# WEATHERFORD MUNICIPAL UTILITY BOARD

# WATER AND WASTEWATER STANDARD SPECIFICATIONS POLICY

**Revised June 20, 2017**

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## GENERAL REQUIREMENTS

(1) Governing Specifications and Details: The design and construction of water and wastewater facilities to serve a subdivision or a development shall be in accordance with these regulations,

- City of Weatherford requirements and Standard Construction Details;
- The Standard Specifications and Drawings for Public Works Construction as published by the North Central Texas Council of Governments (NCTCOG);
- Texas Commission on Environmental Quality (TCEQ) criteria;
- Good engineering principals.

Materials and procedures shall be in accordance with City standard details and materials list and shall supersede NCTCOG specifications.

(2) Warranty Period: All water and wastewater improvements shall have a warranty period of two (2) years. A maintenance bond or other acceptable form of surety shall be submitted for all public water and wastewater improvements. The surety shall cover 100% of the public improvements for a period of two (2) years. Surety types and amounts shall be approved by the Director of Water/Wastewater Utilities or his/her designee and shall be based on engineering estimates or contractor prices.

(3) Minimum Line Sizes:

(a) Water: The minimum line size to serve single family residential areas shall be six (6) inches in diameter and the minimum line size to serve apartments, commercial property, industrial property or property the requires fire protection shall be eight (8) inches in diameter.

(b) Wastewater: The minimum line size shall be eight (8) inches in diameter.

(4) Service Line Sizes:

(a) Water Service: Service lines shall be installed for each lot within the subdivision. The minimum line size for a residential water service on a lot shall be one (1) inch in diameter.

(b) Wastewater Service: Wastewater services shall be sized in accordance with the International Plumbing Code currently adopted by the City of Weatherford. In no case shall a service size be smaller than four (4) inches in diameter.

(5) Connecting to Existing Facilities: Prior to finalizing the design of any proposed water or wastewater facilities, the developer shall meet with the City to discuss the proposed water and wastewater connection points. Connections will be allowed only at locations where the City believes that sufficient quantity and pressures are available to meet the projected requirements of the subdivision or development. No connections to the City's water and

wastewater facilities will be allowed without the approval of the City's inspector and until all new lines have successfully completed the required testing.

(6) Future Extensions beyond Subdivision Boundary: Depending on the location of the proposed subdivision or development, the City may require the developer to provide accommodations for future water and wastewater extensions to the adjacent properties. The accommodations, as well as any required easement dedications, shall be provided at no cost to the City.

(7) Emergency Maintenance by City: If during, the warranty period of subdivision's water distribution or wastewater collection system, a situation arises which requires immediate attention, the City may perform emergency maintenance or repair operations. The cost of such work shall be paid for by the developer/contractor.

(8) Service Lines: Water and wastewater service line locations may vary with each development. The developer must obtain City approval of service line locations prior to construction. Where appropriate, after the curb and gutter has been installed, the service lines shall be marked by inscribing a "W" or "S" in the face of the curb at the service line location.

(9) Route Markers: Where, in the opinion of the City, a proposed water or wastewater line route requires additional identification, the developer shall install City provided route markers at all locations required by the City.

(10) Detector Wire: 12 gauge Copper Head (or approved equivalent) tracing wire system shall be used on all water and wastewater pipelines. The detector wire shall be placed on top of the pipeline and taped in place at five foot intervals. No underground splices are allowed. Above ground tracing stations are required at splice points and/or as directed city staff. Detector wire for water lines shall be blue in color. Detector wire for wastewater lines shall be green in color.

(11) Boring Requirements: All boring operations shall comply with City of Weatherford requirements and Division 500 "Underground Construction & Appurtenances" of the NCTCOG Specifications. Spacers for cased bores shall be Raci Spacers, or an approved equivalent.

(12) Aerial Crossing: Generally, aerial crossings are to be avoided. In the event that an aerial crossing cannot be avoided, it shall be designed by a structural engineer licensed in the State of Texas. All aerial crossings shall be installed with steel encasement pipe. The carrier pipe shall be installed with Raci spacers or approved equivalent. Aerial crossings shall be designed to withstand hydrostatic and buoyancy forces for the 100 year storm event. Bank stabilization shall be provided to prevent erosion of bank sections. Pier supports shall be spaced and designed to ensure that adequate grade, slope and structural integrity are maintained.

