



46

Project: WBS Element 30619
County: Wake

PROJECT SPECIAL PROVISIONS
Utility Construction

I. GENERAL CONSTRUCTION REQUIREMENTS:

Specifications:

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

Owner and Owner's Requirements:

The existing utilities belong to the City of Raleigh. The Contractor shall provide access for the owner's representatives to all phases of construction. The owners shall be notified according to procedures noted elsewhere in these provisions.

The Contractor must call the Public Utilities Department at telephone number 857-4540 and Public Works at 890-3030 and give the location, project name, individual's name, company name, start date and indicate if it involves water relocations. Interruption of water service on main lines shall be limited to a maximum of 4 hours unless approved by the Engineer.

Valve Operations:

No valve in the existing system shall be operated without following the procedure outlined below. Failure to comply with these requirements shall be grounds for suspension of pipe-laying operations until written assurances can be obtained from a company official that such noncompliance will not occur again. The Contractor should be aware that the City of Raleigh regards violations of these requirements as justifying punitive measures.

Notification procedures are as follows:

- a. The Contractor shall notify the City of Raleigh Public Utilities Department's Maintenance Division at 250-2737 in order to request the operation of any valves. At least forty-eight hours notice should be given to the Public Utilities Department, and at least twenty-four hours notice must be given to each consumer affected by a water cut-off. The Contractor is responsible for notifying the affected consumers. All valve operations shall be done by a Public Utilities Department valve crew or by the City's inspector for a particular project.

- b. The Contractor shall provide the following information when calling the Water Distribution Division for valve operation:
 - (1) Name of person calling;
 - (2) Name of company;
 - (3) Telephone number of company;
 - (4) Location of valve and map number if available;
 - (5) Reason for requesting operating and whether to be closed or open;
 - (6) Time valve to be opened or closed, and
 - (7) Approximate time water line to be out of service.
- c. Each time a Contractor needs a valve operated, he/she shall again secure permission, following the steps outlined.
- d. System valves shall be defined as any valve, which has main pressure against either gate face. Newly installed tapping valves and control valves to networks not yet accepted for service are considered as system valves. Valves within a network still under construction are not considered as system valves.

In the case of an emergency, the Contractor shall be allowed to take such steps with the valves and hydrants as are necessary for the protection of life and property. Notification must be made after a break in a four inches or larger water main, or where ruptured smaller lines are causing property damage. After an emergency valve operation, the Contractor shall notify the Maintenance Division and give the details for that operation.

Hydrants shall not be operated without following the above procedures relative to requesting operating permission and reporting emergency use of hydrant.

Construction Water:

The City of Raleigh Public Utilities Department does not provide free or otherwise unmetered construction water for any construction project. Hydrant meters may only be moved with express written permission of the Public Utilities Department. In residential areas hydrant meters may only be used for the filling of swimming pools unless prior approval of the Public Utilities Department. Contractors are responsible for adequate construction water for their job sites in one of the following approved manners:

- a. Apply for permanent water service connection at the Inspections Department Permit Office, 4th floor, Raleigh Municipal Building, 222 West Hargett Street, (890-3450). Sufficient lead-time (6 weeks) should be provided for all new service taps and all fees must be paid in full prior to the work order being authorized.

