City of Loganville

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# SANITARY SEWER PUMP STATION

# & FORCE MAIN DESIGN

# CONSTRUCTION MANUAL

# CITY OF LOGANVILLE
# DEPARTMENT OF UTILITIES

## SANITARY SEWER PUMP STATION DESIGN & CONSTRUCTION MANUAL

PURPOSE: The purpose of this manual is to aid the design engineer and contractor alike, in the design and construction of sanitary sewer lift stations to meet all City of Loganville Department of Utilities standard requirements. The sections and standard detail drawings included have been removed from the Sanitary Sewer Standards and this document now becomes the Sanitary Sewer Standards pertaining to Pump Stations and Force mains.

PUMP STATION DESIGN SUBMITTALS: After reviewing the design standards, the project engineer will prepare a design, submittal for review by the Department of Utilities. The submittal must include the following:

1. Plan design of the pump station layout (including grading around station and elevations)
2. Force main plan and profiles including length and size.
3. Manufactures' details and specifications for the pumps, generator and transfer switch.
4. "Sanitary Sewer Pump Station Design Data" calculation form

*Two* (2) complete sets of the design shall be submitted for review including p*ump and system curves.* Allow at least four weeks from time of submittal for the review. One set of red lined plans will be returned to the engineer with comments to be addressed. After all corrections have been made, s*even* (4) sets of the submittal will be stamped "APPROVED" and *four (4) returned* to the engineer. After receiving the approval, the contractor for the developer may then obtain a "Construction Permit" for the installation of the pump station and the force main by presenting to the Department of Utilities a stamped set of the approved plans

NOTE: A CONSTRUCTION PERMIT MUST BE OBTAINED AND A PRE-CONSTRUCTION CONFERENCE MUST BE HELD WITH THE DEPARTMENT OF UTILITIES DIRECTOR AND THE CONTRACTOR *BEFORE ANY WORK MAY BEGIN!*

*PUMP STATION INSTALLATION:* Because manufacturers' delivery times of the pump stations, control panels, telemetry, and peripheral accessories may vary widely, it is recommended that orders be placed for the equipment as soon as design approvals are received to avoid untimely delays at the time of final plat submittal for the development. Approval of the development is contingent upon complete acceptance of the pump station and force main. It is also recommended that application for the *utility service (i.e.: electric, water, telephone and gas if applicable)* to the pump station be made as early as possible. Experience has shown that receipt of utility service is often a major source of pump station completion delay.

## 1.10 ***PUMP STATIONS***

1.10.1 Lift stations will only be permitted when gravity sewer is unavailable to the property. Unavailable shall generally be interpreted to mean more than *5,000* feet, but this distance can be increased or decreased by City of Loganville based upon actual field conditions, and {the size of the project involved.

1.10.2 The developer shall furnish, install and dedicate to the City of Loganville the entire lift station/force main system. The system will be designed by the developer's engineer (Professional Engineer registered in the State of Georgia). The design must be reviewed and approved by the Division Director, or designated agent.

The designer shall consult with Division Director, or designated agent, during the design of the system. The system shall be designed with all components sized to meet the development's flows adjusted for peaks. The developer may elect to size the system to meet future phases of his/her project or may upgrade the system at a later date to serve additional phases. Any such upgraded capacity shall be reserved for the developer (subject to availability of treatment capacity) for a period of three (3) years from date of final inspection of the system. The reserved capacity shall only include the number of lots or commercial flow quantity as identified on plan submittals approved by the City Of Loganville. Lift station equipment and force mains are manufactured in certain discrete sizes. The difference in capacity between the development's projected flow and the discrete size selected for the developer's project is not to be considered as belonging to the developer. Any such" extra" capacity beyond that reserved for the original developer becomes available for the City of Loganville to utilize at its discretion. The developer may relinquish his reserved pumping capacity at any time by notifying the City of Loganville in writing.

The designer shall locate the lift station to drain the largest possible sub-basin. The City of Loganville Planning Division Director will investigate the service impact associated with future City needs within the sub-basin, and the potential installation of additional force mains and gravity sewer required to serve the sub-basin that will drain to the lift station. If, in his opinion, a larger force main or pump station capacity is to be installed with the developer's project, the designer will design and the Division Director must approve the design of said additional main and pumping capacity. The City of Loganville will pay for the cost of the additional main and additional pump station capacity as betterment.

*Generally, a pump station will not be allowed to be installed downstream from an existing pump station.* The City of Loganville may, at its discretion, require that a gravity line be installed to carry flow from the existing pump station to the proposed pump station thus eliminating the existing pump station. The City of Loganville may, at its discretion, allow the developer to move some or all of the existing equipment and reuse it. If the reuse of equipment is allowed, the developer must coordinate with the City and assume complete responsibility for the handling of all flows during the transition period.

1.10.3 Site development plans and profiles must show:

a. Gravity system and connection to lift station
b. Force main design showing connection to existing system *(Length, type, diameter Valve locations).*
c. Design calculations (see pump station data submittal form)
d. Plan of the sub-basin, which drains to the lift station, to include contours and project flow calculations for the entire sub-basin.
e. Plans and construction details for the pump station.

