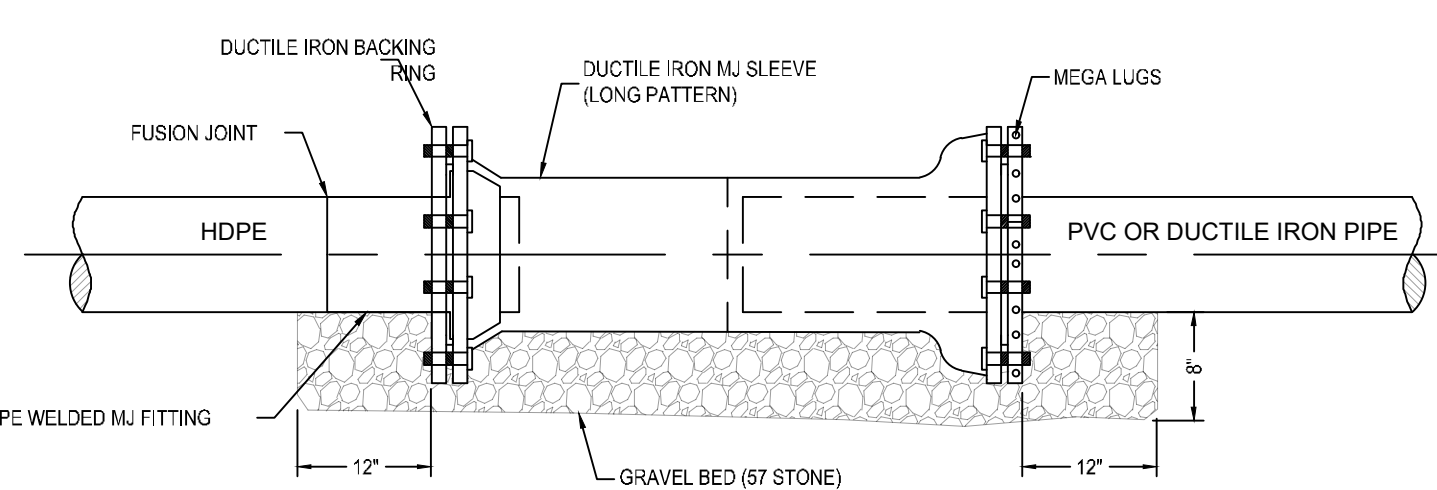
1. PVC PIPE SHALL REQUIRE INSULATED METALLIC LOCATING WIRE (12 GAUGE COPPER) CAPABLE OF DETECTION BY A CABLE LOCATOR AND SHALL BE BURIED DIRECTLY ABOVE THE CENTERLINE OF THE PIPE.
2. LOCATING WIRE SHALL TERMINATE AT THE TOP OF EACH VALVE BOX AND BE CAPABLE OF EXTENDING 12" ABOVE TOP OF BOX IN SUCH A MANNER SO AS NOT TO INTERFERE WITH VALVE OPERATION.
3. USE DUCT TAPE AS NECESSARY TO HOLD WIRE ON THE TOP OF THE PIPE.
4. ALL SPLICES SHALL BE MADE USING A WATER-TIGHT SEALING METHOD APPROVED BY THE CITY.
5. PIPE SHALL NOT BE WRAPPED WITH WIRE.



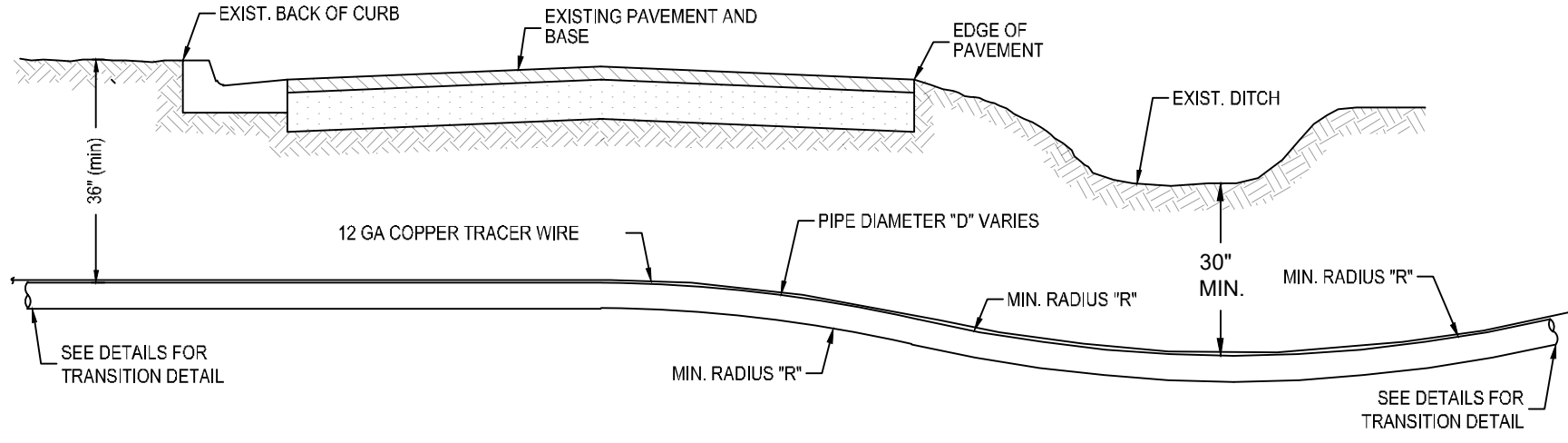
DETAIL PVC PIPE LOCATING WIRE DETAIL
SCALE: N.T.S.