- b. Apply in person with the Public Utilities Meters Division Office, 3304 Lake Woodard Drive, for rental of a hydrant meter. There are a limited number of these meters and they are reserved in advance by contacting the Meter Division (250-2797). A deposit is required along with a per month rental fee per account plus the cost of the water used, at the outside City rate. Hydrant meters are read in 100 cubic feet (ccf). There is a minimum rental fee and an administration fee for billing and closing an account. A service charge is charged when accounts are closed. Customers are responsible for notifying the Meters Division if the meter is not registering usage. The following information is required:
- (1) Meter location;
 - (2) Billing address, telephone number, responsible party name, and federal tax id#;
 - (3) Location of hydrant;
 - (4) Water to be used for;
 - (5) Duration of use and frequency of meter reading,
 - (6) Meters must be brought to the Utilities Operations Center for monthly reading.
- c. Upon application approval, the City shall install Hydrant meters and approved backflow prevention Devices on the fire hydrant requested by the customer, but acceptable to the City, within three (3) business days of the application and deposit being received.
- d. Hydrant meters accounts are billed monthly. Failure To report usage in timely manner for billing or accounts that are not paid in full will result in the loss of water service and the closing of the account with the City.
- e. Hydrant meters will only be set when the temperature is over 35 degrees. Damage to meters from cold weather or abuse will be charged to the customers.
- f. Hydrant meters used for long term use shall be returned at the end of every one year block for inspection.
- g. Upon completion of hydrant usage, deposits shall be refunded to customers within 30 days provided the following has occurred:
1. Hydrant meter and backflow device have been returned in good condition, with no excessive wear nor damage.

2. All outstanding water usage charges and rental charges for the meter and backflow device have been paid in full by the customer.
- h. The cut off to apply for new accounts is 3:00 PM each business day.
- i. It is a violation of the City Code to establish a direct connection to a fire hydrant to fill a tank or tank vehicle. It is also illegal to use a RP or Double detector check valve on a domestic or fireline service for temporary water service. Violations of the City Code will result in loss of service, fines, and other measures as specified by the Code.
- j. Continued use of a hydrant meter, when usage readings are not being registered is considered theft of City water and subject to civil penalties of \$500.00/day. It is the responsibility of the customer to notify the Meters Division at 250-2737 when the meter is not registering/recording the water usage properly.
- k. Hydrant meters and backflow assemblies approved for use in this program is the property of the City of Raleigh Utilities Department. Failure to return the hydrant meter and backflow preventer at the end of the rental period will be considered theft of City property and prosecuted to the fullest extent of the law.

Note: Individuals caught using water unmetered and/or unauthorized by the Public Utilities Department will be prosecuted to the fullest extent of the law.

Explosives:

The use of explosives shall be in accordance with Article 107-11 of the Standard Specifications.

The Contractor shall secure a permit from the City of Raleigh Fire Marshall when the use of explosives is desired.

Utility Pipeline Construction:

Prior to any excavation or construction, the Contractor shall locate all existing utilities in the field. If help is needed in locating utilities operated by the City of Raleigh Public Utilities Department, the Contractor should contact the Construction Division (250-2737).

The maximum length of open trench shall be no more than 300 feet and no less than 20 feet, unless approval is obtained from the Engineer.

Maximum horizontal deflections for ductile iron pipe shall be as follows for an eighteen foot joint of pipe:

MAXIMUM DEFLECTION IN INCHES

<u>Size Pipe</u>	<u>B & S</u>	<u>MJ</u>	<u>Push-on-Joint</u>
6"	7"	27"	19"
8"	15"	20"	19"
10"	14"	20"	19"
12"	12"	20"	19"
14"	10"	13"	11"
16"	9"	13"	11"
18"	8"	11"	11"
20"	7"	11"	11"
24"	6"	9"	11"
30"	5"	9"	11"
36"	4"	8"	11"
42"	4"	7"	7"
48"	3"	7"	7"

When a water main crosses over a sewer main, there must be eighteen inches of vertical separation. If the water main must go under the sewer main, then both these lines must be of ductile iron for a distance of ten feet on either side of the crossing with a twelve inch vertical separation. The crossing of other underground pipe requires a minimum of twelve inches of vertical separation. The Engineer must approve any changes in these clearances. All crossings within these vertical clearances shall be filled with #67 stone.

When a water line passes under a storm sewer, it shall be protected by pouring a concrete pad under the storm sewer to prevent future settlement and infiltration. No extra compensation shall be allowed for the pad.

