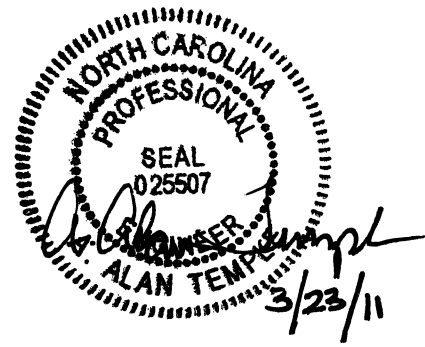


**PROJECT SPECIAL PROVISIONS**  
Utility Construction



## I. DESCRIPTION

The proposed utility construction shall meet the applicable requirements of Division 15 of the NC Department of Transportation's "Standard Specifications for the Roads and Structures" dated July 2006, and the following provisions.

Owner and Owner's Requirements:

The existing utilities belong to City/County Utilities Commission of Winston-Salem and Forsyth County. The Contractor shall provide access for the owner's representatives to all phases of construction. The owners shall be notified two weeks prior to commencement of any work and one week prior to service interruption. The City of Winston-Salem's representative can be contacted at (336) 727-8063.

## II. MATERIALS

Replace Section 1034 and Section 1036 with the following:

**CAST IRON SOIL PIPE AND FITTINGS:** All cast iron soil pipe and fittings will conform to ASTM A74 and be classified as SV (service weight). Single or double hub is acceptable. No-hub pipe shall not be used. All pipe and fittings shall be uniformly coated with bituminous coating. Joints will be rubber gasket. Rubber gaskets shall conform to ASTM C564. See detail on sheet UC-3. 4" cleanouts shall consist of a 4" service weight cast iron ferrule (with 3" iron pipe size tap) and a 3" brass plug. The plug shall have a low raised square head (Southern Code).

**CORPORATION COCKS:** All corporation cocks shall be made of red brass in accordance with ASTM B62 and AWWA C800. Red brass shall consist of 85% copper, 5% lead, 5% zinc, and 5% tin. All corporation cocks shall be of the ball valve type with AWWA inlet threads.

**DUCTILE IRON PIPE:** Ductile iron pipe shall be designed to conform to ANSI A21.50 (AWWA C150) and shall be manufactured to conform to ANSI A21.51 (AWWA C151). The interior of pipe for water will be cement lined in accordance with ANSI A21.4 (AWWA C104). The interior of pipe for sanitary sewer will be lined with 40 mils of Protecto 401 Ceramic Epoxy. All bells and spigots for sanitary sewer pipe must be lined with a minimum of 8 mils of Protecto 401 Joint Compound or approved equal. The exterior of all pipe shall be coated with a bituminous coating. Pipe joints will be single rubber gasket push-on type or mechanical joint type unless otherwise specified or otherwise shown on the Engineer's drawings. Rubber gasket joints shall conform to ANSI A21.11 (AWWA C111). Pipe design laying condition will be Type 2, flat-bottom trench with backfill lightly consolidated to centerline of pipe. Pipe for sanitary sewer shall be thickness Class 50. Pipe for water shall be pressure Class 350 for 3" - 16" and pressure Class 250 for 18" and above. Any deviations in class shall be otherwise specified or otherwise shown on the Engineer's drawings. The unit price for ductile iron pipe in the Contract shall include the furnishing of necessary ductile iron pipe, labor, supervision, equipment and

also include all excavation (except rock excavation), furnishing and placing suitable backfill, hauling and unloading of all pipe and removal and disposal of all rigid and flexible pavement. If for any reason the Engineer finds any or all ductile iron pipe unacceptable, the Contractor shall be responsible for obtaining acceptable pipe. The Engineer's acceptance or rejection of all pipe will be final.