**SPECIFICATIONS FOR WATER IMPROVEMENTS**

(1) Water System Materials and Installation: All material and appurtenances must be in compliance with City of Weatherford and NCTCOG specifications and must be approved by the City prior to construction.

(2) Water Pipe: All water pipe materials shall comply with City of Weatherford requirements and Division 500 "Underground Construction & Appurtenances" of the NCTCOG Specifications.

Water lines twelve (12) inches or less in diameter shall be PVC, AWWA C900, DR-14, blue in color. Pipe material for water lines sizes greater than twelve (12) inches shall be evaluated on a case-by-case basis.

(3) Water Line Fittings: Fittings shall be ductile iron (cement lined, bituminous coated and double poly wrapped) and shall be installed with restrainer glands. Fittings shall comply with City of Weatherford requirements and Section 502.5 of the NCTCOG Specifications.

(4) Thrust Restraint: Thrust restraint for water lines shall be provided in compliance with City of Weatherford requirements and Section 502.4 of the NCTCOG Specifications.

(5) Service Tap and Service Line: All service taps and service lines shall comply with City of Weatherford requirements and Section 502.10 of the NCTCOG Specifications and be installed in accordance with Division 500 "Underground Construction & Appurtenances" of the NCTCOG Specifications. All service lines and fittings shall be lead-free.

(6) Fire Hydrants: Fire hydrants shall be provided as necessary to comply with City policy and be spaced in accordance with Table C-105.1 of the City's currently adopted Fire Code. Only approved national standard three-way fire hydrants with threads that match fire hydrants in use by the City will be allowed. Fire hydrants shall comply with City of Weatherford requirements and Section 502.3 the NCTCOG Specifications and be painted with Sherwin Williams International Red – F75RC7.

(7) Valves: Gate valves shall be used for water lines up to 16" in diameter. Valve types for water lines greater that 16" shall be approved by the City. Valves shall comply with City of Weatherford requirements and Section 502.6 of the NCTCOG Specifications. All lids for water valves shall be marked "WATER".

(8) Combination Air Release & Vacuum Relief Valves: Combination air release and vacuum relief valves shall be installed at high points along feeder mains, transmission mains or major mains to exhaust trapped air or relieve vacuum from the water distribution system. Additional valves may be required along long section of water line. Combination air and vacuum relief valves shall comply with City of Weatherford requirements and Section 502.6.3.1 of the NCTCOG Specifications. All combination air release and vacuum relief valves shall be installed in vault in accordance with the City's standard details with lids marked "WATER". The minimum size and type are as follows:

| Water Line Size | Minimum Size of Relief Valve | Type of Relief Valve |
|---|---|---|
| 12-inch & smaller | 1-inch | Combination |
| 16-inch to 36-inch | 2-inch | Combination |
| 42-inch and above | 3-inch | Combination |

(9) Water Meters: All water meters shall comply with City of Weatherford requirements. All meters less than two (2) inches shall be provided by the City. Meters larger than two (2) inches in size shall be compound type meters equipped with testing and calibration ports, shall have a metered bypass, and installed in a meter vault. All water meters larger than two (2) inches in size and associated equipment and vaults shall be supplied and installed by the developer or property owner and approved by the City of Weatherford.

(10) Meter Boxes: Meter boxes shall comply with City of Weatherford requirements and Section 502.10.2.4 of the NCTCOG Specifications. Meter boxes shall be of appropriate size and type for each application.

(11) Pressure Regulators: In low areas where pressures may exceed 80 psi, builders and plumbers should be advised that in such locations, pressure reducing devices should be installed in accordance with the current Plumbing Code adopted by the City. Pressure reducing valves will not be installed in the public water system.

(12) Fire Lines: All projects requiring fire lines shall be presented to the City for review. The following design criteria shall be considered to be the normal requirements for fire lines in the City's water distribution system:

(a) Double Detector Check Valve: All fire lines are required to have a double gate double detector check valve assembly. The double detector check valve and vault is to be located on private property. The detector check assembly may be located within a fire riser room if an appropriate floor drain is installed. Maximum distance from the water main to double detector check valve shall be 150' as measured in pipe lay length.

(b) Fire Line Testing: The City is responsible for inspection and testing of all fire lines on the owner's side of the meter, gate valve, or back flow preventer.

(13) Looping Requirements: In general, all water lines shall be looped with no dead-end lines. Where dead-end lines cannot be avoided, the maximum allowable dead-end length shall be 500 feet. Fire hydrants shall be provided at the end of all dead-end lines.