Setting Valves and Valve Boxes

Valves shall be set at locations shown on the plans with care being taken to support the valve properly and to accurately position the valve box over the operating nut of the valve. Where pavement is existing, the box shall be adjusted to finished street grade and a concrete pad two-foot square and six-inches thick shall be poured around the box two inches from the top of finished grade as shown in detail W-17. When valves are located in street rights-of-way, but out of pavement, the boxes shall be adjusted to finished grade and a concrete block twenty-four inches square and six inches thick shall be poured around the box one-half inch from the top. When valves are located outside of street rights-of-way, the boxes shall be adjusted six inches above the finished

grade, and a concrete block twelve inches square and six inches thick shall be poured around the box at grade line. Valve locations out of street rights-of-way shall be marked with some type of metal post having a minimum diameter of two inches and a minimum bury of thirty-six inches with a minimum of thirty-six inches exposed. The exposed portion shall be painted bright orange and shall be placed so that a valve-operating tool has free operation.

When a tapping sleeve and valve are being used, the valve, sleeve and machine assembly shall be air tested to hold at 150 psi for a five-minute duration in the presence of the inspector prior to drilling or tapping the main. The valve shall be in the open position during the testing.

Setting Fittings:

Fittings shall be set at locations shown on the plans with care being taken to properly "bell-up" joints and support the body of the fitting. All dead-end lines shall be plugged with mechanical joint plugs or caps and anchored by using thrust collars and blocking.

Setting Hydrants:

Specific directions are required for the setting of all hydrants. In streets where paving is proposed in the near future, the Contractor will be given line and grade stakes for hydrants. It is mandatory for the Contractor to preserve these stakes for the inspector to verify that the hydrant was set correctly. In areas where paving is not anticipated in the near future, hydrants shall be set according to the inspector's directions. When fire hydrants are installed behind guard rails the breakaway flange will be flush with top of the guard rail. In general, hydrants shall be located in a manner to provide complete accessibility and minimize possibility of damage from vehicles or injury to pedestrians.

Hydrant installation shall be as shown in details and will be rodded from the main to the hydrant with a maximum one rod coupling. If the distance is greater than 20 feet the hydrant shall be rodded to a thrust block as shown in details. When hydrants are used as blow-offs assemblies, the valves shall be rodded to a thrust block. Restraining rods and accessories shall be "hot dipped" galvanized.

Before a hydrant is set, all dirt and foreign matter shall be removed from the interior of the hydrant.

Hydrants shall be bagged, to indicate "out of service", until all testing is complete and the mains are placed in service. Bags shall be large enough to cover entire hydrant and shall be black in color. Bags shall be secured with duct tape at the base of the hydrant and shall be removed immediately after the hydrants are placed in service.

Reaction Blocking:

All fittings or components subject to hydrostatic thrust shall be securely anchored by the use of concrete thrust blocks poured in place, unless otherwise directed by the Engineer. The reaction areas required for these thrust blocks shall be as noted on the details. Where concrete must be reinforced, the Contractor shall furnish such reinforcing as is required. The Contractor shall furnish all reaction blocking and reinforcement at no additional cost. Blocking shall be placed between solid ground and the pipe fitting to be restrained. The blocking will be so placed as to allow access to the fitting for repair.

Material for reaction blocking shall be transit-mixed concrete. This concrete shall have a twenty-eight day compressive strength of 2500 psi. Any metal used to resist thrust which is not encased in concrete shall be galvanized or otherwise treated for corrosion resistance or shall be painted as directed by the Engineer.

Valves on ductile iron lines shall be anchored with thrust collars.

Tapping valves shall have a concrete block underneath to support the valve and prevent rotation of the valve and sleeve around the tapped main.

Where any section of a main is provided with concrete reaction backing for fittings or hydrants, the hydrostatic pressure test shall not be made until 3 days after installation of the concrete reaction backing, unless otherwise approved by the Engineer. The Contractor shall furnish all labor, materials, and appurtenances to perform the tests.