MAIN PIPE SIZE	HORIZ. BENDS			TEES								REDUCERS				PLUGS
				SIZE				LENGTH				SIZE		LENGTH		
	90°	45°	22.5°	X48	X42	X36	X30	X24	X42	X36	X30	X24	X36	X30	X24	
48	128	53	26	X48	219	162	106	48	X24	X42	75	36	39	X30	194	321
42	117	49	24	X42	191	134	74	43	X24	X36	75	40	X24	140	192	289
36	106	44	21	X36	163	102	59	31	X16	X30	75	41	X24	117	175	257
30	93	39	19	X30	132	68	22	11	X12	X24	78	121	X16	121	156	222
24	79	33	16	X24	99	53	18	10	X10	X20	100	101	X12	101	137	185
20	68	29	14	X20	75	41	12	10	X8	X16	116	X12	X10	110	117	159
16	57	24	12	X16	51	27	10	X6	X12	112	56	78	X8	96	117	131
12	45	19	9	X12	35	10	X8	X6	X1	X10	58	X8	X6	X4	74	102
10	39	16	8	X10	35	X8	X6	X1	X1	X8	50	X6	54	X4	74	87
8	33	14	7	X8	1	X6	X4	X1	X1	X6	29	53	54	71	72	72
6	25	11	5	X6	1	X4	X3	X1	X1	X4	31	X4	52	71	72	55
4	18	8	4	X4	1	X3	X1	X1	X1	X4	29	X4	52	71	72	39

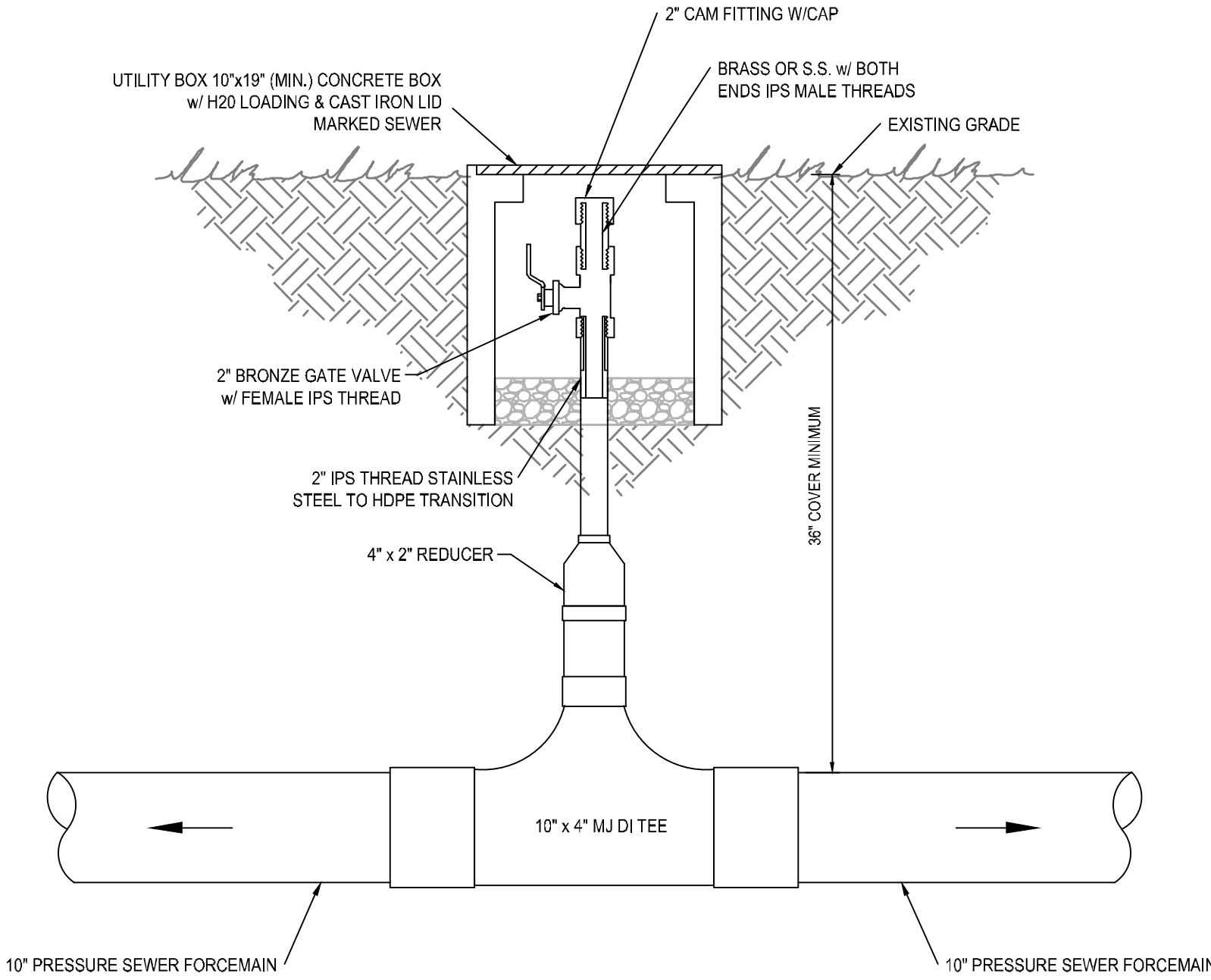
DETAIL THRUST RESTRAINTS
SCALE: N.T.S.



