

NORTH BALDWIN UTILITIES

SPECIFICATIONS FOR UTILITY
INFRASTRUCTURE

General Material Requirements and
Performance Protocols

Version: September 17, 2018

WATER FACILITIES

Pipelines

1. Minimum line size six (6) inch unless specifically approved otherwise.
2. Pipe shall be Cement-lined Ductile Iron (Cl. 51) or PVC (Cl. 200 SDR 21 – White or Blue).
3. Where specifically approved for directional drill installation, pipe shall be HDPE (DR 11 with Blue marker stripe).
4. Minimum of eighteen (18) LF of restrained pipe shall extend in each direction from all valves, fittings, and specials. All fire hydrant leads shall be six inch (6”) restrained MJDIP from main line fitting to hydrant.
5. All water line to be installed by direct bury under an existing or proposed traveled way and/or vehicle parking area shall require enhanced trench backfill methods acceptable to NBU or be constructed using Ductile Iron Pipe to points at least ten (10) feet beyond the limits of the traveled way/parking area.
6. Pipeline shall have no visible leaks or deficiencies.
7. All pipeline shall include a high-strength copper clad steel locator wire with reinforced protective exterior coating (12 ga., Solid, Blue Color, Brass Split Bolt Connectors) installed centered on and affixed to the crown of the pipeline. Wire shall be Copperhead HS-CCS with 30 mil HDPE insulation or approved equal and shall extend to grade within all valve boxes with minimum 12” slack. Split bolt connectors and bare wire ends at all connections and splices shall be acceptably coated to prohibit corrosion.
8. Should the interval between pipeline division valves be greater than 1000 feet, pipeline shall have installed at intervals not greater than 1000 feet a

magnetized locator wire termination box with cast iron cover, Blue in color, and brass wire lugs with locator wire securely attached. Box shall be installed at final surface grade and include concrete marker and retaining collar as for Valves. Box shall be Copperhead "SnakePit" Lite Duty or approved equal.

9. Pipeline Disinfection Requirements

Before bacteriological testing as called for herein, all new water piping and appurtenances shall be disinfected in accordance with the requirements of AWWA C651, except as otherwise specified herein.

The acceptable method of disinfection shall utilize chlorine as the active agent. The free chlorine in aqueous solution shall have sustained concentration of not less than fifty (50) parts per million. The chlorine may be derived from either of the following procedures, subject to NBU approval:

Liquid Chlorine gas and water mixture
Calcium Hypochlorite and water mixture

Under special circumstances NBU may approve the derivation of the chlorine agent via the manual dosing of each pipe section (maximum section length of 20 feet) with dry Calcium Hypochlorite at the time of installation. Written application shall be made to NBU for such approval. The total quantity of calcium hypochlorite dosed shall be that required to yield a chlorine residual of at least 25 ppm throughout and at all extremities of the pipe line being disinfected when the pipeline has been filled with water. The application shall establish the protocol for maintaining and assuring pipeline cleanliness throughout the construction process. Should such approval be granted, the requirements of Paragraph 7.a. below shall be waived.

All costs associated with the disinfection of the pipeline and appurtenances shall be borne by the Contractor.

a. Preliminary Flushing

Prior to chlorination, all dirt, foreign matter, and/or debris that may be in the pipeline shall be removed by a thorough flushing. Flushing may be accomplished through the fire hydrants, or by other approved means. Flushing may be accomplished either prior to or after completion of the pressure test. Each pipe section shall be flushed with a rate of flow through the pipe to create a minimum velocity of 2.5 feet per sec.

Flushing water shall be potable water from a source approved by the Engineer. Should the existing water system of NBU be selected as the flushing water source, to the extent reasonable, NBU shall not charge the Contractor for the water to accomplish a single flushing of the new pipe.

Contractor shall be responsible for all costs to accomplish the successful flushing of the pipe (to include temporary piping, pumping, hauling, disposal, water costs for re-flushing, etc.).

b. Disinfection

Disinfection using chlorine as the active agent is the required method. Derivation of the chlorine agent shall be as set forth above.

If the active agent is derived from liquid chlorine gas or calcium hypochlorite in aqueous solution, the mixture shall be injected or pumped into the pipe following protocols herein specified. If NBU approval is secured for manual dosing of each pipe section using dry calcium hypochlorite, such dosing shall be accomplished at the time of pipe installation.

The Contractor shall provide acceptable apparatus and personnel to field-determine chlorine levels within the pipeline being treated at concentrations as called for herein.

The Contractor is responsible for provision of an approvable source of potable water for disinfection and shall bear all costs related thereto.

c. Point of Application

The required point of application of the aqueous solution chlorinating agent shall be at the beginning of the pipe to be disinfected through a corporation stop inserted in the horizontal axis of the pipe. The water injector for delivering the disinfecting solution into the pipe shall be supplied from a potable water source approved by the Engineer.

d. Rate of Application

If using an aqueous solution chlorinating agent, water from the existing NBU distribution system, or NBU-approved other source of supply, shall be controlled to flow slowly and continuously into the pipe line during the entire period of application of chlorine. Simultaneously, outlets at all piping extremities within the area being disinfected shall be partially opened to allowed displacement of resident water within the pipeline by the chlorinating solution. Introduction of chlorinating solution shall continue until chlorine residuals detected at all piping extremities shall be at least 25 ppm.