On tie-in sections, the Contractor may be required by the Engineer, to anchor pipe bends, tees, etc. with precast concrete blocking, timbers, rodding, or other approved method to allow the water line to be placed back into service as soon as possible.

CHLORINATION

1. All additions or replacements to the water system, including fire lines, shall be chlorinated before being placed in service. Such chlorination must take place under the supervision of the Engineer.
2. Pipe subjected to contaminating materials shall be treated as directed by the Engineer. Should such treatment fail to cleanse the pipe, replacement shall be required. The Owner shall bear no portion of any cost sustained by the Contractor in meeting this specification.
3. Chlorination of a completed line shall be carried out after completing the pressure test and in the following manner.

- a. Taps will be made at the control valve at the upstream end of the line and at all extremities of the line including valves. These taps shall be located in such a manner as to allow HTH solution to be fed into all parts of the line.
- b. A solution of water containing high test hypochlorite (70%) available chlorine or chlorine gas solution shall be introduced into the line by regulated pumping at the control-valve tap. The solution shall be of such a concentration that the line shall have a uniform concentration of 50 ppm total chlorine immediately after chlorination. The chart below shows the required quantity of 70% HTH compound to be contained in solution in each 1000 foot section of line to produce the desired concentration of 50 ppm.

<u>Pipe Size</u>	<u>Pounds High Test Hypochlorite (70%) Per 1000 feet of Line</u>
6"	0.88
8"	1.56
10"	2.42
12"	3.50
14"	4.76
16"	6.22
20"	9.76
24"	14.00
30"	31.50
36"	14.29
48"	56.00

- c. The HTH solution shall be circulated in the main by opening the control valve and systematically manipulating hydrants and taps at the line extremities. The HTH solution must be pumped in at a constant rate for each discharge rate in order that a uniform concentration will be produced in the mains.
- d. Services shall be sterilized by methods acceptable to the Engineer, and the Contractor shall have the same responsibility for laterals as for mains in regard to bearing full cost of any corrective measures needed to comply with bacteriological or other requirements.
- e. HTH solution shall remain in lines for no less than twenty-four hours, unless otherwise directed by the Engineer.
- f. Extreme care will be exercised at all times to prevent the HTH solution from entering existing mains.

BACTERIOLOGICAL SAMPLING

1. Free residual chlorine after twenty-four hours shall be at least 10 ppm, or the Engineer will require that the lines be rechlorinated.
2. Flushing of lines may proceed after twenty-four hours, provided the free residual chlorine analysis is satisfactory. Flushing shall be continued until chlorine returns to normal levels. During times of water shortages or distribution main problems, the flushing operation may be delayed. The Engineer shall determine when flushing is allowable. The Contractor shall advise the Engineer prior to the chlorination and flushing so that the Engineer can advise the Public Utilities Department of the construction location, size and length of mains. All tests will be done in the presence of the Engineer. Flushing will be for short durations.
3. The City of Raleigh shall collect samples for bacteriological analysis for each section of pipe between main line valves after flushing is completed. The Contractor shall furnish such help as may be required to secure these samples.
4. In the event that two successive bacteriologic tests fail, that section of the main shall be rechlorinated by the Contractor and new tests performed prior to moving to the next section of main.

SEALED AS BUILT PLANS

Certified surveyed "As built" plans and profiles, sealed by a Professional Land Surveyor, shall be furnished to the Engineer upon completion and acceptance of the public main by the City. The surveyed "as-built" plans shall have North Carolina Geodetic Survey grid coordinate to all meter boxes, valves, manholes, and mains along with the depth information. The water permit number information must also be included. Surveyed "As built" plans of installed utilities shall be furnished to the City prior to issuance of the letter of acceptance. All service stubs shall be shown on the surveyed "as-built" plans.