DETAIL HDPE TO PVC TRANSITION CONNECTION
SCALE: N.T.S.



DETAIL DIRECTIONAL BORE ROADWAY CROSSING
SCALE: N.T.S.



DETAIL - TYPICAL TERMINAL CLEANOUT
SCALE: N.T.S.



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FLORIDA

SEAL

CLIFFORD L. KNAUER, P.E. 53930
EB 0008794

BID SET
(NOT FOR CONSTRUCTION)

SCALE



REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY K. SPELL
APPROVED BY C. KNAUER
CHECKED BY A. ROUCHALEAU
DATE MARCH 2020

TITLE

SANITARY SEWER
DETAILS

PROJECT NO. 50113689

D1

SHEET NO.

BASIC ELECTRICAL REQUIREMENTS

SCOPE

THIS SCOPE COVERS THE FURNISHING, INSTALLATION, TESTING, ADJUSTING AND PLACING IN OPERATION ALL ELECTRICAL EQUIPMENT, DEVICES, FACILITIES, MATERIALS, AND AUXILIARY ITEMS NECESSARY FOR THE COMPLETE AND SUCCESSFUL OPERATION OF ALL ELECTRICAL EQUIPMENT AS HEREIN DESCRIBED, SHOWN ON THE PLANS, OR DEEMED NECESSARY FOR THE COMPLETION OF THE ELECTRICAL PORTION OF THE PROJECT. IT IS THE INTENT TO OUTLINE THE ELECTRICAL REQUIREMENTS OF THE CONTRACT IN ORDER TO PROVIDE THE INFORMATION NECESSARY FOR THE CONSTRUCTION OF A FULLY OPERATIONAL SYSTEM AS SHOWN ON THE PLANS AND AS HEREIN DESCRIBED. A COMPREHENSIVE ELECTRICAL SCOPE OF WORK IS AS FOLLOWS:

- POWER/ELECTRICAL SYSTEM
- TELEPHONE AUTO DIALER
- LIFT STATION ELECTRICAL
- UTILITY WORK
- CONNECTION OF ELECTRICALLY POWERED MECHANICAL EQUIPMENT
- TEMPORARY CONSTRUCTION POWER
- ALL INCIDENTALS NECESSARY FOR A COMPLETE AND FULLY OPERATIONAL ELECTRICAL SYSTEM.

WORKING CLEARANCES

WORKING CLEARANCES AROUND EQUIPMENT REQUIRING ELECTRICAL SERVICES SHALL BE VERIFIED BY CONTRACTOR TO COMPLY WITH CODE REQUIREMENTS. SHOULD THERE BE APPARENT VIOLATIONS OF CLEARANCES, THE CONTRACTOR SHALL NOTIFY THE ENGINEER BEFORE PROCEEDING WITH CONNECTION OR PLACING OF EQUIPMENT.

IN THE CASE OF PANEL BOARDS, SAFETY SWITCHES AND OTHER EQUIPMENT REQUIRING WIRE AND CABLE TERMINATION'S, THE CONTRACTOR SHALL ASCERTAIN THAT LUG SIZES AND WIRING GUTTERS OR SPACE ALLOWED FOR PROPER ACCOMMODATION AND TERMINATION OF THE WIRES AND CABLES ARE ADEQUATE.

WORKMANSHIP

ALL WORK SHALL BE ACCOMPLISHED BY PERSONS SKILLED IN PERFORMANCE OF THE REQUIRED TASK. ALL WORK SHALL BE DONE IN KEEPING WITH CONVENTIONS OF THE TRADE. WORK OF THIS DIVISION SHALL BE CLOSELY COORDINATED WITH WORK OF OTHER TRADES TO AVOID CONFLICT AND INTERFERENCE.

ALL CONDUCTORS INSIDE THE LIFT STATION ENCLOSURE SHALL BE IDENTIFIED WITH STANDARD VINYL-CLOTH SELF ADHESIVE CABLE/CONDUCTOR MARKERS OF WRAP-AROUND TYPE. MARKERS SHALL BE PLASTIC COATED AND PRE-NUMBERED TO SHOW CIRCUIT IDENTIFICATION. WRITE-ON TYPE MARKERS WILL NOT BE ACCEPTED. CONDUCTORS AND CABLES IN MANHOLES AND HANDHOLES SHALL BE IDENTIFIED BY BRASS TAGS WITH DIE STAMPED LETTERING.

UTILITIES

ARRANGE WITH POWER COMPANY FOR THE SERVICES AND INSTALL THE SERVICES IN ACCORDANCE WITH THEIR REQUIREMENTS, REGULATIONS AND RECOMMENDATIONS. INSURE THAT 480/277V, 3 PHASE IS AVAILABLE FROM UTILITY. COORDINATE WITH POWER COMPANY THE LOCATION OF THE UTILITY POINT OF CONNECTION. CONTRACTOR IS RESPONSIBLE FOR RISER AND WEATHERHEAD WHERE UNDERGROUND SERVICE IS NOT AVAILABLE.

ARRANGE WITH TELEPHONE COMPANY FOR THE SERVICES AND INSTALL THE SERVICES IN ACCORDANCE WITH THEIR REQUIREMENTS, REGULATIONS AND RECOMMENDATIONS.