1.10.4 The Engineer's pump station submittal package shall include:
a. Pump submittal with shop drawings and specifications *including Wet well Elevations.*
b. Valve information and shop drawings.
c. Generator submittal with specifications and shop drawings, along with automatic transfer switch specifications and shop drawings
d. Telemetry equipment submittal. Include bypass pump submittal with spec, shop drawing and pump curves.
e. Single line electrical drawing showing power distribution for station.
f. Stamped by a Professional Engineer registered in the State of Georgia.
g. Site development plan and profile.

1.10.5 Pump Stations with a capacity less than 1,000 G.P .M. shall be one of the following:
a. Flygt submersible
b. Smith and Loveless above-ground suction lift
c. Yeomans submersible

Pump Stations with a capacity above 1,000 G.P .M. shall be one of the following:
a. Flygt submersible
b. Yeomans submersible
c. Smith and Loveless above-ground suction lift

* Note: Submersible cable entries shall be grommet and washer type. No potted entries shall be permitted. All pumps must be supplied with a certified pump test curve from the manufacturer. All pumps must be able to pass a 3" solid.

1.10.6 Pumps can be obtained from the following manufacturers/representatives:
a. Flygt pumps are available from ITT/Flygt, Inc
b. Yeomans pumps are available from GPM Environmental Company
c. Smith and Loveless pumps are available from Smith & Loveless, Inc

1.10.7 JWC Muffin Monster grinder system is required on all influent pipes coming into station.
a. Location to be in an easily accessible location for maintenance.
b. An open channel grinder housed in a manhole.
c. Designed to meet proposed and future flow.

## 1.11 ***STATION LAYOUT / DRIVEWAY***

1.11.1 A buffer shall be placed around each lift station site. The buffer will extend 30 feet outside the fenced in station to make a 90' X 90' buffer. The City of Loganville, at its discretion, may require a larger buffer dependent on the proximity of structures, type of development, size of pump station, or other factors which may indicate a need for additional buffer. This buffer is required in residential subdivisions, and shall be indicated on the final plat. In addition, a permanent easement, dedicated to the City of Loganville, shall be provided to include the required fenced in area, with an additional 6-inches extending beyond the fence on all sides

1.11.2 Earth slopes around the pump station created by" fill" that are steeper than 3 to 1 must be stabilized with "rip-rap." All fill slopes shall be compacted to not less than 95 % of maximum density. A *certified letter of compaction* shall be provided to the inspector prior to final inspection.

## 1.12 ***PUMP STATION PAD***

1.12.1 A minimum 4"concrete pad (31' X 31' minimum) shall have 5% fall away from station in all directions. Concrete must extend 6" past post all the way around fence. Reinforcing steel shall be used in the slab. Asphalt is not acceptable for the pad.

## 1.13 ***DRIVEWAY***

1.13.1 An access road will require a turnaround. Access road and turnaround are to be paved 12-foot width minimum. Turn around shall be 20' off the fence 20' deep with a 15' radius to the driveway. Concrete or asphalt is acceptable, must be a minimum of 4" depth.

1.13.2 Site plan to show finished grade contour lines (2' intervals) in and around lift station and access road. Spot elevations shall be provided on station pad to show proper drainage.

1.13.3 Site plan to show all existing and proposed utilities. *All utility meters must be properly mounted outside of fenced station. If gas is required gas pipe must be buried underground*

1.13.4 Water meter shall be set at the right of way.

1.13.5 A potable water service with an acceptable double check valve backflow prevention device must be provided. *A yard hydrant with 50' of ¾" nylon reinforced garden hose with brass nozzle must be installed.*

1.13.6 Install a 120 V LED security light on 20' breakdown pole with automatic eye and pole lowering winch.

## 1.14 *PUMP STATION FENCE*

1.14.1 Fenced areas for all stations are to be a minimum 30' x 30'. Fences are to be installed using 8-foot high #4 chain link wire with top rails and bottom tension wires; 3 strands of barbed wire at the top on angled extension arms; posts in 3' of concrete spaced 10' apart; and PVC fence slats. (Color: gray) A 2' chain that can be locked with a #2 Master lock must be provided.

1.14.2 Provide a double gate with 8 foot sections on 4" diameter posts.

## 1.15 *SPARE PARTS REQUIRED*

1.15.1 Provide spare air and vacuum relief valve for force main. (If applicable),

1.15.2 For Smith & Loveless A.G.S.L., provide two extra sets of seals per model of pump, one vacuum pump, five float switches or blotter control, one motor starter, electrical breakers and fuses, alternate relays, check valves, in-line filters, 1- Pump Motor and other spare parts as required by the Utility Department.

1.15.3 For submersible pump stations, provide five float switches or one probe, one phase monitor relay, one motor starter with overload block, 1 Pump Motor and other spare parts as required.

