

(Revision Date November 28, 2007)

STANDARD SPECIFICATIONS FOR  
CONSTRUCTING UTILITY FACILITIES

DIVISION II - DESIGN CRITERIA

A. PURPOSE

The purpose of these guidelines is to establish technical and design specifications for the Utilities Board of the City of Daphne and other entities proposing sanitary sewer facilities and/or water distribution facilities and/or gas facilities within the City of Daphne, its planning jurisdiction, or Utilities Board of the City of Daphne service area. The required criteria have been established to assist with ensuring quality construction for all sanitary sewer, water distribution, and gas facilities within the City of Daphne and its planning jurisdiction and uniformity for facilities accepted for maintenance by the Utilities Board of the City of Daphne. Any deviation from the criteria contained herein shall be evaluated by the Utilities Board of the City of Daphne for approval based on compliance with approved operation and maintenance requirements. Plans and specifications shall be prepared and certified by a professional engineer registered in the State of Alabama.

To assure maintainability and minimize inventory costs, certain equipment manufacturers are included on the Utilities Board of the City of Daphne approved equipment and materials list. Lift stations and booster pump station equipment, as well as all appurtenant materials for the construction of new sewer, water distribution facilities and gas facilities shall be new and unused.

If requested by the entity constructing the sewer facilities and/or water distribution facilities and/or gas facilities, the Utilities Board of the City of Daphne will take ownership and maintain sanitary sewer and/or water distribution facilities and/or gas facilities provided the following conditions are satisfied:

1. Preliminary acceptance of the facilities is granted by the Utilities Board of the City of Daphne after construction is completed. Preliminary acceptance will be evaluated on compliance with the guidelines and standards set forth in this document. Also, all necessary easements for utility mains and land for pumping stations/gas regulating stations have been properly executed and recorded. The plans shall be further defined as a record drawing set of plans detailing actual construction items including references for laterals, valves and other appurtenances. Also, plans shall be submitted in digital format. Format shall be in accordance with the Utilities Board of the City of Daphne's current standard. The current digital format is 24"x36" TIFF only. Utilities, roads, subdivision layout, text, and miscellaneous items shall be grouped on individual layers/levels on the digital drawings. Coordinate system shall be NAD 1983 Alabama West (Feet) Zone State Plane in US survey monuments and lot corners in text format. Text documentation that lists all files being submitted and describes the data in each file including a schedule of layers or levels in the drawing(s) shall also be provided. In addition, a statement allowing the Utilities Board of the City of Daphne or others working on their behalf the right to use the data as necessary for GIS purposes and to conduct Utility business shall be provided. However, it is the Contractor's responsibility to confirm with the Utilities Board of the City of Daphne that at the time of submitting the record drawings, the above mentioned format is the acceptable current Board standard for digital drawings.

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2. Final acceptance of facilities submitted to the Utilities Board of the City of Daphne for ownership and maintenance by the Utilities Board of the City of Daphne shall be granted after a two year period provided the system is properly operated and maintained by the entity responsible for constructing the system and the system is determined to continue to meet the Utilities Board of the City of Daphne standards after the two-year period. Some materials require a longer warranty period that will be extended beyond the two (2) years. Any defects discovered during those warranty periods shall be replaced in-kind at no expense to the Owner.
3. Sewer facilities, water facilities or gas facilities constructed, maintained and operated by entities other than the Utilities Board of the City of Daphne shall provide an annual performance bond or letter of credit to the Utilities Board of the City of Daphne by December 31 of each year if one is not being provided to the City of Daphne for the utility work. The bond amount shall be set by the Utilities Board each year based on the Utilities Board of the City of Daphne's estimated replacement value of the sanitary sewer and/or water distribution facilities and/or gas facilities owned and maintained by others for the purpose of ensuring that sewer and/or water service interruptions, sanitary sewer overflows, and the adverse affects from these conditions for any reason are promptly remedied at the cost of the entity and for no cost to the customers or the Utilities Board of the City of Daphne.
4. Sanitary sewer system collection lines shall discharge directly into a treatment facility with a current NPDES permit and available capacity as verified in writing from ADEM. Temporary or permanent discharging of sanitary sewer into holding tanks or facilities for intermittent transporting to treatment facilities shall not be allowed within the City of Daphne or its planning jurisdiction.
5. Sanitary sewers shall be separated a minimum of 5 feet clear horizontal distance from any existing or proposed water main. Where sanitary sewers are required to cross water mains a minimum of 18 inches vertical distances between the outside of the mains shall be obtained. Sewer mains at water main crossings shall be constructed with ductile iron pipe with joints at least 9 feet from the crossing centerline. If these conditions cannot be obtained, additional design considerations approved by the Utilities Board of the City of Daphne shall be incorporated to protect both lines and prevent cross contamination.
6. An approved air release valve unit shall be installed at all applicable areas along a force main and in accordance with the installed air release valve manufacturer's recommendations.
7. Sanitary sewer collection systems for multi-customers shall be gravity systems in accordance with the standard specification parameters. Low pressure (multiple grinder pumps) systems shall not be acceptable within the City of Daphne, its planning jurisdiction, and the Utilities Board of the City of Daphne service area unless otherwise approved by The Utilities Board of the City of Daphne. Considerations will be given to areas where access for proper maintenance to sewer mains is impractical and cost prohibitive as determined by The Utilities Board of the City of Daphne.