**FIRE HYDRANTS:** All fire hydrants shall be dry-barrel fire hydrants which comply with ANSI/AWWA C502. All hydrants will have a dry top with O-ring seals which permanently seal off the stem operating threads from water and keep the lubricant in. All hydrants shall be opened by turning the operating nut on top of the hydrant counterclockwise. The main valve shall be a compression type valve with a valve opening of 4 ½" or 5 1/4" unless otherwise specified. Each hydrant will have two hose nozzles and one steamer nozzle. The 2 ½" hose nozzles and the 4 1/4" steamer nozzle shall have Winston-Salem standard threads. The nozzle shall be fastened into the hydrant barrel by mechanical means, but shall not be leaded into the barrel. Nozzle caps shall be chained to the barrel. All hydrants will be furnished with a breakable traffic feature that will break upon impact. The feature shall consist of a breakable safety flange on the barrel and a breakable safety coupling in the main valve stem. Hydrants must have a bronze main valve seat ring that threads into a bronze drain ring. Each hydrant shall have at least two bronze drain outlets. All hydrants will have 6" mechanical joint base connections unless otherwise specified by the Engineer. Hydrants shall be designed for a minimum working pressure of 250 psi. Assembled hydrants shall be subjected to hydrostatic tests of twice the rated working pressure in accordance with ANSI/AWWA C502. All exterior iron surfaces below ground level shall be covered with two coats of asphaltic varnish or fusion bonded epoxy. All exterior iron surfaces above ground level shall be painted yellow to the satisfaction of the Engineer. All interior iron surfaces of the hydrant shoe which are in contact with water (including the lower valve plate and nut) shall be coated with a minimum of 8 mils of fusion bonded epoxy or liquid epoxy in accordance with ANSI/AWWA C550. All hydrants shall have a thrust or anti-friction washer in the operating area of the hydrant bonnet. A weather cap around the operating nut on top of the hydrant is required.

Hydrants will normally be three and one-half feet from the ground to the bottom of the hydrant (42" bury). However, when plans indicate a deeper bury is required, such hydrants will be furnished conforming to the depth of bury as shown on the plans. Hydrant extensions will be installed only if necessary.

**FITTINGS (DUCTILE IRON):** Ductile iron fittings shall meet all requirements of ANSI A21.10 (AWWA C110) and will be of the mechanical joint type unless otherwise specified. All glands shall be ductile iron, not gray iron. The interior of fittings for water will be cement lined in accordance with ANSI A21.4 (AWWA C104). The interior of fittings for sanitary sewer will be lined with 40 mils of Ceramic Epoxy. All bells and spigots for sanitary sewer fittings must be lined with a minimum of 8 mils of Joint Compound. The exterior of all fittings shall be coated with a bituminous coating. Fittings coated on the interior and exterior with 8 mils of fusion bonded epoxy in accordance with ANSI/AWWA C116 and ANSI/AWWA C550 are acceptable. Fittings will have a minimum pressure rating of 250 psi unless otherwise specified by the Engineer. All Fittings are subject to approval by the Engineer, and his acceptance or rejection shall be final. Rubber gasket joints shall conform to ANSI A21.11 (AWWA C111). Ductile iron

compact fittings conforming to ANSI A21.53 (AWWA C153) are acceptable. "DI" or "Ductile" shall be cast on each fitting.

**IRON AND STEEL (MISCELLANEOUS):** All miscellaneous iron and steel such as angle iron, checkered plate covers, valve stem guides and supports, etc. will be galvanized.

Galvanizing will be by the hot-dip process after the materials have been cut, assembled and all holes punched. Any field welds or bolts which may be used to fasten iron or steel together will be painted immediately after installation with two coats of cold galvanizing compound.

**MANHOLE RINGS AND COVERS (TYPE 1):** Manhole rings and covers will be made of cast iron and will conform to ASTM A48, Class 35B. In addition, all manhole rings and covers shall be designed to support an H-20 wheel load. All castings will conform to the shape and dimensions shown on plans and will be free from holes, cracks or any other defects. Rings and covers will have machined seats so that the cover will not rattle. Rings will weigh a minimum of 190 pounds and covers a minimum of 120 pounds. The name of the manufacturer and the part number shall be cast permanently on the ring and the cover. Castings that do not meet specifications shall be rejected.

**METERS:** All 5/8" - 2" meters will be installed by the City of Winston-Salem. Water connections shall include all items shown on City of Winston-Salem detail drawings except for the meter and the expansion connection.

**METER BOXES AND VALVE BOXES:** Cast iron meter boxes will conform to ASTM A48, Class 30B. All boxes will conform to the shape, dimensions and weights shown on the plans and will be free from holes, cracks or any other defects. All castings shall be thoroughly coated with an asphaltic varnish. The name of the manufacturer shall be permanently cast on each piece. Castings that do not meet specifications shall be rejected.