(14) Water Sample Stations: Water sample stations may be installed at the request of the City at major intersections, water transmission line tees/crosses, large water meters, or other locations to be designated by the City.

**Location of Facilities**

(1) Water Lines:

a. Lines within Street Right-of-Way: Water lines shall be located in the parkways between the back of curb and the street right-of-way. Water and wastewater lines shall not be installed on the same side of the street unless approved by the City.

b. Lines at Other Locations: Water lines shall be located within landscape areas and open areas. Water lines proposed to be installed under pavement or structures shall be avoided.

c. Separation from Other Utilities: Water lines location and separation distances from wastewater facilities shall meet the requirements of Chapter 217 and 290 of the TCEQ Rules and Regulations. Water lines shall be no closer than two (2) feet in all directions from any other underground utilities unless approved by the City.

(2) Meter Boxes: Water meter boxes shall be centered on the property line or easement line. When possible, the meter box should be located a minimum of two feet behind the back of curb.

(3) Fire Hydrants:

1. Single Family Residences: Generally, fire hydrants must be installed along a street at 500 feet intervals to comply with the City's currently adopted Fire Code.

2. Other Land Uses: For all other land uses, fire hydrants must be installed at 300 foot intervals, and be able to cover the entire building with 500 foot "hose lay".

3. Street Location: All fire hydrants must be installed at least two and one half (2½) feet, but less than eight (8) feet, from the back of the curb of the paved street or edge of a designated approved fire lane. Normal location is three (3) feet behind the curb and near a property corner if possible. Location of fire hydrants should be selected to provide shortest possible lead under street pavement. The location of fire hydrants that are not proposed near a street shall be approved by the City.

4. Fire Hydrant Elevation: The elevation of the fire hydrant shall be set to where the breakaway flange is two (2) to six (6) inches above finished grade and the fire hydrant openings are 18 to 28 inches above finished grade.

(4) Valves. Valves should be located at water line intersections and all fire hydrant leads. A 24"x24"x6" concrete pad shall be installed around all valve boxes in all areas. Stub-outs for future extensions shall have a valve as far as possible, but no further than twenty (20) feet, from the end of the stub-out.

**Typical Trench Requirements**

(1) Minimum Cover. Water lines shall be installed with a minimum cover of 42" over the top of the pipe.

(2) Embedment and Backfill. Embedment and backfill shall be installed in accordance with Division 500 "Underground Construction & Appurtenances" of the NCTCOG Specifications.

Typically, embedment for water mains shall consist of a six (6) inch sand bedding and a sand envelope surrounding the pipe. The envelope shall extend a minimum of six (6) inches either side of outside pipe wall and a minimum of six (6) inches over the top of the pipe. Sand embedment shall comply with City of Weatherford requirements and Section 504.5 of the NCTCOG Specifications.

a) In general, excavated material may be used in the trench backfill, provided:

1. All hard rock and stones having any dimensions greater than two (2) inches in diameter and debris and roots larger than two (2) inches are removed.

2. The material is approved for backfill by the City Inspector. Testing of the material may be required if the City Inspector finds that the material may be unsuitable.

b) In areas where the trench excavated material is unacceptable, the backfill shall be granular material complying with City of Weatherford requirements and Section 504 of the NCTCOG Specifications.

c) In areas where the water line will be under pavement, the water line shall be backfilled and pavement repaired in accordance with the City standard details for utility trench repairs.

**Testing and Disinfection**

(1) Hydrostatic Testing: All pipelines shall be hydrostatically tested in accordance with the procedures set forth in the TCEQ Rules and Regulations, City of Weatherford requirements and Section 506 of the NCTCOG Specifications. All testing shall be completed in the presence of a City representative.

(2) Disinfection: All pipelines and facilities shall be purged and disinfected in accordance with the TCEQ Rules and Regulations, City of Weatherford requirements and Section 506 of the NCTCOG Specifications. The contractor will be required coordinate with City staff to collect the sample. The sample will be tested at the expense of the City. Facilities shall be disinfected and sampled as necessary until satisfactory results are achieved. A minimum of 2 samples will be required at sample rate of one (1) per 1000 linear feet of new line installed.