1.15.4 Provide spare cutter cartridge for JWC Muffin Monster grinder.

## 1.16 *WETWELL/CHECK VALVE VAULT*

1.16.1 The wet well shall be sized to prevent excessive cycling of the pumps. Starts shall be limited to one start per ten minutes unless otherwise recommended by the pump manufacturer. Size shall be as recommended by the pump supplier and shall be approved by the City of Loganville, (Minimum 6-foot diameter). All check valves and discharge lines should come within 16 inches of the top elevation of wet well. Hatch doors shall be sized by the pump supplier to allow adequate clearance to easily remove the pumps. Check valve vaults for all stations shall be 6' x 6' precast concrete with (1) 48" x 48" double leaf aluminum hatch for 4" and 6" piping. Vault size shall be 8' x 8' for piping 8" and above.

1.16.2 Storage shall be provided above the high-level alarm equal to three (3) hour at design flow. Storage volume is calculated to be that volume between the high-level alarm and the lowest point of overflow (including basement elevations regardless of backflow valves in service lines). Said storage may consist of any combination of line capacity, manhole capacity, and wet well volume. No corrugated metal pipe may be utilized for storage.

1.16.3 Check valves used on submersible stations shall be Val-Matic "Swing Flex" with backflow actuator available from Charles Finch Company or Flygt sure shut swing check valve with backflow actuator.

1.16.4 All pump stations shall have separate plug valves on each discharge line of pumps and a plug valve installed on the force main. Plug valve shall be no less than 3' outside the pump station. A valve key shall be provided to the City of Loganville. After the plug valve on the force main there will need to be a Tee (same size of force main) and a plug valve with a blind flange to allow for connection of bypass pump.

1.16.5 To cover the cost of odor control problems, the developer shall pay $25 per GPM of the developments peak flow. This fee shall be paid prior to final inspection

1.16.6 All piping in the wet well and check valve vault is to be flanged pipe to flanged pipe. No Uni-flange or Mega-flange types will be allowed. Solid sleeve flex joint shall be used between the wet well and valve vault.

1.16.7 Floats and probes shall be installed at the closest accessible location.

1.16.8 Steps are to be provided and grouted in wet well and check valve vault before station is accepted by City of Loganville

1.16.9 Wet wells are to be coated with a bitumastic coating or approved equal before station is accepted by the City of Loganville.

1.16.10 On submersible type pump stations the access ladder for the check valve vault shall be an OSHA approved type ladder. Submersible stations must also be equipped with a personnel safety hatch for the wet well and valve vault. Safety hatch shall be a metal grate with safety - latch. Safety hatches can be obtained from the following manufacturers/representatives:

a. Flygt pumps are available from ITT/Flygt, Inc.
b. U.S. Foundry

1.16.11 All pump stations shall comply with NFPA 820.

1.16.12 All applicable City pump station detail drawings must be included on 22" x 34" pump station submittal.

## 1.17 ***ELECTRICAL SPECIFICATIONS***

1.17.1 Three-phase power shall be provided for all pumps. No phase converters or single-phase power allowed. The power source may be 208 voltage, 240 voltage or 480 voltage.

1.17.2 All conduit shall be galvanized rigid conduit or IMC with threaded couplings. No threadless couplings shall be allowed.

1.17.3 No conduit runs or junction boxes are to be installed inside or on top of wet well. Splicing of cables inside the wet well will not be permitted.

1.17.4 When Main fused disconnect switch or main circuit breaker shall meet the following requirements:

a. Be of a type that can be locked in the on or off position.
b. The switch shall be U.L. listed for service entrance.
c. The enclosure shall be stainless steel
d. The switch must be mounted inside the fenced area of the station.

1.17.5 Pump stations shall have factory installed six digit non-resettable elapsed time meters to show individual pump running time to the 1/10th of an hour. A similar elapsed time meter shall be included to indicate simultaneous operation of pumps to the 1/lOth of an hour.

1.17.6 All control wiring shall be stranded. No solid wire shall be allowed, except that the telemetry may be 22-gauge multi-pair telephone cable.

1.17.7 A phase monitor shall be provided in the pump control panel. The pump operation shall be inhibited when an open phase/phase reversal condition is detected. A contact of the phase monitor shall also be connected to the telemetry system for remote indication of the open phase/phase reversal condition.

1.17.8 Pump control panel enclosure shall be NEMA-4X stainless steel.

1.17.9 A surge suppressor shall be provided at the power service entrance. The surge suppressor shall have voltage characteristics to match the power service.

The surge suppressor shall be in NEMA-4X enclosure and shall provide line to line, line to neutral, line to ground and neutral to ground protection modes as applicable for the power service

The surge suppressor shall be provided with a disconnect. Minimum surge current rating shall be 1OOKA per mode, 200KA per phase per NEMA LS-I. The surge suppression system shall be duty cycle tested to survive 20KV, 10KA, IEEE C62.41 category surge current with less than 5 % degradation of clamping voltage. The surge suppressor shall have minimum surge capacity of 2500 impulses per mode and 5000 impulses per phase. Status indicating lights and form C dry alarm contacts shall be provided.