If NBU approval is granted for manual dosing of each pipe section using dry calcium hypochlorite, water from the existing NBU distribution system, or NBU-approved other source of supply, shall be controlled to flow slowly and continuously into the pipe line until is is completely filled. Provision shall be

made to expel air from the pipeline to ensure a complete fill. After filling, chlorine residuals at all piping extremities shall be at least 25 ppm.

e. Back Pressure Prevented

Back pressure, causing a reversal of flow in the pipe being treated, shall be prevented.

f. Retention Period

Treated water shall be retained in the pipe for a period adequate to destroy all non-spore-forming bacteria. This period shall be at least 24 hours. After the chlorine treated water has been retained for the required time, the chlorine residual at pipe extremities and at other representative points shall be at least 25 ppm. If inadequate pipe extremities chlorine residual is present, the chlorination process shall be repeated.

g. Operation of Valves and Hydrants

In the process of chlorinating the pipe, all valves or other appurtenances shall be operated while the pipe line is filled with the chlorinating agent.

h. Final Flushing

Following chlorination, all highly-chlorinated water shall be thoroughly flushed from the pipeline at its extremities until the replacement water throughout its length shall, upon test, prove chemically equal to the water served the public via NBU's existing system. Flushing water shall be as hereinbefore specified. To the extent reasonable, NBU shall not charge the Contractor for the water to accomplish a single flushing of the new pipeline. Contractor shall be responsible for all costs to accomplish the successful flushing of the pipeline (to include temporary piping, pumping, hauling, discharge water disposal, discharge water neutralization, costs of water for re-flushing, etc.).

10. Pipeline shall pass an acceptable bacteriological test series performed by an acceptable, certified laboratory on two (2) consecutive-day samples collected at a minimum 24-hour interval encompassing not more than 5000 LF of pipeline. Contractor to furnish appropriate sample bottles, collect the samples in the presence of NBU, and deliver sealed samples to NBU for transport to the laboratory. Contractor shall identify an acceptable local ADEM-certified testing laboratory, make all arrangements for testing, and be responsible for all costs thereof.

NBU shall deliver collected, sealed samples to the laboratory. Contractor shall arrange for all testing results to be certified by the laboratory and directly reported to NBU and such other parties as the Contractor desires.

Should successful bacteriological tests not result, Contractor shall take appropriate actions and repeat the process until successful test results are obtained. NBU will provide water and sample delivery for the initial test sequence without charge. Additional water requirements and sample transport may be subject to charge.

11. Hydrostatic Test Requirements

Pipeline shall be successfully hydrostatically tested as called for herein.

- a. Test pressure shall be a minimum of 150 psi (+/- 5 psi), measured at the point of highest elevation within the test section, for a minimum period of six (6) hours.
- b. Test pressure shall be continuously monitored throughout the test period via a recording pressure chart (minimum 8-inch chart diameter) located within the test section. The pressure recorder used for the test shall have been certified accurate by a recognized entity not more than six (6) months prior to the test date and a copy of such certification shall accompany the test chart.
- c. All system valves within the test section, except for test section isolation valves and, if applicable, fire hydrant leader valves, shall be confirmed to be full-open during the duration of the test period.
- d. At conclusion of the test period, the last test step shall be a pump-up to initial test pressure.
- e. Test shall be terminated, while recording pressure chart remains connected, by a bleed-off of test pressure from a site within the test section most remote from the recorder location to confirm entire test section is active.
- f. Total gallons used during the test, inclusive of final pump-up, shall be measured by a suitable, certified-accurate water meter and, for the test to be considered acceptable, shall not exceed 2.62 gallons per inch-diameter per mile of pipeline tested.
- g. The test chart shall be annotated to present the date of the test, the serial number of the pressure recorder used, the calculations of both allowable and measured leakage, and the name of the Engineer representative witnessing the test; and shall bear a definitive statement regarding test

success and shall be certified by an Alabama-registered Professional Engineer.

Fire Hydrants

1. Open CCW, 5 ¼" Main Valve, 2" Operating Nut, MJ, Painted Red.
2. Breakaway traffic flange type.
3. Hydrant set plumb and nominally one foot inside right-of-way with pumper nozzle normal to roadway centerline.
4. All fire hydrant leads shall be minimum six inch (6") restrained MJ DIP from main line fitting to hydrant and shall include a hydrant isolation gate valve.
5. In the case of main line size less than six inch (6"), a Post Hydrant with main line size isolation valve shall be installed at the end of the pipeline. Specific approval required for any other use of a Post Hydrant.
6. Mueller A-423 Only (Post Hydrants shall be Mueller A-411, MJ Only) and shall be required to be stamped with date of the current year.

Valves

1. NRS, Resilient-type, Cast Iron Body, MJ, 250 psi rated, AWWA C515 Compliant.
2. Mueller, Clow, American Flow Control, M&H, or approved equal.
3. Cast iron valve box with "WATER" cast into cover. Upper 18" - 24" section of valve box riser shall be cast iron, lower riser sections may be of CI 200 PVC. Riser sections shall be in alignment and securely centered on valve stem.
4. Concrete retaining collar at grade centered on valve box (minimum collar dimensions 24 inches x 4" thick).
5. Pipeline locator wire shall extend to and be secured at grade within valve box with minimum 12" slack.

Retainer Glands

1. Ductile Iron, MJ, Wedge-type, Twist-off Torque Nuts.
2. Specifically rated for use on the specific pipeline material.
3. EBAA Iron, Sigma, Star, Tyler Union, or approved equal.

Fittings

Ductile Iron, Cl. 350, MJ, Cement Mortar Lined, AWWA C110 or C153.