**SPECIFICATIONS FOR WASTEWATER IMPROVEMENTS**

(1) Wastewater System Materials and Installation: All material and appurtenances must be in compliance with City of Weatherford and NCTCOG specifications and must be approved by the City prior to construction.

(2) Wastewater Pipe: All wastewater materials for main lines and service lines (pipes and fittings) shall comply with City of Weatherford requirements and Division 500

"Underground Construction & Appurtenances" of the NCTCOG Specifications. Wastewater lines and services twelve (12) inches or less in diameter at all depths shall be PVC SDR-26. Pipe material for sewer main lines greater than twelve (12) inches in diameter shall be evaluated on a case by case basis. Wastewater pipe shall be green in color.

(3) Service Tap: Service taps shall be standard wye and a 45° bend. No tees will be allowed.

(4) Force Main Pipe: All force main materials (pipes and fittings) shall comply with City of Weatherford requirements and Division 500 "Underground Construction & Appurtenances" of the NCTCOG Specifications. Force mains twelve (12) inches or less in diameter shall be green, PVC, AWWA C-900, DR-18. Pipe material for line sizes greater than twelve (12) inches shall be evaluated on a case by case basis. All force mains shall have isolation gate valves located at intervals no greater than 2000'. Gate valves shall comply with City of Weatherford requirements and Section 502.6 of the NCTCOG Specifications. Combination air and vacuum relief valves shall be required at high points along force mains and shall comply with City of Weatherford requirements and Section 502.6.3.1 of the NCTCOG Specifications. All combination air release and vacuum relief valves shall be installed in vault in accordance with the City's standard details. All lids for force main valves shall be marked "SEWER".

(5) Manholes: Manholes shall comply with City of Weatherford requirements and Section 502.1 of the NCTCOG Specifications. All lids for wastewater manholes shall be marked "SANITARY SEWER" or "WASTEWATER". All manholes shall be either cast-in-place concrete or precast concrete. Drop manholes shall be exterior drop only as shown on the City's details. Manholes in flood-prone areas shall be constructed with watertight frames and covers.

a) Placement: Manholes shall be placed at all points of change in alignment, grade or size of wastewater main, intersection of two or more wastewater mains, at the end of the line, and any locations to provide accessibility for maintenance ease. Manholes will be required for all size on size taps to the sewer main. Manholes may be required for certain types of businesses types regardless of the size of the business's sewer service.

b) Distance between Manholes: On wastewater mains, the maximum distance between wastewater manholes shall be 500 feet for straight segments. For curved segments, the maximum distance between manholes shall be 300 feet.

c) Wastewater Manholes in the FloodPlain: For wastewater main manholes located in the 100-year flood plain, manhole covers and rings shall have gaskets and shall be bolted or have approved means of preventing inflow. Where gasket manholes are required for more than three manholes in a sequence, a venting method, such as raising the rim at least one foot above 100-year flood plain, will be provided on every third manhole. If this is not practical, an approved alternate venting method, which will minimize inflow, will be used.

d) Manhole at End of Line: All wastewater mains shall end (highest point) with a manhole.

e) Flow Lines of Wastewater Mains: In manholes with pipes of different sizes (diameters), the tops of pipes shall be placed at the same elevation (crown to crown). Exterior drop invert installation is required if the connecting wastewater main having an elevation difference greater than 24 inches. Elevation difference 24 inches or less shall have a hydraulic slide to reduce turbulence.

f) Manhole Frame and Cover: Manhole covers for all wastewater manholes are required to have an opening of 30 inches in diameter or larger. All wastewater manholes in unpaved areas, in which the rim is at approximate ground level, shall have a concrete pad to secure manhole frame.

(6) Lift Stations: Prior to construction, the City shall approve the location and design of any proposed lift station. The developer should give consideration to items such as odor, floodplain location and aesthetics when selecting a proposed lift station site.

(7) Cleanouts: Cleanouts shall comply with City of Weatherford requirements and Section 502.2 of the NCTCOG Specifications. All lids for wastewater cleanouts shall be marked "SEWER". Prior to installation, the City shall approve the cleanout frame, cover, pipe and fittings. All cleanouts lids in unpaved areas shall be install with a 24"x24"x6" concrete pad at the ground surface.

(8) Minimum Cover: Where the topography requires that a wastewater main line is to be installed with less than 2 ½ feet of cover, the pipe shall be either encased in concrete or constructed of ductile iron pipe through the restricted area.