GUARANTEE

THE CONTRACTOR SHALL GUARANTEE ALL OTHER ELECTRICAL SYSTEMS, MATERIALS AND WORKMANSHIP TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE. HE SHALL CORRECT ALL DEFECTS ARISING WITHIN THIS PERIOD UPON NOTIFICATION BY THE OWNER OR ENGINEER, WITHOUT ADDITIONAL COMPENSATION.

MATERIAL STANDARDS

MATERIAL SHALL BE NEW AND COMPLY WITH STANDARDS OF UNDERWRITERS' LABORATORIES, INC., WHERE STANDARDS HAVE BEEN ESTABLISHED FOR THE PARTICULAR PRODUCT AND THE VARIOUS NEMA, ANSI, ASTM, IEEE, AEIC, IPCOA OR OTHER PUBLICATIONS REFERENCED.

TEST EQUIPMENT

THE CONTRACTOR SHALL PROVIDE ALL TEST EQUIPMENT AND SUPPLIES DEEMED NECESSARY BY THE ENGINEER/INSPECTOR AT NO EXTRA COST TO THE OWNER. THESE SUPPLIES SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: VOLT METERS, AMP METERS, LIGHT METERS, FUEL, GENERATOR LOAD BANKS, WATT METERS, HARMONIC DISTORTION TEST EQUIPMENT, AND OSCILLOSCOPES.

SUBMITTAL

SUBMIT SHOP DRAWING FOR APPROVAL BY THE OWNER.

SUBMIT SHOP DRAWINGS AND PRODUCT DATA GROUPED TO INCLUDE COMPLETE SUBMITTAL OF RELATED SYSTEMS, PRODUCTS, AND ACCESSORIES IN A SINGLE SUBMITTAL. NO ELECTRICAL WORK MAY BE PERFORMED UNTIL ALL SHOP DRAWINGS ARE APPROVED. SUBMIT SHOP DRAWINGS ON THE FOLLOWING SYSTEMS AS GROUPED BELOW:

- POWER/ELECTRICAL SYSTEM
 - CONDUIT
 - WIRE
 - PULL BOXES
 - BREAKERS
 - DISCONNECTS
 - FUSES
 - LIGHTING
- LIFT STATION CONTROL SYSTEM
 - PUMP CONTROLLER
 - FLOATS
 - H-O-A SWITCHES
 - HOUR METERS
 - NAME PLATES
 - PUMP STARTERS
 - CONTROL RELAYS
 - CONTROL SCHEMATICS
- UTILITY WORK
 - UTILITY COORDINATION INFORMATION
 - UTILITY CONDUIT
 - MISC.

MARK DIMENSIONS AND VALUES IN UNITS TO MATCH THOSE SPECIFIED.

MOTOR SCHEDULE

	MOTOR SIZE	FULL LOAD CURRENT (NEC)	FULL LOAD CURRENT (NAMEPLATE)	VOLTAGE/ PHASE
PUMP #1	11 HP	15.5 A	13 A RUN	460 / 3
PUMP #1 (FUTURE)	20 HP	27 A	19.2 A RUN	460 / 3
PUMP #2	11 HP	15.5 A	13 A RUN	460 / 3
PUMP #2 (FUTURE)	20 HP	27 A	19.2 A RUN	460 / 3
MIXER	3.4 HP	5.5	5.5 A RUN	460 / 3

LOAD CALCULATION

LOAD	CONNECTED				
	KVA	HP	AMPS	VOLTAGE	PHASE
PUMP NO. 1 (FUTURE UPGRADE)		20	27	460	3
PUMP NO. 2 (FUTURE UPGRADE)		20	27	460	3
MIXER		3.4	5.5	460	3
CONTROL POWER & MISC.	3		6.25	480/120	1
TOTAL			65.75		
25% OF LARGEST MOTOR			6.75		
CONNECTED + 25% OF LARGEST MOTOR			72.5		

FINAL INSPECTION AND TESTING

AFTER THE ELECTRICAL INSTALLATION IS COMPLETE, THE CONTRACTOR SHALL DELIVER TO THE ENGINEER THE FOLLOWING INFORMATION WITH HIS REQUEST FOR FINAL INSPECTION. THE ELECTRICAL WORK SHALL BE THOROUGHLY TESTED TO DEMONSTRATE THAT THE ENTIRE SYSTEM IS IN PROPER WORKING ORDER AND IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. EACH MOTOR WITH ITS CONTROL SHALL BE RUN AS NEARLY AS POSSIBLE UNDER OPERATING CONDITIONS FOR A SUFFICIENT LENGTH OF TIME TO DEMONSTRATE CORRECT ALIGNMENT, WIRING CAPACITY, SPEED AND SATISFACTORY OPERATION. ALL MAIN SWITCHES AND CIRCUIT BREAKERS SHALL BE OPERATED, BUT NOT NECESSARILY AT FULL LOAD. CONTRACTOR MAY BE REQUIRED DURING FINAL INSPECTION, AT THE REQUEST OF THE ENGINEER TO FURNISH TEST INSTRUMENTS FOR USE DURING THE TESTING.