Tapping Sleeves For Main Lines

1. Full encirclement end and/or body gaskets to completely encapsulate the tap zone and Test Ports.
2. Ductile Iron or Stainless Steel construction.
3. Mueller, JCM, Romac, or approved equivalent.
4. No pipeline taps of any nature shall be accomplished without minimum of 24 hour notice to and receipt of authorization from NBU. Prior to advancing the drill bit into the active water line, the tap sleeve assembly shall be pressure tested with air to detect any possible leaks. Upon receipt of NBU authorization, the tap shall then be completed. Excavation shall remain open and dry to afford NBU opportunity to observe the completed work and confirm absence of any visible leaks. Upon receipt of NBU concurrence, tap site excavation may be backfilled.

Services

1. Taps Onto Main Lines
 - a. All main line service taps require use of service saddles.
 - b. For PVC or HDPE main lines up to 8" - Service saddles shall feature double stainless steel straps or shall be hinged brass.
 - c. For all DIP and PVC or HDPE greater than 8" - Service Saddles shall feature double stainless steel straps.
 - d. Service Saddles shall be Mueller, JCM, McDonald, Romac, or approved equal. Service brass shall be as specified elsewhere herein.
 - e. No service taps of any nature shall be accomplished without minimum of 24 hour notice to and receipt of authorization from NBU. Upon completion of the tap, excavation shall remain open and dry to afford NBU opportunity to observe the work and confirm absence of any visible leaks. Upon receipt of NBU concurrence, tap site excavation may be backfilled.

2. Service Brass - Mueller or McDonald, low lead.
3. Service Tubing - $\frac{3}{4}$ " Type K Copper with no joints between main tap and meter site.
4. Curb Stop – shall be service size with integral lock wing, brass.
5. Dual Check Valve – All services, regardless of size or service conditions, shall have at least a Dual Check Valve (Mueller H-14242 or approved equal) installed immediately downstream of the Water Meter, unless a more rigorous backflow prevention device is called for under “Backflow Preventers” herein.
6. Meter Boxes
 - a. Standard Box - Plastic Meter Box with cast iron reader, 12" Deep, 16 1/2" x 11 7/8" Nominal Dimensions, Black, 2 Mouse Holes, Hinged Flush Cover marked “WATER METER”. Carson Model 1015-1033, or prior approved equal.
 - b. Jumbo Box - Plastic Meter Box, 12" Deep, 15" x 21" Nominal Dimensions, Black, 2 Mouse Holes, Flush Cover marked “WATER METER” with Hinged CI Reader Eye. Carson Model 0012-1011, or prior approved equal.
7. Dual Water Services Conditionally Permitted
 - a. In the circumstance of two adjacent lots being located on the opposite side of the road from the serving water line, it will be permissible to service the lot pair via a “Dual Service”.
 - b. The Dual Service shall feature a single one (1) inch service tap onto the water main and a single one (1) inch K copper roadway service crossing. Crossing shall be centered on the common property line between the lot pair.
 - c. The Service Box for each lot of the pair shall be located five (5) feet each side of the common roadway frontage corner.
 - d. All other requirements set forth herein shall remain applicable.
 - e. NBU “Standard Dual Water Service Detail” is available upon request.
8. Service box shall be set at the Right-of-Way/Easement line normal, or as nearly as possible thereto, to the location of the associated main line tap. Any deviations shall require specific written approval.

9. If roadway at service location has or is to have a concrete curb/gutter, station of the service box shall be identified by a "W" stamped into the concrete curb/gutter normal to the service box location.

Dry Taps Prohibited

No pipeline taps of any nature intended for ultimate or subsequent use for delivery of water service for any purpose shall be made to any water system pipeline prior to the pipeline being acceptably certified to NBU to have successfully passed specified hydrostatic and bacteriological tests and the pipeline is continuously maintained filled with potable water at local service pressures.

Water Meters

Water meters shall be all bronze main case, direct reading, locking sealed register with leak detector, and registration in gallons. Meters shall be configured for and include all components required to enable remote electronic reading. Meters shall be as manufactured by Sensus or Neptune.

Backflow Preventers

Every service connection of any type (residential, commercial, industrial, fire, irrigation, etc.) to the NBU water system shall incorporate an acceptable and approved Backflow Preventer properly installed immediately on the customer side of the service meter prior to any service line branches, sub-connections, or facilities. Required type of Backflow Preventer shall be as determined by NBU to be commensurate with the risk hazard level of the service connection. Backflow Preventers shall be of the manufacturer, series, and type as identified below, or approved equal.

- | | |
|-----------------|---|
| Low Hazard | - Mueller H-14242 Dual Check Valve |
| Moderate Hazard | - Watts Series LF709 with Flanged Ends, OS&Y Resilient- type Isolation Valves (2), Test Cocks |
| High Hazard | - Watts Series LF909 with Flanged Ends, OS&Y Resilient- type Isolation Valves (2), Test Cocks |

Pipeline Markers

Pipeline markers shall be fiberglass. Marker shall have a minimum ground penetration of 18" and shall extend a minimum of 36" above local grade. Marker shall be Blue in color throughout its mass. Marker shall be installed at not

greater than 1000-foot intervals along the pipeline route positioned at the nearest Right-of-Way / Property line.

Each marker shall be affixed with four (4) permanent, reflective decals legibly presenting the following information and arranged in the following order (top to bottom) on the marker:

Reflective Decal (No Text)
"Caution Water Pipeline"
"North Baldwin Utilities (251/580-1626) CALL BEFORE DIGGING"
"Normal Offset From Marker _____ Feet"

The offset distance shall be measured normal from the pipeline and shall be entered into the blank using indelible marking. Marker shall be as manufactured by Carsonite, or approved equal.

Valve Markers

Each valve shall be marked by a solid concrete marker placed on-station with the valve at the property / right-of-way line. Marker shall be approximately 5" square and at least four (4) feet long and have "NBU" cast as raised letters into at least one face of the marker within 12" of the top. Marker shall have permanently affixed Blue trapezoidal reflectors on the front and both lateral faces within 6" of the top.