When approved as an acceptable system in lieu of a gravity system, low pressure systems shall be constructed to provide flow conditions that will minimize the development of corrosive and odor conditions from H<sub>2</sub>S and to prevent the development of sewage BOD<sub>5</sub> concentrations greater than 350 mg/l.

8. Force main systems shall include clean out provisions for performing maintenance cleaning of the force main system. The distance between cleanout accesses shall not exceed one mile. Access cleanouts shall allow for inserting and retrieval of approving maintenance “pigs” without excavating or “breaking into” the force main. Access cleanouts configuration and materials shall be approved by the Utilities Board of the City of Daphne General Manager.
9. All gravity sanitary sewer laterals shall have an approved cleanout with backflow prevention measures.
10. All new sanitary sewer and/or water distribution and/or gas facilities shall be constructed in accordance with the Utilities Board of the City of Daphne standard specifications, the Alabama Department of Environmental Management (ADEM) standards and design criteria for water and sanitary sewer facilities, Ten States Standards, Environmental Protection Agency (EPA) Capacity Management, Operations and Maintenance (CMOM) provisions, and U.S. Department of Transportation, Transportation of Natural and Other Gas by Pipelines, Minimum Safety Standards. When conflicts between these standards occur, the more stringent of the requirements as determined by the Utilities Board of the City of Daphne shall be required. Several of the standards required by the Utilities Board of the City of Daphne are in accordance with the Recommended Standards for Water Works “Ten States Standard”.
11. The material preference used in easements and under concrete pavement in dedicated right of ways is ductile iron. However, the Utilities Board of the City of Daphne will consider other material selections that meet their standards based on specific field conditions.
12. For new developments, lateral locations shall be stamped in the curb with either an ‘S’ or ‘W’ as appropriate for the respective utility lateral. Also, as a general guidance in new development, the sewer lateral shall be located at one of the side lot lines of the parcel within the right of way and the water service line shall be located at the opposite side lot line in the right of way. The utility service location at the proposed side setback shall alternate per each parcel.

B. SANITARY SEWER SYSTEM DESIGN CRITERIA

<u>DESIGN PARAMETER</u>	<u>DESIGN VALUE</u>
1. MINIMUM VELOCITY (ft/sec) IN GRAVITY LINES	2.1
2. DESIGN ROUGHNESS COEFFICIENT (Manning’s n/Hazen-Williams C)	0.013/130
3. FLOW DEVELOPMENT	
a. Single family dwelling (GPCD)	125
4. MINIMUM PEAK HOURLY FLOW FACTOR	2.5
5. MINIMUM SLOPE (%)	
a. 8" Sanitary Sewer Gravity Main	0.40

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b.	10" Sanitary Sewer Gravity Main	0.28
c.	12" Sanitary Sewer Gravity Main	0.22
d.	16" Sanitary Sewer Gravity Main	0.13
e.	18" Sanitary Sewer Gravity Main	0.12
f.	20" Sanitary Sewer Gravity Main	0.09
g.	24" Sanitary Sewer Gravity Main	0.08
h.	30" Sanitary Sewer Gravity Main	0.07
6.	MINIMUM DEPTH (inches from top of pipe to ground surface)	36

DESIGN PARAMETER DESIGN VALUE

7. FORCE MAIN

a.	Pipe material of construction (Ductile Iron or PVC)	
b.	Minimum depth of cover (inches)	36
c.	Velocity range (FPS)	3.5 - 5.5

8. PUMPS

a.	Maximum pumping rate (GPM)	Peak Hourly Flow
b.	Minimum number of pumps per station	2
c.	Pump type	Self Priming or Submersible

9. WET-WELL

a.	Maximum detention time between pump run cycles (minutes)	15
b.	Maximum detention time at peak flow (hours)	2
c.	Minimum diameter (feet)	8
d.	Grinder pump station minimum storage capacity (hours)	24
e.	Grinder pump station wet well minimum diameter (feet)	6