(9) Minimum Grades and Velocities: Minimum grades shall be maintained in constructing sewer lines in accordance with the requirements of the City of Weatherford and the TCEQ. The use of flatter grades may be approved by the City in special situations, but in no case shall the grades be less than that required to provide a minimum velocity of two (2) feet per second.

(10) Minimum Horizontal Curvature: Typically, sewer lines should be designed with straight alignments. When horizontal curvatures must be used, the minimum radius shall comply with the pipe manufacturer's recommendation, but in no case shall the radius of curvature be less than 300 feet. A manhole will be required at the point of curvature (PC), point of tangency (PT) and any point of reverse curvature (PRC) or compound curvature (PCC) of a curve. Maximum manhole spacing along curves shall be 300 feet.

**Typical Trench Requirements**

(1) Minimum Cover: Where topography requires that a wastewater main line is to be installed with less than 2 ½ feet cover, the pipe shall be installed in steel casing pipe through the restricted area.

(2) Embedment and Backfill: Embedment and backfill shall be installed in accordance with Division 500 "Underground Construction & Appurtenances" of the NCTCOG Specifications.

a) Typically, embedment for wastewater mains shall consist of a six (6) inch crushed stone bedding and a crushed stone envelope surrounding the pipe. The envelope shall extend a minimum of six (6) inches either side of outside pipe wall and a minimum of six (6) inches over the top of the pipe. Crushed stone embedment shall comply with City of Weatherford requirements and Section 504.5 of the NCTCOG Specifications.

b) In general, excavated material may be used in the trench backfill, provided:

1. All hard rock and stones having any dimensions greater than two (2) inches in diameter and debris and roots larger than two (2) inches are removed.

2. The material is approved for backfill by the City Inspector. Testing of the material may be required if the City Inspector finds that the material may be unsuitable.

c) In areas where the trench excavated material is unacceptable, the backfill shall be granular material complying with City of Weatherford requirements and Section 504 of the NCTCOG Specifications.

d) In areas where the wastewater line will be under pavement, it shall be backfilled and pavement repaired in accordance with the City standard details for utility trench repairs.

**Testing**

(1) Air and Mandrel Testing: Prior to acceptance, all gravity wastewater lines shall be air and deflection tested in accordance with the procedures set forth by the TCEQ Rules and Regulations, City of Weatherford requirements and Section 507 of the NCTCOG Specifications. All testing shall be accomplished in the presence of a City representative.

(2) Hydrostatic Testing of Force Mains: All force mains shall be hydrostatically tested in accordance with the procedures set forth in the TCEQ Rules and Regulations, City of Weatherford requirements and Section 506 of the NCTCOG Specifications All testing shall be accomplished in the presence of a City representative.

(3) Visual Inspection: All gravity wastewater mains must be visually inspected by closed circuit television inspection (CCTV). The City Inspector shall be on site during video inspection, and the City shall be furnished a video copy of inspection along with a report.

(4) Manholes: Manholes shall be tested separately and independently of wastewater lines by hydrostatic exfiltration or vacuum testing. The test shall be in accordance with the procedures set forth by the TCEQ Rules and Regulations, City of Weatherford requirements and Section 507 of the NCTCOG Specifications.

## PRIVATE WATER AND WASTEWATER INFRASTRUCTURE POLICY

(1) On rare occasions, the Developer may find it advantageous to serve the development by private water and wastewater infrastructure. Private water and wastewater facilities will only be considered for projects such as multi-family residential complexes, mobile home parks, recreational vehicle parks, condominiums, industrial complexes and retail complexes. The approval of private water and wastewater infrastructure shall be considered only on a case-by-case basis. This does not include the use of water wells and onsite sewer facilities (OSSFs).

(2) If private water and/or wastewater facilities are allowed, the property owner and/or developer will be required to submit an affidavit to the City stating that infrastructure is privately owned and maintained in perpetuity and include a copy of this policy as an attachment.

(3) The property owner and/or developer shall also comply with all applicable provisions of Federal, State and Local regulations which require submetering. In accordance with the Texas Water Code Chapter 13, the owner of a condominium, apartment house, manufactured home rental community, or multiple use facility, on which construction begins after January 1, 2003, shall provide for the measurement of the quantity of water, if any, consumed by the occupants of each unit through the installation of submeters or individual meters. Projects under construction or completed prior to January 1, 2003 may install or request individual meter from the City. All infrastructure up to the meter point must be in compliance with this policy. Conditions stated herein shall be required in order to allow the City to approve such requests. No exceptions to any of the requirements will be considered.