Marker shall be as manufactured by Baldwin Lighting, Inc., 15208 Brady Road Extension, Bay Minette, AL, or approved equal.

SANITARY SEWER FACILITIES

Sewer Mains

1. Gravity Sewer pipe - SDR 35 PVC (Green) or Asphaltic-lined Ductile Iron (Cl. 52 min.) Pipeline depths greater than fifteen feet (15') shall require pipe material approval by NBU.
2. Pressure Sewer pipe - See Force Mains.
3. Minimum gravity sewer size shall be eight (8) inch.
4. Minimum gravity sewer grade 0.4% unless specifically approved otherwise.
5. Connectors to join pipes of dissimilar materials or sizes without manufactured joints and/or without use of specialty fittings shall feature a flexible sleeve in contact with the pipeline externally reinforced by a full encapsulation stainless

steel shear ring and the entire assembly shall be secured to the pipe with stainless steel bands. Connectors shall be Fernco Series 5000 Strong Back, Mission Flex-Seal ARC, or approved equal.

6. Pipeline shall pass an acceptable industry-standard “flashing” test that clearly demonstrates pipeline alignment.
7. Pipeline shall pass acceptable industry-standard “go - no go” mandrel test.
8. Pipeline shall pass an acceptable industry-standard low-pressure air test.
9. Pipeline shall be internally inspected via closed-circuit television to demonstrate existence of no visible leaks or deficiencies.
10. All test results to be certified by an Alabama-licensed Professional Engineer.

Gravity Sewer Pipe Envelope Requirements

Prior to pipeline installation, trench shall be excavated to required depth and grade. Trench shall be free of standing/flowing water and any debris/objects of dimensions or characteristics that could be deleterious to pipeline integrity. A minimum six inch (6”) depth of Foundation material shall be placed in the trench, compacted, graded, and shaped for the pipe barrel prior to placement of the pipeline. After placement of the pipeline, and after proper pipeline grade and alignment have been established, haunching material shall be placed up to the pipe spring line. Upon re-confirmation of pipeline grade and alignment, Initial Backfill shall be placed to an elevation twelve inches (12”) above the pipe crown. Placement of trench backfill shall then proceed in six inch (6”) compacted lifts to surface grade. Materials used for ‘Foundation’, “Haunching”, and “Initial Backfill” shall be angular stone (with no dimension greater than ¾”), gravel, or sand.

Manholes

1. Constructed of precast concrete in conformance with ASTM C478.
2. All manholes serving as a termination point for any sanitary sewer force main shall be lined with a sprayed-on polyurethane liner after installation (Sprayroq, or approved equal).
3. Mastic joint seals and no visible leaks or deficiencies.
4. Integral anti-flotation collar.
5. Type II cement and 100% calcareous aggregate.
6. Minimum four (4) foot diameter.

7. Flexible pipeline entry sleeves keyed into manhole wall and secured to pipeline with stainless steel bands
8. Manhole Frame and Cover shall be cast iron, non-vented, with non-penetrating pick holes, with "SEWER" cast into the cover and shall be U.S. Foundry No. USF 604-E (8" Rise), USF 170-E (6" Rise), USF 580-E (2 ½" Rise), or approved equal. All manhole frames shall be fully compatible with U.S. Foundry Cover Type E (23 ¾" Diameter, 1 ¼" Thickness).
9. Outside drop connections shall be provided when drop exceeds two (2) feet. Drop connection shall be constructed with asphaltic-lined, restrained joint Ductile Iron Pipe (Cl. 52) and Fittings (Cl. 350).
10. Force Main and Pressure Sewer Connections shall be at the flow line of the receiving manhole unless specifically approved otherwise.
11. Manholes shall pass an acceptable vacuum test certified by an Alabama-licensed Professional Engineer.

Services

1. Gravity Sewer
 - a. Service wyes - no service tees.
 - b. Minimum four (4) inch diameter.
 - c. Service line shall be Sch. 40 PVC (Foam-core pipe prohibited).
 - d. Minimum 30" to maximum 60" lateral end depth at property line without special approval.
 - e. Service Lateral Markers
 - 1) For all service installations along roadways having or to have concrete curb/gutter, the station of the service lateral end shall be identified by an "S" stamped into the concrete curb/gutter normal to the lateral end location.
 - 2) For all service installations, fiberglass service lateral end markers shall be provided. Marker shall have a minimum ground penetration of 18" and shall extend a minimum of 36" above local grade. Marker shall be Green in color throughout its mass. Marker shall be installed at the end of each gravity sewer lateral stubout at the Right-of-Way/Easement line.

Each marker shall be affixed with four (4) permanent, reflective decals legibly presenting the following information and arranged in the following order (top to bottom) on the marker:

Reflective Decal (No Text)
"Caution Sewer Lateral End"
"North Baldwin Utilities (251/580-1626) CALL BEFORE
DIGGING"
"Depth At Marker _____ Feet"

The sewer lateral end depth shall be measured vertically from the final local ground surface and shall be entered into the blank using indelible marking. Marker shall be as manufactured by Carsonite, or approved equal. **Provide locate wire from tap to cleanout and something about a sewer pad**