The surge suppressor shall be U.L. listed and labeled under UL1449 and UL1283. Acceptable manufacturers are:

a. Liebert
b. Current Technologies
c. United Power

## 1.18 ***GENERATOR SPECIFICATIONS***

1.18.1 The standby generator shall be rated for continuous standby service for the stations full load demand. This shall include running both pumps with staggered startups.

1.18.2 The generator shall be housed in a weatherproof enclosure. Quiet site soundproofing shall be provided to reduce noise to 68 db at a distance of 7 meters for natural gas powered generators and 70 db at a distance of 7 meters for diesel powered generators.

1.18.3 The entire standby generator set shall be warranted for a period of five years from the date of commissioning.

1.18.4 Outdoor weather-protective housing with critical grade exhaust muffler shall be installed. The housing shall have hinged side access doors and a rear control door. All doors shall be lockable. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturers standard color. Vibration isolators as recommended by the generator set manufacturer shall be provided. The generator must be mounted far enough away from obstructions to allow all doors to be opened 90°. All conduits and gas lines shall be installed underground.

1.18.5 Generator shall be supplied with all auxiliary systems necessary for operation (i.e. batteries, battery charger, block heater, etc.).

1.18.6 The standby power system shall include an automatic transfer switch. Transfer switch shall be rated for 100% of full load. Switch shall be provided with indicators for all phases of operation and be equipped with a fully programmable timer for exercising the equipment. The switch must be selectable for load or no load.

1.18.7 Generator shall be load tested at 100 % full load on site for a period of four hours using resistive load banks. Notify City of Loganville inspector prior to test, and provide certification letter from the manufacturer.

1.18.8 Three complete sets of 0 & M manuals and keys shall be provided for generator and automatic transfer switch.

1.18.9 Generator control system must include a programmable control device to allow automatic start-up and test functions. Test functions can be programmed for daily, weekly or monthly testing. Connections for remote monitoring of function and failure must be provided.

1.18.10 Pump stations are required to have continuous standby power. Generators rated 100 KW and below are to be installed to operate on natural gas. If gas is unavailable, a letter of exception must be obtained from the City of Loganville. Generators above 100 KW shall be diesel powered with 100 gallons minimum fuel storage capacity or 24-hour operating time, which ever is greater. Fuel storage shall be accomplished by the use of corrosion -resistant double wall sub-base fuel tank only, no underground storage will be allowed. A leak detection device shall be provided in the interstitial space for sensing fuel leakage. The device contact shall be connected to the generator control panel terminals for telemetry.

1.18.11 Generators can be obtained from the following manufacturers/representatives:

a. Cummins-Onan
b. Kohler
c. Caterpillar

Generator manufacturer will provide a 60-month comprehensive warranty to include parts and labor.

1.18.12 Transfer switches shall be in NEMA-4 enclosure obtained from the following manufacturers/representatives:

a. Cummins-Onan
b. ASCO

1.18.13 The transfer switches shall be configured to switch back when power is restored to the station.

1.18.14 A generator ground grid must be provided.

1.18.15 Pump station emergency bypass shall be installed on force main and constructed of ductile iron. Above ground piping and valve shall be painted with epoxy. Two valves shall be installed, one on each side of the emergency bypass connection to allow isolation on the force main.

## 1.19 ***TELEMETRY EQUIPMENT***

1.19.1 Every lift station must be equipped with a telemetry system. The telemetry equipment shall be provided and installed by the developer in complete working order. The telemetry system will include a horn and light alarm.

1.19.2 The telemetry system shall be provided by Missions Controls (678) 969-0021 a Missions SCADA Model 110 RTU with power and conditioner with computer communications or a Missions SCADA - Model 800 RTU. The style of unit will be determined by the City of Loganville Department of Utilities. The contractor will cover the cost of all monitoring fees for first year of service. The contractor will provide the startup at no cost to the City of Loganville. The approval of the SCADA System Model will be determined by the City of Loganville

a. Contact the City of Loganville, *(Utilities Department @ 770-466-1306)* for detailed information or Missions Controls 678-969-0021.

b. Mount the telemetry transmitter inside of the control panel for submersible pumps. A NEMA 4X panel is required for above ground pumps.

c. Provide a grounded 120 V.A.C. outlet for the transmitter. Straight wiring is not acceptable.

d. For Smith and Loveless pump stations provide one 10 pair 22-gauge multi-conductor cable from pump control panel to Missions transmitter. For submersible stations provide a 10 pair terminal strip inside enclosure. The monitored conditions shall include high level, pump 1 run time, pump 2 runtime, generator fail, phase loss, generator on, generator alarm, pumps fail. Provide one 5 pair multi-conductor cable from generator set, through the transfer switch to verbatim transmitter, for generator status and monitoring.

d. Make all connections at the transmitter

g. Must install gate entry alarm to connect to the Mission SCADA Unit (Contact the City of Loganville, Utility Department @ 770-*466-1306)* for detailed information.

## 1.20 ***FORCE MAINS***

1.20.1 Force mains will not be approved to flow downhill into the receiving manhole. After the proposed force main passes over the last high point along its route a new gravity sewer line must be installed to convey the flow downhill to the existing sewer system. Exceptions to this requirement may be granted on a case by case basis if in the opinion of City of Loganville. there is no benefit to the city for having gravity sewer in the particular location involved.