ALL PANEL BOARD AND ALL OTHER MAIN FEEDER CIRCUITS SHALL BE GIVEN A MEGGER TEST USING A 1000 VOLT MEGGER. THIS TEST SHALL BE PERFORMED AFTER CONDUCTORS ARE PULLED, BUT BEFORE FINAL CONNECTIONS ARE MADE. THE CONTRACTOR SHALL RECORD THE CIRCUIT DESIGNATION AND THE MEGGER READING ON EACH PHASE. THIS WRITTEN RECORD SHALL BE SUBMITTED TO THE ENGINEER. THE COST OF THIS TEST OR ANY RETEST CAUSED BY INSUFFICIENT MEGGER READINGS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

AS-BUILT DRAWINGS

THE CONTRACTOR SHALL PROVIDE DETAILED AS-BUILT DRAWINGS FOR ALL WORK INDICATING ALL CONTROL AND POWER WIRING. THE AS-BUILT DRAWINGS SHALL ALSO INCLUDE DETAILED CONTROL SCHEMATIC FOR THE CONTROL SYSTEM.

SUPPORTING DEVICES

ALL SUPPORTING DEVICES SHALL BE STAINLESS STEEL OR ALUMINUM UNLESS OTHERWISE INDICATED.

CONDUIT

CONDUIT BELOW GRADE SHALL BE SCH. 80 PVC. ALL EXPOSED CONDUIT SHALL BE ALUMINUM. ALL CONDUIT SUPPORTS SHALL BE STAINLESS STEEL OR ALUMINUM. ALL CONDUIT SHALL BE SIZED PER THE NEC.

WIRE

THE CONDUCTOR SIZES SHOWN ON THE DRAWINGS ARE BASED ON THWN-2 COPPER CONDUCTORS. CONDUCTOR AMPACITY HAS BEEN SELECTED BASED ON 75 DEG. C TEMPERATURE RATING. INSURE THAT ALL TERMINATION PROVISIONS ARE SUITABLE FOR 75 DEG. C RATED CONDUCTORS.

DISCONNECT SWITCHES

ALL DISCONNECT SWITCHES SHALL BE 200,000 AIC FUSED DISCONNECT SWITCHES. ALL SWITCH ENCLOSURES SHALL BE NEMA 4X TYPE 316 STAINLESS STEEL. FUSES SHALL BE DUAL ELEMENT TIME DELAY UNLESS OTHERWISE NOTED. TERMINATION PROVISIONS SHALL BE LISTED FOR USE WITH FOR 75 DEG C RATED CONDUCTORS.

GROUNDING

ALL CONDUIT RUNS SHALL HAVE A GREEN GROUNDING CONDUCTOR SIZED PER NEC. GROUNDING ELECTRODE SYSTEM SHALL HAVE A MAXIMUM RESISTANCE OF 10 OHMS.

SHORT CIRCUIT CURRENT RATINGS

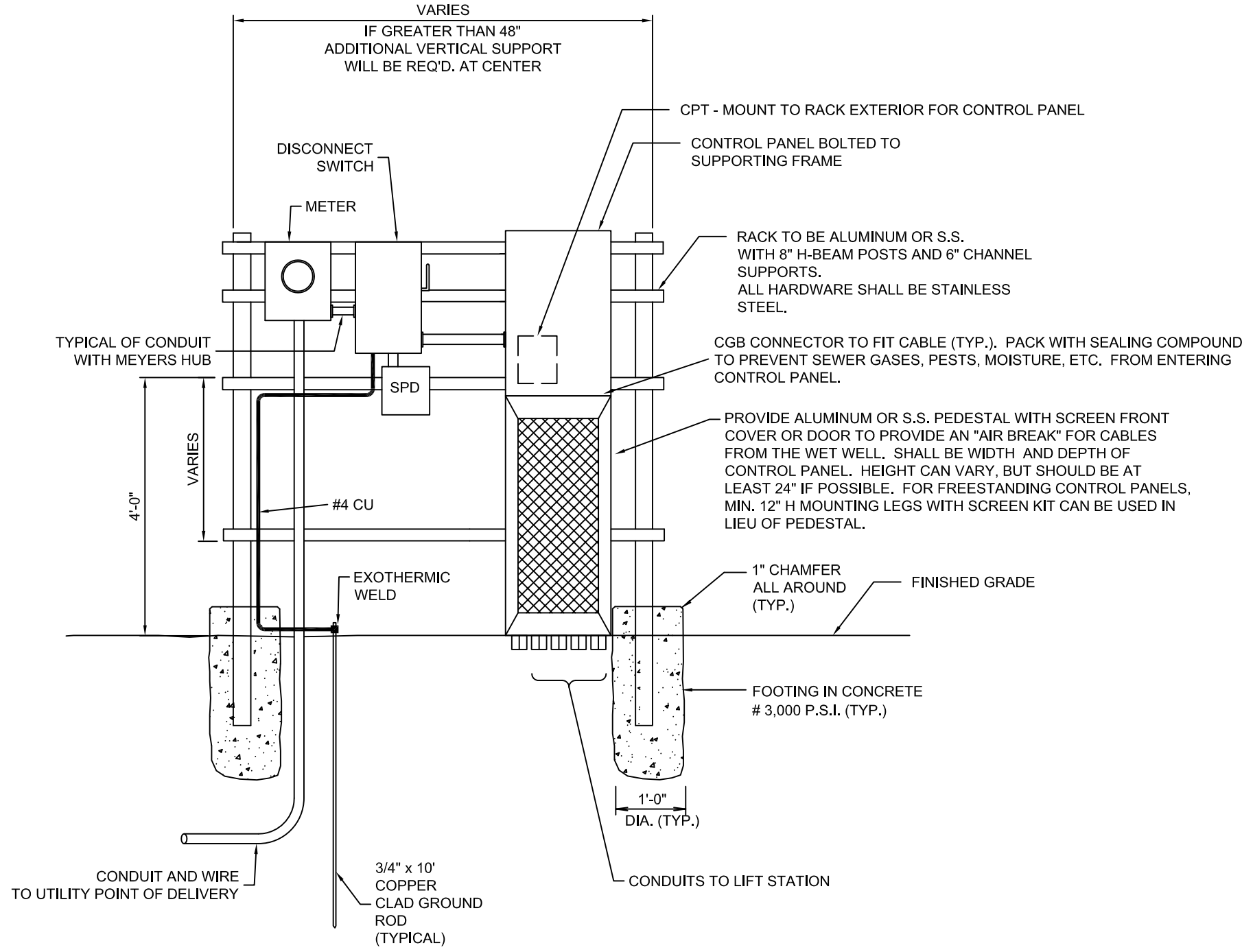
THE SHORT CIRCUIT RATING AT THE SECONDARY TERMINALS OF THE UTILITY TRANSFORMER IS ASSUMED TO BE NO GREATER THAN 18KA BASED ON A UTILITY TRANSFORMER NO LARGER THAN 150KVA WITH AN IMPEDANCE NOT LESS THAN 1.5%. IF THE TRANSFORMER IS LARGER, OR THE IMPEDANCE LOWER, PLEASE CONTACT THE ENGINEER FOR EVALUATION.