**METER YOKES AND ACCESSORIES:** All red brass shall conform to ASTM B62 and AWWA C800. Red brass shall consist of 85% copper, 5% lead, 5% zinc, and 5% tin.

**RETAINER GLANDS:** All retainer glands shall be wedge action glands with torque limiting twist off nuts.

**SERVICE SADDLES (SEWER):** Service saddles for 4" sewer connections may be used in lieu of wyes.

**SERVICE SADDLES (WATER):** Service saddles shall be used as follows:

<u>Pipe Size</u>	<u>Maximum Size Direct Tap Without Saddle</u>
4"	3/4"
6"	1"
8"	1"
12"	1 1/2"

The saddle body shall be ductile iron with corrosion resistant paint. The body shall have a CC threaded outlet. Attached to the body shall be double U-bolt straps. Straps, washers and nuts shall be high-strength, low-alloy steel in accordance with ANSI A21.11 (AWWA C111).

**VALVES (GATE):** All gate valves shall be resilient-seated gate valves which meet the specifications of ANSI/AWWA C509 or ANSI/AWWA C515. The valve body, bonnet and seal plate shall be coated on all exterior and interior surfaces with a minimum of 8-10 mils of fusion bonded epoxy in accordance with ANSI/AWWA C550. The valve shall incorporate a guide system with guide lugs on the wedge or on the body. The wedge shall be gray or ductile iron, fully encapsulated with rubber (including guide lugs and stem nut holder). Non-rising stem valves shall have two O-ring seals above the stem thrust collar that can be replaced with the valve under pressure. Nonrising stem valves shall also have a thrust washer on the stem thrust collar. Valves used for buried service will have a non-rising stem, mechanical joint end connections, and a 2" square operating nut. The word "OPEN" and an arrow to indicate the direction of opening the valve shall be cast on the flanged base of the operating nut. Above ground valves, unless otherwise specified, will have an outside screw and yoke rising stem or a non-rising stem, flanged end connections, and a handwheel to operate the valve. The word "OPEN" and an arrow to indicate the direction of opening the valve shall be cast on the rim of the handwheel. All valves will open by turning the nut or handwheel counterclockwise. Valves installed in manholes will normally be considered to be buried service valves and valves installed in vaults will normally be considered to be above ground valves.

Resilient-seated gate valves shall be designed for a minimum working pressure of 250 psi. Each valve shall be seat tested at the rated working pressure and shell tested at twice the rated working pressure in accordance with ANSI/AWWA C509 - Section 5 or ANSI/AWWA C515 - Section 5.

**VALVES (TAPPING):** Tapping sleeves and valves shall be used for "wet" taps into existing water mains as indicated on the Engineer's drawings. The Contractor shall verify the type of material, size, etc., of the existing main prior to ordering the sleeve. The sleeve shall be a split sleeve with mechanical joint end connections and a flanged outlet. Sleeves shall be designed for a minimum working pressure of 200 psi. For taps on larger mains (24" and above), a saddle may be used in lieu of a sleeve, but only if the tap is less than or equal to half the size of the line to be tapped. The tapping valve shall meet all specifications for "gate valves" except that the valve shall have an inlet flange (with centering ring) for connection to the flanged sleeve outlet. The unit price named shall include installation also.

All tapping sleeves and valves shall be water tested before the tap is made. Test pressure shall be 200 psi. All tapping sleeves and valves shall be installed level. The Engineer must be present during the entire tapping and testing process.

### III. CONSTRUCTION REQUIREMENTS

The following requirements supplement the requirements of Division 15 of the Standard Specifications:

#### **(A) Meters (Section 1515-4(B))**

- 1) Water service shall be maintained to all dwellings during construction.
- 2) The Contractor shall install a new meter box, angle valves and yoke adjacent to the existing water line from the dwelling near the right-of-way line or as directed. The Contractor shall expose a portion of the water line from the dwelling to determine the material and have proper fittings for reconnection to the new meter box. After the line and connections have been pressure tested and disinfected and approved, the Contractor shall remove the existing meter and install it in the new yoke. The Contractor shall reconnect the dwelling side water line from the existing-meter box to the new meter box. This reconnection should follow Section 1500-9.