1.20.2 Provide spare air and vacuum relief valve for force main.

1.20.3 Within the proposed development, the force main shall be located in a 20' utility easement immediately outside the proposed right-of-way.

1.20.4 The top quarter of the force main pipe shall be painted green.

1.20.5 Requirements:

a. Minimum size for force mains shall be 4-inch diameter.

b. Force main shall have 5 feet of cover unless authorized by the inspector, based on field conditions.

c. D.I.P. (Ductile Iron Pipe) shall be utilized on all force mains. Pipe class shall be such that the "manufacturers allowable working pressure" is either a minimum of twice the design working pressure, or one and one half times {the design surge pressure, whichever is the greater.

d. Pressure-Testing: force mains shall be subjected to a test pressure equal to 150 percent of the total dynamic head for a minimum of two hours. The test shall be performed using potable water. No leakage will be allowed. The entire test must be witnessed and approved by the City of Loganville Utilities Department. The test will be performed from the check valve vault to the dump manhole.

To schedule a test the contractor shall notify the City of Loganville Utilities Department at 770-466-1306 a minimum of 48 hours in advance. The inspector shall determine the test pressure and gauge location. He will then schedule the test with the Department of Utilities Pump Station Inspector. The contractor shall remove, valve off, or otherwise protect any equipment that might be damaged by the pressures used in the test. All piping shall be securely anchored prior to the test. Pipe laid in trenches shall be backfilled. Joints, fittings, and valves may be left exposed to be examined during the test.

Before applying the test pressure, all air shall be expelled from the pipe. If air release valves are not available at high points, the contractor shall make necessary taps using an approved saddle and insert plugs after the test has been complete. The approval of the force main by the inspector shall become a part of the overall lift station/force main system approval. Prior approval must be obtained from the City of Loganville before tapping.

The contractor shall bear the complete cost of the test including temporary plugging and blocking and the repair of all leaks.

e. Air Release Valves: Force Mains shall have an air release valve at each point as required by the City of Loganville.

f. On force mains exceeding 1500 feet, plug valves may be required to facilitate future repairs.

g. All valves shall be full port eccentric plug valves.

## 1.22 ***START-UP/ACCEPTANCE***

1.22.1 A force main test must be complete and accepted by City of Loganville Utilities Department Personnel prior to scheduling a startup. To schedule a startup call 770-466-1306 for the Department of Utilities Director. A minimum 48-hour notice must be given.

1.22.2 All utilities must be working. (i.e.: water, electric, telephone and gas if applicable). No station will be accepted without a phone line (SCADA System) or water line hookup.

1.22.3 Personnel on site: General Contractor or Developer, Electrical Contractor, Pump Manufacturer and City of Loganville Department of Utilities Personnel.

1.22.4 Submersible pumps must be pulled at the time of start-up.

1.22.5 Generator must run both pumps simultaneously.

1.22.6 A start-up letter is required from the pump manufacturer.

1.22.7 All spare parts should be brought to the start-up as well as 0 & M Manuals for pumps and generator. Keys for the generator should be left in the transfer switch.

1.22.8 All utility information should be brought to start-up. This includes account numbers and phone numbers. Any letters or tests performed which require written documentation should also be available. (i.e.: letter of compaction. 4-Hour load bank test on generator, etc.).

1.22.9 The City of Loganville may "sign-off' on the final subdivision plat without the pump station being complete under the following conditions:

a. The developer has made reasonable and diligent effort to design, order, and complete the station.

b. A hold shall be placed upon certificates of occupancy and/or building permits.

c. The developer must present a "cash" bond equal to the value of the incomplete work or twice the value of the incomplete work as determined by the City of Loganville.

** Sanitary sewer pump station subittals must include this form with ALL indicated information provided. Design formulas, design minimums, and given variables are shown below or on reverse, and are to be utilized in providing required data. In addition to below, designer must subit all design information from manufacturer supporting the proposed pumps and electrical requirements.

**Name of Project:** _____

**Name of Developer:** _____

**Name of Engineer:** _____

**Location:** _____ **L.L.:** _____ **Dist.:** _____

**********

## FLOW INFORMATION

Proposed Flow from Dev.: 400 GPD [ single family residences ] X _____ = _____
No. of lots GPD

Design Flow Average: _____ / 1,440 [minutes per day ] = _____
GPD GPM (A)

Design Flow Peak: _____ X 2.5 [ peaking factor ] = _____
GPM (A) GPM (P)

**Force Main Size:** _____ **inch** **Force Main Velocity:** _____ **(fps)**

**Pump Rate:** _____ **GPM**

**NOTE: Main size, velocity and pump rate from chart on reverse.**
**Must maintain recommended minimum 2.5-feet/sec. scour velocity.**

## TOTAL DYNAMIC HEAD INFORMATION

Static Discharge Head: _____ (-) _____ = _____ (ft)
High-point Elev. Center-line Pump Elev. SDH

Static Suction Head: _____ (-) _____ = _____ (ft)
Center-line Pump Elev. Pump-Off Elev. SSH

Station Loss: _____ (ft)
SL From Manuf.