2. Pressure Sewer

- a. Main line service taps shall be accomplished as follows:
 - 1) For Non-HDPE Main – Service Saddle with double Stainless Steel straps (1½" FIP Outlet), ½" Brass Corporation Stop (MIP x CTS Compression).
 - 2) For HDPE Main – HDPE Tapping Tee (1½" Outlet) with Integral ½" HDPE Ball Valve (1½" CTS Compression Outlet).
 - 3) Service Saddles shall be Mueller, McDonald, JCM, Romac, or approved equal.
- b. Service lines shall be 1½" CTS DR11 HDPE, or larger. All pipeline shall include a high-strength copper clad steel locator wire with reinforced protective exterior coating (12 ga., Solid, Blue Color, Brass Split Bolt Connectors) installed centered on and affixed to the crown of the pipeline. Wire shall be Copperhead HS-CCS with 30 mil HDPE insulation or approved equal and shall extend to grade within all valve boxes with minimum 12" slack. Split bolt connectors and bare wire ends at all connections and splices shall be acceptably coated to prohibit corrosion
- c. Service Brass - Mueller or McDonald.
- d. Service Box – Shall be located at the property line and shall be PVC (Green) with "SEWER" cover marking and otherwise as specified herein for Water Facilities. The Service Box shall be defined as the "Point of Service".

- e. Service End Fittings – 1½” Brass Check Valve (FIP x FIP) followed immediately by 1½” Brass Lock-wing Curb Stop, all located within Service Box
- f. Responsibility for provision, installation, ownership, operation, and maintenance of the Pressure Sewer Service shall remain with the Customer beyond the Point of Service (the Service Box).

Solids Handling Pump Stations

1. Wet Well

- a. Precast concrete in conformance with ASTM C478 with Type II cement and 100% calcareous aggregate; Mastic joint seals.
- b. Entirety of wet well interior, except for bottom, shall be lined with sprayed-on polyurethane liner after installation (Sprayroq, or approved equal).
- c. Six (6) foot minimum diameter; Integral anti-flotation collar.
- d. Wet Well top shall be above 100-year flood elevation and shall have minimum four -inch (4”) top vent.
- e. Five (5) foot minimum depth from lowest inlet sewer invert to bottom.
- f. All process piping and fittings within pump station limits (to include within wet well and continuously through discharge valve vault) shall be Asphaltic-lined, Flanged, Ductile Iron, Cl. 53 minimum.
- g. Minimum 150 psf live load rated hinged aluminum access hatch.
- h. All nuts, bolts, hardware, etc. within wet well shall be Type 304 stainless steel.
- i. No visible leaks or deficiencies.

2. Solids Handling Pumps

- a. Suction Lift - Gorman Rupp or WEMCO (Suction legs shall, in their entirety, be of welded, Sch. 40 steel with provision included for flushing suction leg without piping disassembly or entering wet well).
- b. Submersible – Flygt or WEMCO (Dual 2” Stainless steel lift-out rail system).
- c. Pump installation shall be duplex.
- d. Any suction lift pump installation shall include an acceptable, enclosed, all-weather structure to house pumps, motors, controls, and ancillary equipment. Structure shall include a lockable personnel door and lockable overhead-type door adequately sized to accommodate transit of installed components. Structure shall be properly lighted and ventilated, feature a sloped-to-drain concrete floor, provide minimum eight-foot (8') interior ceiling height, and provide a minimum five feet (5') of unobstructed horizontal clearance in all directions between installed equipment and structure wall. Structure shall be constructed of low-maintenance components (all wood construction shall not be acceptable).
- e. Valved by-pass pumping connection on force main within station site.
- f. Concrete valve vault with 150 psf live load rated aluminum cover containing discharge gate valve and check valve for each pump.

3. Electrical and Controls

- a. Four (4) sealed level sensing floats acceptably mounted in wet well.
- b. Type 304 stainless steel NEMA 3R control enclosure with aluminum dead front door.
- c. Three-phase utility power unless specifically approved otherwise.
- d. Manual transfer switch.
- e. Solid-state soft motor starters or Electronic Variable Frequency Drives unless specifically approved otherwise.
- f. Elapsed run time meters for each pump and pump combination.
- g. Alarm light with 'Dim Glow' power monitor feature.

- h. Provision of phase monitors, surge suppressors, intrinsically safe relays, audible alarm.
- i. All controls and devices shall be compatible for connection to and communication with NBU SCADA system. At minimum, SCADA outputs to be available shall include: Utility Power Status, Wet Well Level, Status of Each Pump (Off, On, Failed), Elapsed Run Time Meter Reading (For Duplex Installation - Pump1, Pump2, Pump1+Pump2).

Individual Service - Interceptor Tanks and Effluent Pump Systems (STEP)

1. Primary Interceptor Tank shall be approved by the Alabama Department of Public Health for onsite wastewater systems. The Primary Interceptor Tank shall be fitted with water tight risers and installed per the manufacturer's recommendations. Risers shall extend from tank to finish grade and shall be fitted with bolt down lid.
2. Effluent Pumping System shall consist of effluent screens, pump, vault, control panel, and accessories. Effluent screens shall have a surface area of no less than 16.8 square feet and shall not allow particles greater than 1/8" to pass. Effluent Pump shall be able to deliver a minimum of 10 gpm at 150' TDH. Control Panel shall be compatible with all electrical components within the system. Control Panel shall contain a manual transfer switch and generator receptacle, both audible and visual alarms which indicate high and low levels, and an internal decal indicating make and model numbers of the effluent pumps.
3. All STEP system components shall be approved by NBU prior to installation.

Individual Service Grinder Pump Stations

1. Provision, installation, ownership, operation, and maintenance of the grinder pump system shall be the responsibility of the Customer. NBU Pressure Sewer System responsibility shall terminate at the customer's property line (also the "Point of Service" as defined elsewhere herein).
2. Customer provided Grinder Pump shall be capable of completely macerating the constituents commonly encountered in domestic sewage and feature minimum pumped fluid delivery capability of 7 GPM against a discharge head of 185 feet.
3. Customer provided Grinder Pump System shall derive all required electrical power from the electrical system of the served structure.