10. SITE

a.	Fence (chain link or wood)	---
b.	Roadway (paved, single lane, 12% maximum grade)	---
c.	Maximum landscaped slope (%)	20
d.	Design flood event	100 years

11. BUILDING

a.	Minimum height (feet)	8
b.	Minimum unobstructed floor space (feet)	4
c.	Ventilation requirements (air changes/hour):	
	(1) Continuous duty	12
	(2) Intermittent	30
d.	Water service line (inches)	3/4
e.	Interior lighting (48", 4 bulb, 40W fixtures/100SF) (each)	2
f.	Interior electrical receptacles (each):	
	(1) 110 volt	4
	(2) 220 volt	2

12. ELECTRICAL

- |    |                         |         |
|----|-------------------------|---------|
| a. | Incoming service:       |         |
|    | (1) Voltage (volts)     | 460/230 |
|    | (2) Phase               | 3       |
| b. | Control voltage (volts) | 120     |

ADDITIONAL SANITARY SEWER REQUIREMENTS:

1. Gravity sanitary sewer collection mains shall be a minimum of eight (8) inches in diameter.
2. Where velocities will exceed 15 fps, special provisions shall be made to protect against displacement by erosion and impact.
3. Sanitary sewers shall be laid with uniform slope between manholes.
4. Sanitary sewers placed on 20 percent slopes or greater shall be anchored securely with an approved method and spacing.
5. Curvilinear alignment of sanitary sewers shall not be utilized in construction.
6. Manholes shall be installed at a maximum of every 400 feet. Manholes shall also be installed at: a) all changes in grade, size, or alignment; b) all intersections; and c) the end of each line.
7. Manholes shall be a minimum of 48 inches in diameter with minimum access diameter of 22 inches.
8. An approved drop connection shall be installed at each manhole where the sanitary sewer pipe is 24 inches or more above the manhole invert.
9. Sanitary sewage system components and piping configurations shall comply with the Utilities Board of the City of Daphne Standard Details for sewer systems.
10. New sewage pumping stations shall be equipped with either emergency standby power generator or bypass pumps as determined by the Utilities Board of the City of Daphne, Alabama for each site. If the lift station pump motor is 5 HP or less and the station has a minimum of 12 hours of storage at average design flows, the Developer/Owner may submit for consideration a request to Daphne Utilities for waiver of the generator requirement. The review will be on an individual bases and consider such factors as located in an environmentally sensitivity area or difficult to access as determined solely by the Utilities Board of the City of Daphne.
11. Supervisory control and data acquisition (SCADA) systems in accordance with the SCADA system currently in use by the Utilities Board of the City of Daphne sewer system for monitoring operating conditions of the pump station from remote sites shall be installed at new sewage pumping stations.

C. WATER SYSTEM DESIGN CRITERIA

1. Pressure

All water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of 20 psi (140 kPa) at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system should be approximately 60 to 120 psi and not less than 35 psi.

2. Diameter

The minimum size of water main for providing fire protection and serving fire hydrants shall be eight-inch diameter. Larger size mains will be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure of 20 psi.

3. Fire protection

When fire protection is to be provided, system design should be such that fire flows and facilities are in accordance with the requirements of the State Insurance Services Office.

4. Small mains for domestic service

The minimum size of water main in the distribution system where fire protection is not to be provided should be a minimum of three (3) inch in diameter. Any departure from minimum requirements shall be justified by hydraulic analysis and future water use, and can be considered only in special circumstances.

5. Hydrants

Water mains not designed to carry fire-flows shall not have fire hydrants connected to them.

All fire hydrants shall have isolation valves.

6. Dead Ends

- a. In order to provide increased reliability of service and reduce head loss, dead ends shall not be permitted except for new construction of a single street with a cul-de-sac. All new subdivisions shall be looped feed to provide adequate fire protection.
- b. Where dead-end mains occur, they shall be provided with a fire hydrant if flow and pressure are sufficient, or with an approved flushing hydrant or blow-off for flushing purposes. Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. No flushing device shall be directly connected to any sewer.

7. New water pumping stations shall be equipped with either emergency standby power generator or bypass pumps as determined by the Utilities Board of the City of Daphne, Alabama for each site. Supervisory control and data acquisition (SCADA) systems in accordance with the SCADA systems currently in use by the Utilities Board of the City of Daphne water system for monitoring operating conditions of the pump station from remote sites shall be installed at new water pumping stations.