#### **(B) Remove Water Meter (1530-3(C))**

The Contractor shall remove the existing meter box and yoke, and stockpile them and arrange for the City's Utilities Construction and Maintenance Department to pick up.

#### **(C) Remove Fire Hydrant (1530-3(D))**

The Contractor shall remove the existing fire hydrant and arrange for the City's Utilities Construction and Maintenance Department to pick up.

#### **(D) Sanitary Sewer Clean-out (1520-3)**

A new connection shall be installed as indicated on the plan or as directed by the Engineer. Any existing connections without clean-outs or are clay or PVC shall be replaced from the right-of-way line all the way back to the sewer main with new pipe. The Contractor shall tap the sewer main and install a new sewer connection and clean-out per the details on the plans. An approved coupling shall join the new connections to the existing service. The existing clay or PVC connection shall be removed and backfilled as shown on the plans or as directed by the Engineer.

#### **(E) Abandon Valves (1530-3)**

Prior to paving, water valves shall be abandoned by removing the lid and filling the box with flowable fill.

#### **(F) Remove Water Valve (1530-3)**

Remove water valve and connect existing water line to new water line using appropriate fittings. Contractor should stockpile and arrange for the City's Utilities Construction and Maintenance Department to pick up.

**(G) Relocate Sanitary Sewer Clean-out (1520-3)**

Connections labeled "Relocate Sanitary Sewer Clean-out" shall be adjusted vertically or relocated to the right-of-way line as directed by the engineer. For clean-outs to be moved the Contractor shall expose a portion of the sewer connection to determine the location and material.

For cast iron connections, the Contractor shall install a new combination wye along with a new stack. All sanitary sewer clean-outs shall conform to details on the plans. This reconnection should follow Section 1500-9.

The Contractor shall also remove the existing sanitary sewer clean-out stacks as directed by the Engineer. Removal of existing clean-outs shall be accomplished by removing the existing stack to the combination wye and plugging the combination wye as directed by the Engineer. The Contractor shall backfill as shown on the plans or as directed by the Engineer.

All sewer connections damaged by the Contractor shall be repaired. Clay connections shall be repaired with approved couplings per the details on the plans. Cast iron pipe connections shall be repaired with full bell sections of pipe. Any other material is to be repaired as directed by the Engineer.

The following requirements replace Section 1510-3(A) of the Standard Specifications:

- (A) FLUSHING:** Prior to pressure testing and disinfection, the Contractor shall flush all water mains with a polyurethane foam pipe pig (minimum 5 pounds per cubic foot density). The pipe pig shall be propelled hydraulically through the mains at a rate sufficient to remove all foreign matter. Valves shall be operated in a manner which will direct the pipe pig toward the end of the main or a selected discharge point. The pig shall be removed through an open end of the main, a fitting, or through a fire hydrant which has the main valve seat ring removed. Flushing shall continue until the Engineer determines that the mains are free from all foreign matter. The Engineer must be present during the entire flushing process. Any work done without his supervision will not be accepted.
- (B) PRESSURE TESTING:** After flushing of the water main is completed, all water mains shall be tested in accordance with AWWA C600 - Section 4. The test shall be performed with all hydrant valves (4 ½" or 5 ¼") closed, but all hydrant leg valves (6") open. All corporation cocks shall be open and angle valves inside meter boxes will be closed. The number of sections to be tested at one time shall be determined by the Engineer. Testing shall not be performed within 24 hours after the new main is filled or within two days after the thrust blocks have been poured. Test pressure at the high point in the new main shall be 200 psi, and this pressure shall be maintained for no less than two hours. Test pressures above 200 psi must be approved by the Engineer. If after the two hour period the pressure has dropped more than five psi, a quantity of water must be used to bring the pressure back up to test pressure. This quantity of water must be metered and shall not exceed the following allowable leakage figures:

\* ALLOWABLE LEAKAGE IN GALLONS PER 1000 FEET OF MAIN

MAIN SIZE	4"	6"	8"	12"	16"	20"	24"	30"	36"
	.76	1.15	1.53	2.29	3.06	3.82	4.59	5.73	6.88

\* This table is figured for 200 psi. Engineer will provide allowable leakages for higher test pressures.