4. Recommended characteristics of the Grinder Pump System to be supplied by the Customer shall include:
 - a. Pump and pump system should have at minimum five (5) years acceptable performance experience in at least one hundred (100) domestic installations and have an established system of locally available service and support.
 - b. Installation should feature at least a simplex pump and include a fiberglass pump well capable of storing approximately 70 gallons of flow volume after activation of an integral high level alarm without overflow or interruption of service.
 - c. Pump system should feature a pump mounting and power connection system that enables pump removal, exchange, and reinstallation without entering or voiding the pump well. Pump discharge connection, inclusive of discharge valve and piping disconnect, and assembly for disconnection and reconnection of a sealed, watertight pump power supply shall be located no greater than twelve inches (12") below the top of the pump chamber.
 - d. Pump system should include all level sensing and electrical components to control pump operations. Any/all electrical or control connections, junctions, and/or components located within the pump chamber shall be accessible for service but shall be sealed against moisture and shall not be adversely affected by submergence upon flooding of the pump chamber.
 - e. Pump system should be capable of effectively functioning using standard 230 volt / 1 phase / 60 hertz power supply. Connection to served-structure power supply should be in accordance with all applicable electrical codes and should include a power disconnect panel located within 15 feet of pump installation.
 - f. Pump station should receive sewage via gravity plumbing from the served structure with a service clean-out located immediately prior to the station.
 - g. Pump station should deliver sewage to the NBU Pressure Sewer System at the Point of Service via a minimum 1¼" service pipeline.
 - h. Pump station should feature a properly load-rated non-corroding pump lift-out assembly securely affixed to the pumping unit and extending to the top of the pump chamber.

Force Mains and Pressure Sewers

1. Pipe shall be Asphaltic-lined Ductile Iron (Cl. 52), PVC (Cl.200 SDR 21, Green), or HDPE (DR 11 with Green Marker Stripe).
2. Force Mains - minimum four (4) inch diameter; Pressure Sewers - minimum two (2) inch diameter; unless specifically approved otherwise.
3. Fittings 3" diameter and larger shall be asphaltic-lined, MJ ductile iron (CL350 - C110 or C153). For smaller than 3" fittings, secure NBU prior approval of proposed material and joint restraint system.
4. Minimum of eighteen (18) LF of restrained pipe shall extend in each direction from all valves, fittings, and specials on 3" and larger pipelines. For smaller than 3" pipelines, secure NBU prior approval of proposed pipe and joint restraint system.
5. Gate valves shall be as for Water Facilities
6. Cast iron valve box with "SEWER" cast into cover. Upper 18" - 24" section of valve box riser shall be cast iron, lower riser sections may be of CI 200 PVC. Riser sections shall be in alignment and securely centered on valve stem. Box shall include concrete retaining collar and internally routed locator wire as for Water Facilities.
7. Retainer Glands shall be as for Water Facilities.
8. Tapping Sleeves shall be as for Water Facilities.
9. Automatic air/vacuum release assemblies shall be installed at all high points along pipeline route and shall be housed in concrete vaults. (APCO, Crispin, Val-Matic or approved equal).
10. Pressure sewers to include an acceptable flushing assembly at all upstream terminations and intermediate points as determined necessary.
11. Pipeline shall have no visible leaks or deficiencies.
12. All pipeline shall include a high-strength copper clad steel locator wire with reinforced protective exterior coating (12 ga., Solid, Green Color, Brass Split Bolt Connectors) installed centered on and affixed to the crown of the pipeline. Wire shall be Copperhead HS-CCS with 30 mil HDPE insulation or approved equal and shall extend to grade within all valve boxes with minimum 12" slack. Split bolt connectors and bare wire ends at all connections and splices shall be acceptably coated to prohibit corrosion.

13. Should the interval between pipeline division valves be greater than 1000 feet, pipeline shall have installed at intervals not greater than 1000 feet a magnetized locator wire termination box with cast iron cover, Green in color, and brass wire lugs with locator wire securely attached. Box shall be installed at final surface grade and include concrete marker and retaining collar as for Valves. Box shall be Copperhead "SnakePit" Lite Duty or approved equal.

14. Hydrostatic Test Requirements

Sanitary sewer force mains and pressure sewers shall be successfully hydrostatically tested as called for herein.

- a. Test pressure shall be a minimum of 100 psi (+/- 5 psi), measured at the point of highest elevation within the test section, for a minimum period of two (2) hours.
- b. Test pressure shall be continuously monitored throughout the test period via a recording pressure chart (minimum 8-inch chart diameter) located within the test section. The pressure recorder used for the test shall have been certified accurate by a recognized entity not more than six (6) months prior to the test date and a copy of such certification shall accompany the test chart.
- c. All system valves within the test section, except for test section isolation valves and, if applicable, identified special function valves, shall be confirmed to be full-open during the duration of the test period.
- d. At conclusion of the test period, the last test step shall be a pump-up to initial test pressure.
- e. Test shall be terminated, while recording pressure chart remains connected, by a bleed-off of test pressure from a site within the test section most remote from the recorder location to confirm entire test section is active.
- f. Total gallons used during the test, inclusive of final pump-up, shall be measured by a suitable, certified-accurate water meter and, for the test to be considered acceptable, shall not exceed 0.71 gallons per inch-diameter per mile of pipeline tested.
- g. The test chart shall be annotated to present the date of the test, the serial number of the pressure recorder used, the calculations of both allowable and measured leakage, and the name of the Engineer representative witnessing the test; and shall bear a

definitive statement regarding test success and shall be certified by an Alabama-registered Professional Engineer.