REGULATORY REQUIREMENTS

CONFORM TO APPLICABLE SECTIONS OF THE BUILDING CODE FOR HOLMES AND WASHINGTON COUNTY FLORIDA, AND ALL LOCAL RULES, REGULATIONS, AND ORDINANCES.

ELECTRICAL: CONFORM TO LATEST ADOPTED VERSION OF NFPA 70.

OBTAIN PERMITS, AND REQUEST INSPECTIONS FROM AUTHORITY HAVING JURISDICTION.

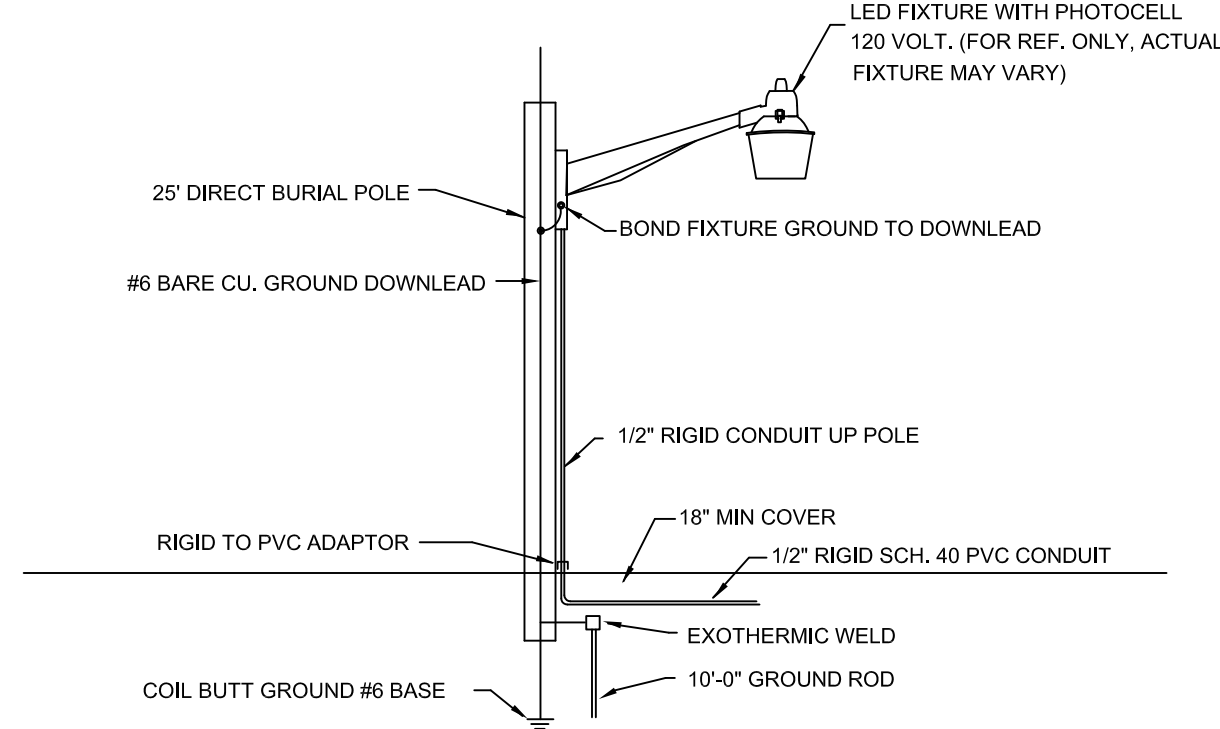


EQUIPMENT INSTALLATION DETAIL

NOT TO SCALE

NOTE:

PROVIDE CONCRETE HOUSEKEEPING PAD FOR ANY FREESTANDING ENCLOSURES.