If the allowable leakage is exceeded, the Contractor shall repair the defective portion of the main until leakage is within the specified allowance. All leaks shall be repaired regardless of whether or not the allowable leakage is exceeded. The Engineer must be present during the entire pressure testing process. Any work done without his supervision will not be accepted.

**(C) DISINFECTION:** All water mains shall be disinfected by the Contractor in accordance with AWWA C651. The Contractor shall furnish qualified men to do the work who are experienced with chlorine and disinfecting agents. Disinfection shall be accomplished by the continuous feed method using liquid chlorine or a hypochlorite solution. If liquid chlorine (100 percent available chlorine) is used, a chlorine-gas water mixture shall be injected into the new main through a solution feed chlorinator and a booster pump. If hypochlorite is used, the hypochlorite solution shall be applied to the new main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions. In addition, a rate setter or meter may be required in order that the flow in gallons per minutes may be determined. Hypochlorites shall either be calcium hypochlorite (65 percent available chlorine in granular or tabular form) or sodium hypochlorite (5 - 15 percent available chlorine in liquid form).

Water from the existing distribution system or other approved source and the chlorine solution must both be made to flow at rates which will guarantee a chlorine concentration of 50-100 parts per million throughout the new main. This high concentration chlorine solution shall not be pumped into copper service connections (this could cause the copper to corrode). Concentrations above 100 parts per million must be approved by the Engineer. The main line valve separating the existing and new water mains shall remain closed during the disinfection process. A bypass line and backflow preventer will be used in order to prevent backflow into the existing system. The backflow preventer must be approved by the Engineer. Pumping of the chlorine solution shall be continued until tests conducted at the extremities of the new main indicate a concentration of the required 50-100 parts per million. The chlorinated water shall then be retained in the new main for 24 hours, during which time all valves and hydrants in the new main shall be operated in order to disinfect all parts of the system. After the 24 hour period there should be at least 10 parts per million concentration of chlorine throughout the main. The chlorinated water shall then be flushed from the main until the chlorine concentration in the water leaving the main is no higher than the concentration in the existing distribution system. The chlorinated water must be flushed into the sanitary sewer system or dechlorinated to 0 parts per million of chlorine prior to discharge. The Owner must be notified prior to flushing. Dechlorination shall be accomplished using approved equipment. While the main is being flushed, all service connections shall be thoroughly flushed in order to disinfect each connection.

After final flushing and before the main is placed in service, samples shall be collected by the Owner from the line and tested for bacteriological quality. The number of samples to be taken and the location of the samples shall be determined by the Engineer. The minimum number of samples shall be one for every 4,000 feet of pipe. No hose or fire hydrant shall be used in collection of samples. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated by the Contractor until satisfactory samples have been obtained. The Owner, upon 24 hours advance notice, will furnish the personnel and laboratory facilities to conduct the required bacteriological tests. No samples will be taken on Friday, the day before a holiday or on a holiday.

The Engineer must be present during the entire disinfection process. Any work done without his supervision will not be accepted. Pounds of calcium hypochlorite used for disinfection shall be as follows:

POUNDS OF CALCIUM HYPOCHLORITE REQUIRED TO DISINFECT WATER MAINS WITH 100 PARTS PER MILLION OF CHLORINE

MAIN SIZE	POUNDS PER 1000 FEET OF PIPE
4"	0.8
6"	1.8
8"	3.1
12"	7.0
16"	12.4
20"	19.4
24"	28.0
30"	43.9
36"	63.0

**IV. MEASUREMENT AND PAYMENT**

Payment for the preceding provisions should be included in the appropriate contract pay item listed below. If the contract does not include specific pay items for the preceding provisions, measurement will not be done and items will be considered incidental to other contract pay items.

*Relocate Sanitary Sewer Clean-out* will be measured and paid for per each.

*Remove Water Valve* will be measure and paid for per each.