Pipeline Markers

Pipeline markers shall be fiberglass. Marker shall have a minimum ground penetration of 18" and shall extend a minimum of 36" above local grade. Marker shall be Green in color throughout its mass. Marker shall be installed at not greater than 1000-foot intervals along the pipeline route positioned at the nearest Right-of-Way / Property line.

Each marker shall be affixed with four (4) permanent, reflective decals legibly presenting the following information and arranged in the following order (top to bottom) on the marker:

Reflective Decal (No Text)

"Caution Sewer Pipeline"

"North Baldwin Utilities (251/580-1626) CALL BEFORE DIGGING"

"Normal Offset From Marker _____ Feet"

The offset distance shall be measured normal from the pipeline and shall be entered into the blank using indelible marking. Marker shall be as manufactured by Carsonite, or approved equal.

Valve Markers

Each valve shall be marked by a solid concrete marker placed on-station with the valve at the property / right-of-way line. Marker shall be approximately 5" square and at least four (4) feet long and have "NBU" cast as raised letters into at least one face of the marker within 12" of the top. Marker shall have permanently affixed Green trapezoidal reflectors on the front and both lateral faces within 6" of the top.

Marker shall be as manufactured by Baldwin Lighting, Inc., 15208 Brady Road Extension, Bay Minette, AL, or approved equal.

MISCELLANEOUS

Casings

Casings installed by dry bore and jack shall be coated, welded steel having minimum 0.25" wall thickness and diameter not less than 1.3 times the maximum outside diameter of the carrier pipe joint assembly, unless specifically approved otherwise. Casing to be installed by direct bury may be of PVC pipe (minimum SDR 35) on a case-by-case basis with same sizing requirement as for steel. Casing ends shall be sealed to carrier pipe via flexible end seals.

Carrier Pipe Installed Within Casings

Carrier pipe installed within casing shall be minimum CI 51 ductile iron with restrained joints or CI 200 SDR 21 PVC with provision for joint restraint, unless specifically approved otherwise. Ductile iron carrier pipe may be direct installed within casing with NBU prior approval. All carrier pipe not ductile iron shall be fitted with securely attached appropriate pipeline spacers installed as per pipeline and spacer manufacturers' recommendation. Spacer system shall position the carrier pipe along the casing centerline. Spacers shall be two-piece, heavy-duty, polymer-coated carbon steel or stainless steel similar to Advanced Products and Systems, Inc. Model SI. Spacers shall be as manufactured by APS, CCI, Cascade, or approved equal.

Nominal Pipe Restraint

All water main, sanitary sewer force main, and pressure sewer shall include restrained pipe extending a minimum of eighteen (18) LF in each direction from all valves, fittings, and specials. Additional thrust restraint shall be provided as determined appropriate by the design professional.

Special Pipeline Material Transitions - HDPE to PVC or DIP

Transition from HDPE piping to PVC or DI piping shall feature a transition assembly comprised of a butt-fused HDPE section with a protruding circumferential anchoring web (Anchor Ring), if changing pipe size – a butt-fused HDPE reducer (Reducer), a butt-fused HDPE coupling providing a standard MJDI plain-end pipe configuration (MJ Adapter with gasket and stiffener), DI follower gland, long-pattern MJDI Solid Sleeve, MJ gasket (standard or transition), MJ wedge-type Retainer Gland (IPS PVC or DI), and all required accessories.

Easements

Any proposed utility infrastructure intended for conveyance to NBU that is not located within a dedicated public right-of-way or property to be deeded to NBU shall be encompassed within a Utility and Ingress/Egress Easement granted to NBU. Each such Easement shall be a minimum of twenty (20) feet in width centered upon the utility, with the utility located not closer than five (5) feet from any boundary of such Easement, and extend continuously along the utility with direct access to the Easement from a dedicated public right-of-way. The form of the Easement shall be acceptable to NBU.

Pipeline Construction Closure Section

A new section of pressure pipeline may be connected to an active segment of the water or sewer system utilizing a Pipe Closure Section upon receipt of prior approval from NBU. Upon such approval, the following minimum requirements and protocols shall be applicable:

1. Any and all Pipe Closure actions shall be accomplished under the observation of NBU. Contractor/Engineer shall provide NBU a minimum of 24-hours written notice of commencement.
2. Pipe Closure section length shall not exceed ten (10) feet.
3. Pipe Closure shall utilize all Ductile Iron Pipe and fittings. All joints shall be restrained.
4. Pipe Closure shall be accomplished utilizing solid sleeves. No "bucking" of the pipe shall be allowed.
5. Pipe Closure materials and the ends of the installed pipelines to which connection is to be made shall be thoroughly cleaned and washed during preparation for installation. No trench waters, trash, dirt, debris, etc. shall be allowed to contact or enter the pipe materials or piping ends after cleaning.
6. Applicable to Water System projects only, immediately prior to installation the interior and joining surfaces of all Pipe Closure materials and the ends of the installed pipelines shall be thoroughly swabbed with a highly chlorinated water solution (minimum chlorine concentration of 50 ppm).
7. After Pipe Closure installation has been accomplished, the section shall remain exposed and subjected to full local NBU line pressure. The section shall be closely examined for any leakage. Any and all leakage shall be corrected.
8. Upon NBU concurrence, the section may be backfilled in accordance with project requirements.

GENERAL

Utility Project Planning Guidance

Reference applicable additional project planning guidance entitled “Procedural Guidance Governing Utility Infrastructure Additions” viewable at www.northbaldwinutilities.com.