Certified surveyed "As Builts" should be provided in digital format. The digital file of utilities needs to show the overall water and sewer system layout along with the property or subdivision boundaries and connecting manhole. The water distribution system drawings should show main sizes, material, hydrants, valves, blow-off assemblies, and any other relevant information (backflow preventors, air release valves, etc.). The digital file should be delivered in DXF format. If this is not possible, then, DWG, DGN, and SHP are also acceptable formats.

III. COMPENSATION

No direct payment will be made for utility construction work required by the preceding provisions, which are general requirements applying to utility construction, and all of the requirements stated will be considered incidental

work, paid for at the contract unit prices of the various utility items included in the contract.

1. FIRE HYDRANT:

Fire hydrants shall be installed in accordance with the applicable utility provisions herein, as shown on the utility plans, and/or as directed by the Engineer.

Fire hydrants shall be iron body, fully bronze mounted, dry barrel type conforming to AWWA C502-94 and shall be suitable for a working pressure of 150#. Hydrants shall be constructed to permit withdrawal of internal working parts without disturbing barrel or casing. Valves, when shut, shall be reasonably tight when upper portion of the barrel is broken off. All hydrants shall have a breakable safety flange located at the connection of the barrel of hydrant. Nozzles shall have Raleigh Standard Threads and shall consist of the following: 2-two and one-half inch nozzles, and 1-5" Storz connection nozzle. The nozzle shall be an integral part of the fire hydrant and must be furnished by the manufacturer. Storz connector shall have the following characteristics: brass hydrant nozzle connection; have hard anodized aluminum storz ramps and lugs (hydrant and cap side); and require a high-torque Storz spanner wrench in order for the cap to be removed. Bronze to bronze threads shall be provided between the hydrant seat or seat ring and the seating attaching assembly. All hydrants must include cast or ductile epoxy lined shoe, rubber drain seals and positive, protective valve stop device. Working parts shall be bronze. Design, materials, and workmanship shall be similar and equal to the latest stock pattern ordinarily produced by the manufacturer. Nipple caps shall be securely chained to the barrel. Valve opening shall be 5 1/4 inches in diameter. Barrel shall be of sufficient length to stand approximately thirty inches above ground and maintain a cover of 36" unless otherwise specified. Hydrants shall be painted with one coat of red lead paint and two coats of approved paint of the owner's standard color. Final coat shall be applied after hydrant installation. Hydrants shall be open-left type.

Fire hydrants shall be located and installed as shown on the utility plans. Each hydrant shall be connected to the main with a 6-inch branch line having at least as much cover as the distribution main. Hydrants shall be set plumb with the pumper nozzle facing the roadway and with the breakaway safety flange between 1 and 4 inches above the finished surrounding grade. Except where approved otherwise, the backfill around hydrants shall be thoroughly compacted to the finished grade line immediately after installation to obtain beneficial use of the hydrant as soon as possible. Not less than 7 cubic feet of clean crushed stone shall be placed around the base of the hydrant to insure drainage of hydrant barrel.

Fire hydrants, installed in accordance with the plans and provisions herein and accepted, will be measured and paid for at the contract unit price per each for "Fire Hydrant, 150# WP". Such prices and payments will be full compensation for all materials, labor, excavation, rods, reaction backing, stone, installation, backfilling, and incidentals necessary to complete the work as required.

2. REMOVE AND STOCKPILE EXISTING FIRE HYDRANT:

The existing fire hydrants to be removed and stockpiled will be separated at the hydrant base from the existing pipe and stockpiled in an area accessible by truck or as directed by the Engineer.

After the fire hydrants are stockpiled, the contractor shall contact the City of Raleigh in order for them to receive and remove the fire hydrants.

The quantity of fire hydrants removed, and accepted, will be measured and paid for at the contract unit price per each for "Remove and stockpile Exist Fire Hydrant". Such price and payment will be full compensation for all labor, excavation, removal, stockpiling, and incidentals necessary to complete the work as required.