Fittings Loss: _____ (ft) (+) _____ (ft) = _____ (ft)
Type Fitting Type Fitting FL [Equiv. Length of Straight Pipe]
(Equiv. from Chart) (Equiv. from Chart)

Force Main Loss: _____ (ft) (+) _____ (ft) X _____ (ft) X _____ /100= _____
Length FL C-Value Mult. Fric. Loss FML
(From Chart) (From Chart)

Total Dynamic
Head: _____ (+) _____ (+) _____ (+) _____ = _____
SDH SSH SL FML TDH

# DESIGN CALCULATIONS

NOTES:

A PRECONSTRUCTION CONFERENCE MUST BE HELD WITH THE CITY OF LOGANVILLE DEPARTMENT OF WATER QUILITY CONTROL AND THE CONTRACTOR OF RECORD BEFORE ANY WORK MAY BEGIN. .

DESIGN CRITERIA:
FLOW PER SINGLE FAMILY RESIDENCE-200 GPO FOR ONE (1) BEDROOM APT.
-300 GPO FOT TWO (2) BEDROOM APTS.
-400 GPO FOR OTHER RESIDENTIAL

PEAK FACTOR = 2.5
DESIGN FLOWS _____ AVERAGE _____ PEAK
STATIC HEAD _____ FT
PUMP DESIGN TDH _____ GPM @ _____FT

FORCE MAIN DIAMETER _____
FORCE MAIN VELOCITY (2.5 F.P.S. MIN.) _____
HIGH ALARM ELEVATION _____
LOWEST OVERFLOW ELEVATION _____
STORAGE VOLUME _____
STORAGE TIME AT DESIGN FLOW _____

PUMPS:
MANUFACTURER _____
MODEL _____
_____ DIA. IMPELLER
_____ DIA. SUCTION
_____ DIA. DISCHARGE
_____ H.P.
_____ V, _____, _____ WIRE, _____ CYCLE
WETWELL VOLUME: _____ GAL.
PUMP CYCLE TIME: _____ AT MINIMUM ADF
_____ AT MINIMUM PEAK FLOW

GENERATOR:
MANUFACTURER _____
MODEL _____
RATING _____ KW _____ V _____ FUEL

**CITY OF LOGANVILLE UTILITIES DEPARTMENT**

THE TELEMETRY SYSTEM SHALL BE A "MISSIONS MODEL 110 RTU OR MODEL 800 RTU WITH POWER CONTROL. MISSIONS STARTUP SHALL BE PROVIDED TO THE CITY OF LOGANVILLE AT NO COST TO THE CITY.

A. CONTACT UTILITIES DEPARTMENT (PUMP STATION MAINTENANCE 770-466-1306) FOR DETAILED INFORMATION.

B. FOR SUBMERSIBLE PUMP STATIONS:

THE TELEMETRY TRANSMITTER SHALL BE PROVIDED INSIDE THE PUMP CONTROL PANEL SUPPLIED BY PUMP MANUFACTURER. THE 120V POWER AND THE ALARM/STATUS CONTACTS INSIDE THE PUMP CONTROL PANEL SHALL BE FACTORY WIRED TO THE TELEMETRY TRANSMITTER.

C. FOR ABOVE GROUND PUMP STATIONS:

THE TELEMETRY TRANSMITTER SHALL BE PROVIDED IN A NEMA-4X .PANEL.