Required Project Review Documents

Prior to commencement of any activities associated with the planning, design, installation, or construction of any utility work (water, wastewater, or natural gas) anticipated to be subsequently presented to NBU for acceptance, documentation, inclusive of at least the following, bearing the signature and seal of the responsible Alabama-registered Professional Engineer, shall be submitted to NBU for review:

1. Letter confirming the Design Professional’s review of and incorporation of the requirements of then current NBU “Specifications for Utility Infrastructure” into the project. Letter shall be co-signed by the Developer.
2. Engineering Report, adequately detailed, describing the project and inclusive of appropriate technical analyses to establish the requisite performance parameters and capability of proposed utility infrastructure.
3. Specifications describing the materials and methods of construction incorporating NBU requirements.
4. Plans clearly and completely presenting the location, scope, and details of the work to be accomplished.

No water, sewer, or natural gas system infrastructure or material of any nature shall be installed in any project or segment thereof prior to receipt of NBU written approval of said documents. A minimum of fourteen (14) working days shall be allowed for NBU to accomplish its review.

Submittals / Shop Drawings

Appropriate submittals/shop drawings describing any and all materials to be incorporated into the work, bearing the signature and seal of the Project Engineer certifying that the materials are suitable for the purposes and uses intended and are in conformance with NBU requirements, shall be submitted to NBU. NBU concurrence therein shall be obtained prior to installation in the work.

“Approved Equal” Consideration

Request for NBU consideration of an alternate material, product, and/or procedure as an “approved equal” or “approved equivalent” to the item specifically called for herein, where such substitution is not prohibited, shall be submitted in writing. Such request may not be considered if presented as a component of the review/approval process for any specific project. The request shall be accompanied by such documentation and information as may be appropriate to support the request. The signature and seal of the Alabama-registered Professional Engineer recommending the alternate material, product, or procedure and certifying that the alternate item is suitable for the purposes and use intended and is otherwise in compliance with NBU requirements shall be affixed so as to address the entirety of the request.

A minimum of fourteen (14) working days shall be allowed for NBU to accomplish its review. NBU may request supplemental information in support of the request. Each receipt of such supplemental information will restart the review timeline.

Record Drawings

Record Drawings, documenting the work as constructed and bearing the certifying seal and signature of an Alabama-licensed Professional Engineer, shall be required prior to consideration of any infrastructure for acceptance by NBU. The Record Drawings shall specifically locate via discrete measurements all components of the installed systems. Location by triangulation from readily field recoverable features will be required. Measurements from intangible features (e.g. survey lines, property pins, etc.) as reference points will not be acceptable.

Unless waived in writing for a specific project, Record Drawings shall be referenced to a minimum of two (2) NBU set or identified monuments.

NBU also requires receipt of approved Record Drawings in an acceptable electronic format (“dwg” or “shp”) geographically located using Alabama State Plane coordinates (NAD 83). Contact NBU for specific format guidance.

Mandatory Acceptance Inspection

Upon the responsible Professional Engineer’s certification and NBU routine observation that the proposed work has been accomplished, the project owner shall arrange for the conduct of an Acceptance Inspection. Present at such Inspection shall be, at minimum, an Agent of the responsible Professional Engineer and NBU. The findings of such Inspection shall be documented by the Project Engineer in a written report to be certified by the Engineer and submitted to NBU. NBU shall review the Engineer’s Report and provide a written report of its findings.

Dependent upon the outcome of the Inspection, the requirement for subsequent follow-up re-inspection shall be determined.

Required Project Acceptance Documents

NBU requires receipt of the following documentation, in appropriate form, prior to consideration of acceptance of utility infrastructure into the NBU system and initiation of service thereby:

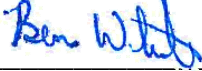
1. Certification by an Alabama-licensed Professional Engineer that the project was constructed in accordance and conformance with applicable codes and requirements, approved Plans and Specs and NBU requirements.
2. Detailed drawings of suitable scale certified by an Alabama-licensed Professional Engineer describing the infrastructure "As-Built".
3. Continuous pressure recording chart for each test segment, certified by an Alabama-licensed Professional Engineer, thereon documenting the date of testing, the serial number of the test instrument used, specific identification of the infrastructure segment tested, calculations of allowable and actual leakage, and identification of the PE-agent test witness. Chart shall also bear a specific statement regards the success of the hydrostatic test of the identified pipeline segment.
4. Successful bacteriological test reports, certified by an ADEM-approved laboratory, for each water system infrastructure segment tested from two consecutive day's samples.
5. Schedule of Values, certified by the Developer, of infrastructure presented to NBU for acceptance consideration.
6. Hold-harmless release from the Developer in favor of NBU of any and all liens that may be perfected against the infrastructure presented to NBU for acceptance.
7. Deed for infrastructure presented to NBU for acceptance consideration.
8. One year full-value warranty bond from the Developer on infrastructure presented to NBU for acceptance consideration. Warranty period to commence upon the date of NBU acceptance. Bond date shall not precede NBU acceptance date.

USER NOTICE

The above listing of material requirements and performance protocols by North Baldwin Utilities is not purported to be inclusive and static and is subject to revision without notice. The user should contact North Baldwin Utilities to confirm requirements for and acceptability of proposed materials and protocols current as of the time of anticipated activity. The user is reminded that incorporation of unapproved materials and/or protocols into a project may preclude North Baldwin Utilities from consideration of the project for acceptance and/or connection.

Any version hereof bearing a prior Issue Date or without authorized signature below is null and void and of no effect.

NORTH BALDWIN UTILITIES



Benjamin W. White, P.E.
Engineering Manager