Payment will be made as follows:



<b>Pay Item</b>	<b>Per Section</b>
__" Water Line	1515
__" Valve	1515
__" Tapping Valve	1515
__" Water Meter	1515
Fire Hydrant	1515
__" Sanitary Gravity Sewer	1520
Sanitary Sewer Clean-out	1520
__' Dia Utility Manhole	1525
Utility Manhole Wall __' Dia	1525
Abandon __" Utility Pipe	1530
Remove Utility Manhole	1530
Remove Water Meter	1530
Remove Fire Hydrant	1530

<b>Pay Item</b>	<b>Pay Unit</b>
Relocate Sanitary Sewer Clean-out	Each
<del>Remove Water Valve</del>	<del>Each</del>

The attached approved vendor list is being provided as an attachment to these special provisions for the Contractor's information and is not intended as identification of a sole supplier or a proprietary item. Replacement parts and repair kits for these items are on inventory with the City of Winston-Salem/Forsyth County.

**WINSTON-SALEM/FORSYTH COUNTY PREFERRED PRODUCTS LIST**  
**(For Information Only)**

<b>Item</b>	<b>Vendor</b>	<b>Size / Model Number</b>
Sewer Connection Combination Wye	Charlotte Pipe and Foundry Co.	SV-32
Sewer Connection Combination Cleanout	Jumbo Manufacturing Co.	184
Corporation Stop	Ford Meter Box Co.	FB-1000-XX-G
	McDonald Mfg. Co.	4701BT
Fire Hydrant	Mueller Co.	Super Centurion 250
	American Flow Control	MK-73-5
	Kennedy Valve Co.	K-81A
Manhole Ring & Cover	East Jordan Iron Works Co.	V-1384-1 (ring) V-1384 (cover)
	U.S. Foundry & Manufacturing Corp.	669 (ring) KL (cover)
Water Meter Box	Sigma Corp.	
	SIP Industries	
	DSI Industries	
Water Meter Yoke	Ford Meter Box Co.	Y501 (5/8")
		Y504 (1")
	Mueller Co.	H-5010
	McDonald Mfg. Co.	14-1
Angle Valve	Ford Meter Box Co.	BA94-313W-G (3/4")
		BA94-313-G (3/4")
		BA94-44W-G (1")
Retainer Glands	EBBA Iron, Inc.	Megalug Series 1100
	Ford Meter Box Co.	Uni-Flange Series 1400
	Romac Industries, Inc.	RomaGrip
	Sigma Corp.	One-Loc
	Smith-Blair, Inc.	Cam-Lock Series 111
Sewer Service Saddle	Romac Industries, Inc.	CB
Water Service Saddle	Romac Industries, Inc.	202
	Smith-Blair, Inc.	313-024
Gate & Tapping Valve	Clow Valve Co.	
	M & H Valve Co.	
	American Flow Control	
	U.S. Pipe and Foundry Co.	
	Mueller Co.	
	Kennedy Valve Co.	
Tapping Sleeves	Mueller Co.	
	American Flow Control	
	Tyler Pipe Co.	
	U.S. Pipe and Foundry Co.	
	Kennedy Valve Co.	
Tapping Saddles	American Flow Control	
	U.S. Pipe and Foundry Co.	

PROJECT SPECIAL PROVISIONS  
Utility

UTILITIES BY OTHERS

General:

The following utility companies have facilities that will be in conflict with the construction of this project.

- A) Duke Energy – Power (Distribution)
- B) Centurylink – Telephone
- C) Time Warner Cable – Cable TV
- D) Piedmont Natural Gas – Gas

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owner. All utilities are shown on the plans from the best available information.

The Contractor’s attention is directed to Article 105-8 of the Standard Specifications.

Utilities Requiring Adjustment:

- A) Duke Energy - Power (Distribution)
  - 1) See Utilities by Others Plans.
  - 2) Contact person is Ms. Lydia Hoots (336-917-2524).
- B) Centurylink – Telephone
  - 1) See Utilities by Others Plans.
  - 2) Contact person is Mr. Brian Mcniff (336-996-5999)
- C) Time Warner Cable – Cable TV
  - 1) See Utilities by Others Plans.
  - 2) Contact person is Mr. Ron Holmes (336-217-6742)
- D) Piedmont Natural Gas – Gas
  - 1) See Utilities by Others Plans.
  - 2) Contact person is Mr. David Jackson (336-761-8303).

NOTE: All other utilities will remain in place and will be adjusted as necessary.