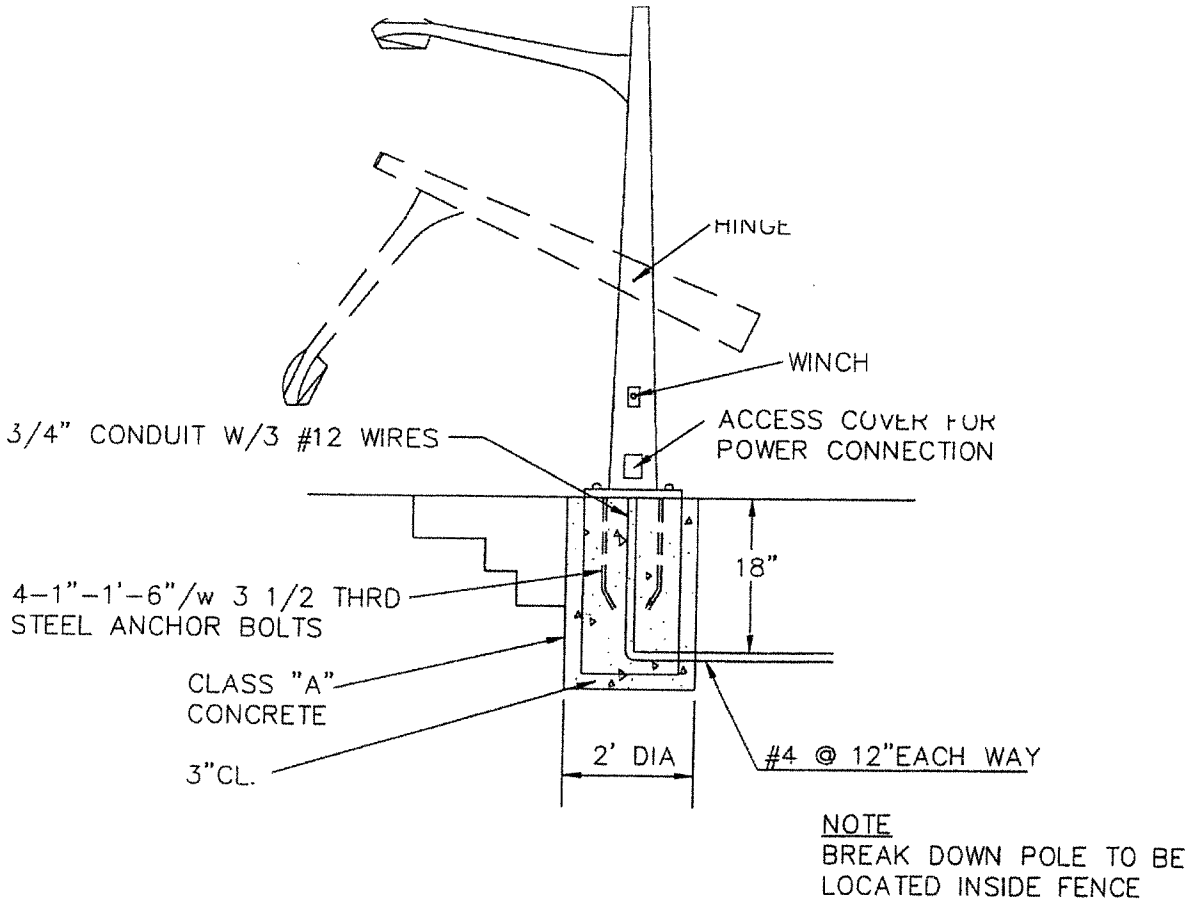
D. PROVIDE ONE 5 PAIR, 22 GAUGE MULTI-CONDUCTOR CABLE FROM TELEMETRY TRANSMITTER TO GENERATOR.

E. PROVIDE ONE 10 PAIR, 22 GAUGE MULTI-CONDUCTOR CABLE FROM ABOVE GROUND PUMP CONTROL PANEL TO THE TELEMETRY TRANSMITTER.

F. MAKE NO CONNECTIONS OF FIELD WIRING AT THE TRANSMITTER. TERMINAL CONNECTIONS WILL BE PERFORMED BY CITY OF LOGANVILLE PERSONNEL.

G. CALL THE MISSIONS CONTROL OFFICE NUMBER, 678-969-0021, AND ASK FOR INSTALLATION OF THE SCADA SYSTEM AT THE LIFT STATION ADDRESS WHICH HAS BEEN APPROVED BY THE CITY OF LOGANVILLE WATER QUALITY CONTROL DEAPRTMENT. THE INITIAL CHARGES FOR INSTALLATION AND FIRST YEAR MONITIORING FEES SHALL BE BILLED TO THE DEVELOPER.

## LED SECURITY LIGHT ON 20' BREAK DOWN POLE




NOTE

EXTERIOR HINGED LIGHT POLE WITH 150 WATT LED, 120 VOLT BALLAST, PHOTOELECTRIC CONTROL, WITH HEAT AND IMPACT RESISTANT LENS. POLE IS TO BE ARCHITECTURAL BROWN AND IS TO BE SUPPLIED WITH LOWERING WINCH.