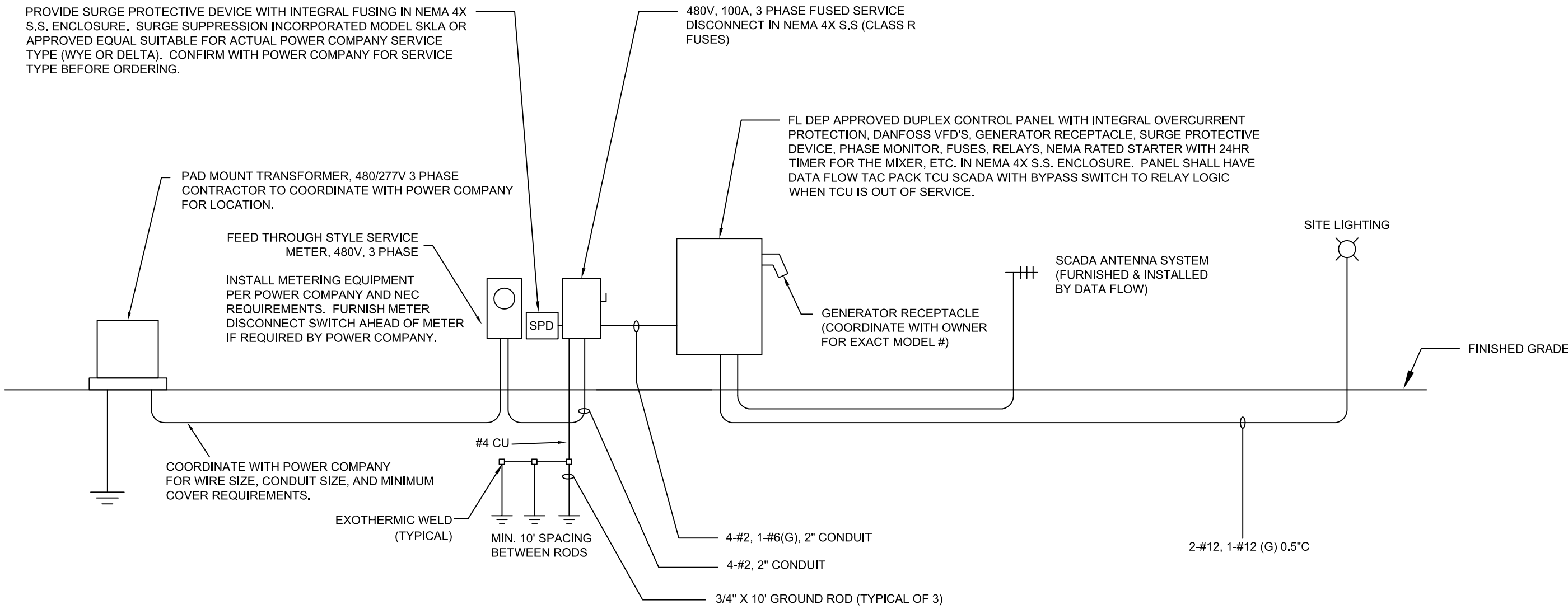


LIGHT POLE DETAIL

NOT TO SCALE

LIGHTING FIXTURE SCHEDULE (THIS SHEET ONLY)

DESCRIPTION	MANUFACTURER	MODEL NUMBER
LED AREA LIGHT, POLE MOUNTED 25' ABOVE FINAL GRADE. FURNISH WITH DIRECT BURIAL POLES. POLE SHALL MEET THE WIND LOADING REQUIREMENTS FOR THE INSTALLED LOCATION.	SPAULDING	CIMARRON LED - CL1-A-90L-U-5K-5W-DB PROVIDE INTEGRAL PHOTO CELL CONTROL



ELECTRICAL RISER DIAGRAM - LS #1

NOT TO SCALE



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PERMIT SET
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SCALE

REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY C. HALL

APPROVED BY C. HALL

CHECKED BY C. HALL

DATE JULY 2020

TITLE

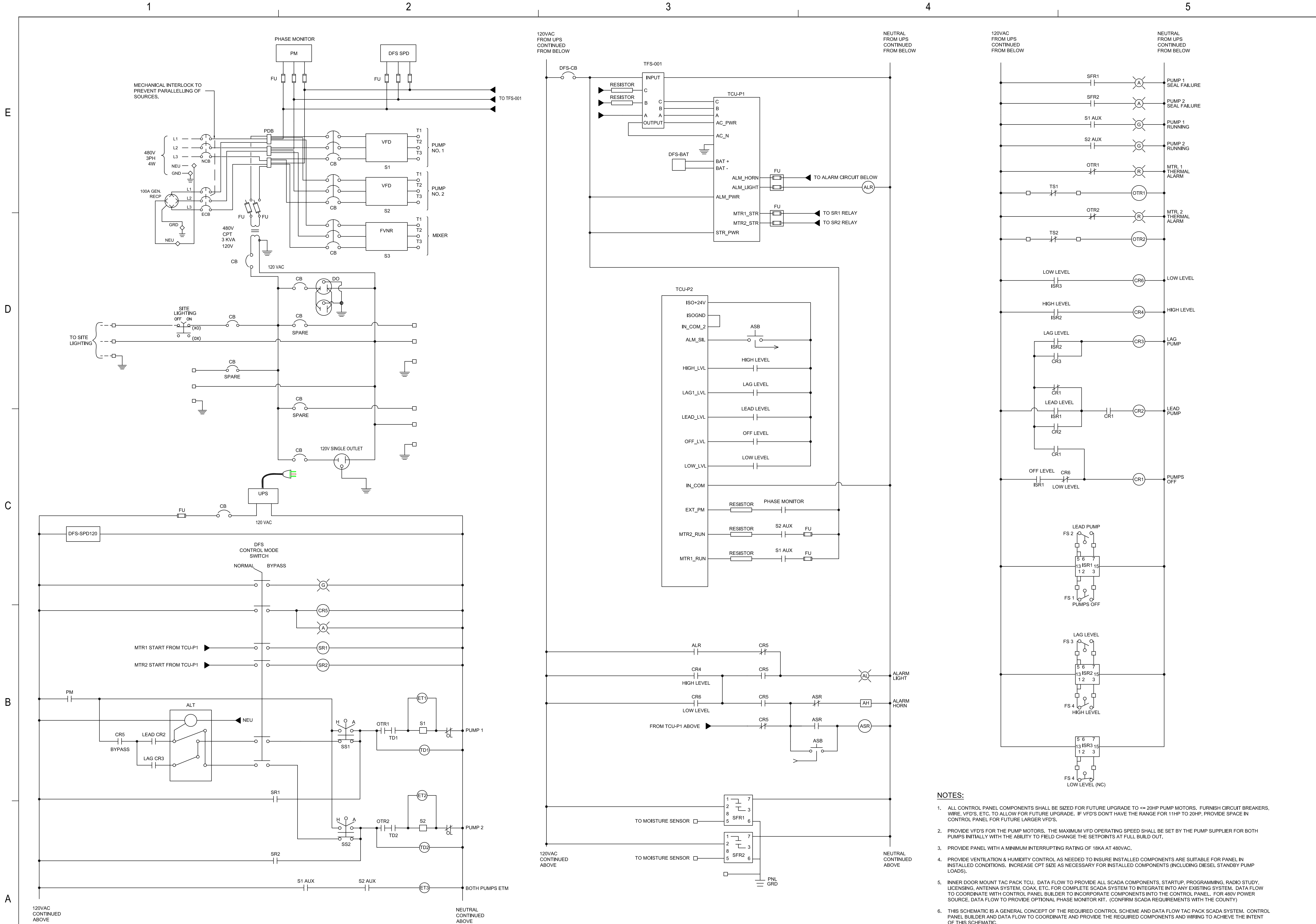
LIFT STATION #1
ELECTRICAL
DETAILS

PROJECT NO. 50113689

E1

SHEET NO.

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FL License # 65846



- NOTES:**
1. ALL CONTROL PANEL COMPONENTS SHALL BE SIZED FOR FUTURE UPGRADE TO <= 20HP PUMP MOTORS. FURNISH CIRCUIT BREAKERS, WIRE, VFD'S, ETC. TO ALLOW FOR FUTURE UPGRADE. IF VFD'S DON'T HAVE THE RANGE FOR 11HP TO 20HP, PROVIDE SPACE IN CONTROL PANEL FOR FUTURE LARGER VFD'S.
 2. PROVIDE VFD'S FOR THE PUMP MOTORS. THE MAXIMUM VFD OPERATING SPEED SHALL BE SET BY THE PUMP SUPPLIER FOR BOTH PUMPS INITIALLY WITH THE ABILITY TO FIELD CHANGE THE SETPOINTS AT FULL BUILD OUT.
 3. PROVIDE PANEL WITH A MINIMUM INTERRUPTING RATING OF 18KA AT 480VAC.
 4. PROVIDE VENTILATION & HUMIDITY CONTROL AS NEEDED TO INSURE INSTALLED COMPONENTS ARE SUITABLE FOR PANEL IN INSTALLED CONDITIONS. INCREASE CPT SIZE AS NECESSARY FOR INSTALLED COMPONENTS (INCLUDING DIESEL STANDBY PUMP LOADS).
 5. INNER DOOR MOUNT TAC PACK TCU. DATA FLOW TO PROVIDE ALL SCADA COMPONENTS, STARTUP, PROGRAMMING, RADIO STUDY, LICENSING, ANTENNA SYSTEM, COAX, ETC. FOR COMPLETE SCADA SYSTEM TO INTEGRATE INTO ANY EXISTING SYSTEM. DATA FLOW TO COORDINATE WITH CONTROL PANEL BUILDER TO INCORPORATE COMPONENTS INTO THE CONTROL PANEL. FOR 480V POWER SOURCE, DATA FLOW TO PROVIDE OPTIONAL PHASE MONITOR KIT. (CONFIRM SCADA REQUIREMENTS WITH THE COUNTY)
 6. THIS SCHEMATIC IS A GENERAL CONCEPT OF THE REQUIRED CONTROL SCHEME AND DATA FLOW TAC PACK SCADA SYSTEM. CONTROL PANEL BUILDER AND DATA FLOW TO COORDINATE AND PROVIDE THE REQUIRED COMPONENTS AND WIRING TO ACHIEVE THE INTENT OF THIS SCHEMATIC.

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SCALE

REVISIONS		
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DRAWN BY C. HALL

APPROVED BY C. HALL

CHECKED BY C. HALL

DATE JULY 2020

TITLE

LIFT STATION #1
ELECTRICAL
DETAILS

PROJECT NO. 50113689

E2

SHAFT NO.