D. GAS SYSTEM DESIGN CRITERIA

1. All gas main work shall conform to the applicable requirements of the U.S. Department of Transportation, Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, most recent edition. Any Contractor employee who will perform gas work shall meet the "Qualifications of Pipeline Personnel - Subpart N". Contractor's employees who fuse plastic pipe shall be certified in fusion approved by Alabama Public Service Commission Office of Pipeline Safety. Contractor's employees who connect to hot gas mains or install live taps shall be qualified in that covered task per Utilities Board of the City of Daphne Operator Qualification Program. (Ref: Energyworld.net, Computer based training and hands on training.) Documentation of compliance of these requirements shall be provided to The Utilities Board of the City of Daphne.
2. A construction form to the Public Service Commission Office of Pipeline Safety shall be submitted by the Contractor prior to beginning construction with a copy to The Utilities Board of the City of Daphne.
3. Bushings shall not be permitted on any gas piping.
4. Valves shall be required on every appliance, including fireplaces with a built in valve. A log lighter valve should be added a minimum of two (2) feet from the unit for external accessibility. If this is not feasible because of the location of the fireplace the valve can be placed in the attic.
5. A pressure test of new and old fuel lines shall be inspected by the City of Daphne Building Inspection Department or authorized agent of the City. Twenty (20) pounds of pressure shall be maintained for a minimum of one (1) hour limit. The inspection authority shall be given proper notice, as detailed herein, of a request for inspection.
6. A regulator shall be installed at each appliance which is located on a pound fuel line system.
7. Shrubs or trees shall not be within two (2) feet of a gas meter.
8. No gas meter shall be installed inside a fenced area with a locked gate at any time.
9. Per Part 192 Minimum Federal Pipeline Safety Standards, if the meter service valve is in the off position, it shall be locked off until it is to be turned on and used following proper inspections.
10. If any appliance or fuel line component is found to be unsafe, the appliance shall be red tagged and the customer shall be given a time frame to have it repaired. If the appliance or fuel line component cannot be isolated, the meter shall be locked off until such repair is made.
11. If a system has a natural gas leak or a carbon monoxide reading of 35 PPM or greater, the system shall be locked off until repaired.
12. If the City Building Inspection Department or authorized agent of the City determines that any part of the venting system is not within code, the system shall be locked off until repaired/corrected.
13. If a leak is found on the customer's fuel line system and if the component cannot be isolated, the meter shall be locked off until repaired and a pressure test is passed.

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Refer to item numbers five and eleven for further explanation.

14. If at any time a customer's fuel line system is locked off due to a leak or changes to the customer's fuel line system, it must be repaired to meet the current gas code adopted by the City of Daphne and the standards as set forth herein and as established by the Daphne Utilities Gas Department.
15. A minimum of one (1) inch diameter galvanized or black iron fuel piping shall be installed from the connection with the meter through the wall of the structure up to the attic. After the fuel piping enters the attic and is no longer within the wall of the structure, the diameter of the fuel piping may be reduced. At this reduction point, the piping shall be at an accessible location.
16. For island stove installations, a four (4) inch casing shall be required to be installed in the slab from the wall to the stove island. There shall be no joints in the fuel piping from the attic to the stove island. Also, a valve shall be installed above the floor under the stove island unit.
17. For commercial buildings, exposed external fuel piping on external walls shall be painted yellow and secured.
18. A flex hose, copper, or corrugated stainless steel flex tubing with yellow coated polymer jacket may be used from the log lighter valve to the fireplace.
19. Daphne Utilities shall only be responsible for setting the meter. The Customer's representative (i.e., plumber) shall be responsible for connecting the meter to the establishment.
20. Prior to the meter being installed, the customer or customer's representative shall provide the total BTU input to the system, type of fuel system desired, and proposed gas appliances. Daphne Utilities has an "Inspection Load" Form to assist with providing the needed information.
21. The customer's representation shall clearly indicate with taping on the fuel system piping located on the outside of the structure near the proposed meter installation as to the type of fuel system desired. Blue tape shall denote an ounce fueling system and red tape shall denote a pound fueling system.
22. All piping installed for future supply pipe shall be connected to the supply line and pressure tested at the time of installation. Also, the future connection location shall be valved and capped.
23. All gas inspections shall be scheduled with City of Daphne Building Inspection Department or authorized agent a minimum of twenty-four (24) hours prior to the requested inspection date. It shall be the customer's or the customer's appointed representative (i.e. plumber) responsibility to schedule such inspections at the appropriate time during construction.
24. Rough piping inspections shall be scheduled and performed after all piping has been installed and before any such piping has been covered or concealed or any fixtures or gas appliances have been connected. This inspection shall also include a pressure test as detailed in Section I, above.
25. Final inspections shall be scheduled and performed at time of requested turn in for service.

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26. I pressure test, piping, and installation are not inspected and approve by the Building Inspection Department or authorized agent, service shall not be turned on to the facility.

**END OF SECTION**