| | |
|---|---|
| BRACKET | GE PART # RBSU2H6PP |
| POLE | GE PART # ASHTS202T-5.3-11PP |

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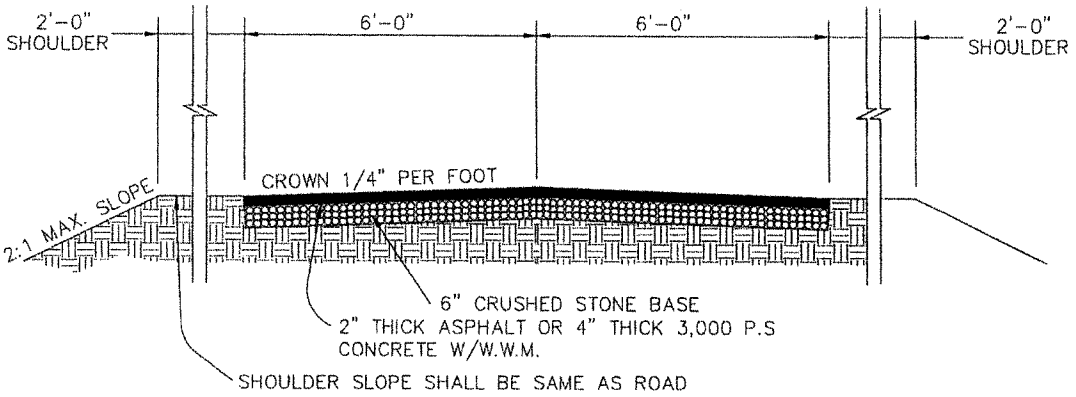
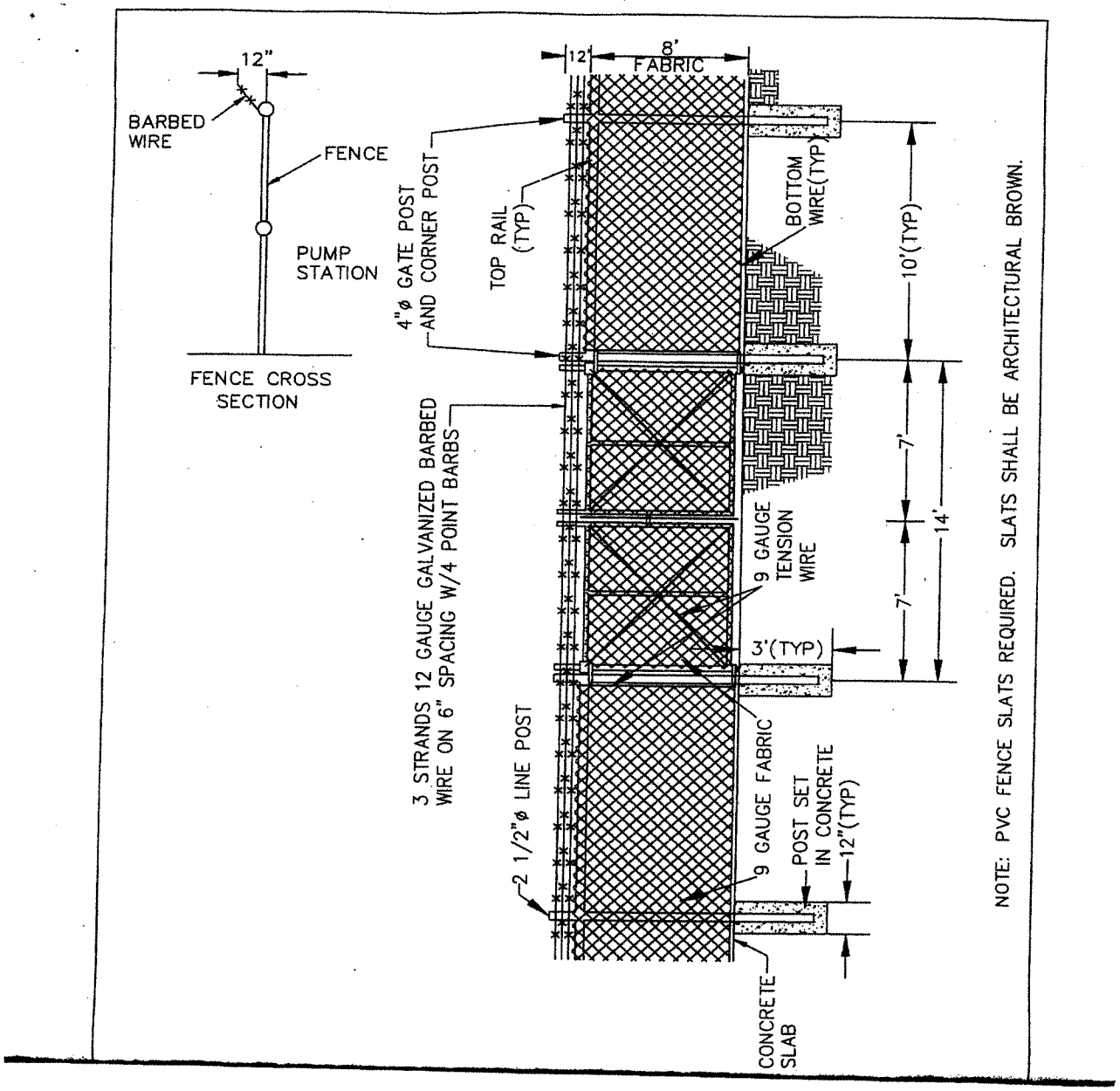



NOTES

ENGINEER SHALL SUBMIT COPY OF PLAN AND PROFILE OF ACCESS ROAD FROM PUMP STATION SITE TO EXISTING ROAD OR STREET. SLOPE OF ACCESS ROAD SHALL COMPLY WITH COUNTY REGULATIONS.


12"
BARBED WIRE
FENCE
PUMP STATION
FENCE CROSS SECTION
12"
8' FABRIC
4"ø GATE POST AND CORNER POST
TOP RAIL (TYP)
BOTTOM WIRE(TYP)
10'(TYP)
7'
7'
14'
3 STRANDS 12 GAUGE GALVANIZED BARBED WIRE ON 6" SPACING W/4 POINT BARBS
9 GAUGE TENSION WIRE
3'(TYP)
2 1/2"ø LINE POST
9 GAUGE FABRIC
POST SET IN CONCRETE 12"(TYP)
CONCRETE SLAB
NOTE: PVC FENCE SLATS REQUIRED. SLATS SHALL BE ARCHITECTURAL BROWN.