(4) All provisions for the construction of water and wastewater improvements shall be applied, in entirety, as specified in the **Water and Wastewater Standard Specifications Policy,** latest edition. The following additional requirements shall also apply:

**(a) Water**

1. Master Water Meter: A master water meter shall be constructed meeting all requirements as specified in **Water and Wastewater Standard Specifications Policy,** latest edition. The meter shall be sized to allow the unobstructed flow of water as required for fire suppression. The master meter shall be placed in public right-of-way or easement.

2. Backflow Prevention: An approved backflow prevention assembly shall normally consist of a Double Check Detector Backflow-Prevention Assembly, installed in a watertight concrete vault and in accordance with AWWA Manual M14. Care must be taken on the location of the assembly so as not to adversely effect the proper functioning of the master meter. The backflow prevention assembly must also comply with all provisions of 30 TAC Chapter 290, Subchapter D. The Owner will be perpetually responsible for all testing requirements. Failure of the assembly to pass tests or the failure to conduct such tests will result in service interruption.

**(b) Sewer**

1. Flow Measurement: If it is deemed necessary, the Developer will be required to install a suitable, solids handling flow metering device. Flow measurement should occur immediately adjacent to the development as the sewer main exits the property and be placed in public right-of-way or easement.

2. Whether or not flow measurement is required, the City may monitor wastewater exiting the development for quantity and characteristics. Should the City reasonably suspect abnormal amounts or uncharacteristic wastewater discharge is occurring, the Owner will be required to undertake any engineering studies, laboratory testing and/or construction to correct the situation.

## STANDARDS FOR MATERIALS FOR WATER MAINS AND SERVICES

1. All 4” to 12” pipe shall be PVC, AWWA C900, DR 14 class pipe, blue in color.

2. All mechanical type fittings shall be ductile iron type that meets all C110/A21-10 ANSI/AWWA standards. Additionally, fittings shall have mechanical joint restraints, EBAA iron series 2000 PV or approved equivalent.

3. All valves 2” through 12” shall be a resilient seat gate valve, and must meet all AWWA and fire protection standards. Approved brands include Mueller, Clow, or M&H. Valve larger than 12” shall be approved on a case-by-case basis.

4. The construction of all water mains and services shall include the installation of a blue 12 gauge Copper Head (or approved equivalent) tracing wire system.

5. Valve boxes shall include an adjustable two piece cast iron box or a non-adjustable 10” cast iron box with lids marked “WATER”.

6. All ductile iron tees shall be anchor type.

7. All ductile iron fittings shall be wrapped with 2 layers of 6 mil plastic wrap and securely taped.

8. All water services shall be K type copper with compression type fittings.

9. All new water service shall be a minimum of 1” in diameter.

10. Tapping sleeves shall be stainless steel or epoxy coated steel. Nuts and bolts shall be stainless steel.

11. Meter boxes shall be White Rhino or approved equivalent with 12 5/8” cast iron ring and lid or approved equivalent that will accommodate the City’s AMS meter system.

12. Fire Hydrants shall be Mueller Centurion, M & H model 129, or Clow Medallion, meet or exceed AWWA C 502 and field painted with Sherwin Williams International Red – F75RC7.

## STANDARDS FOR MATERIALS FOR WASTEWATER MAINS AND SERVICES

1. 4” to 12” pipe shall be SDR-26 with gasket.

2. 4” to 10” force main pipe shall be AWWA C 900, DR 18 minimum and be green in color. Pipe shall also have marking tape with wording; “Wastewater Force Main” attached to the pipe.

3. All wastewater service connections shall include a standard wye and a 45° fitting.

4. The construction of all wastewater mains and services shall include the installation of green 12 gauge Copper Head (or approved equivalent) tracing wire system.

5. All clean-outs located in the ROW shall have cast iron clean-out with a lid.

6. Watertight manhole lids and rings shall be Vulcan #330P or approved equivalent, with “SANITARY SEWER” marked on the lid.

7. Standard manhole lids and rings shall be EJIW 1495A Cover, EJIW V1420/1480Z1 Frame or approved equivalent, with “SANITARY SEWER” marked on the lid.

8. Valve boxes for force mains shall include an adjustable two piece cast iron box or a non-adjustable 10” cast iron box with lids marked “SEWER”.

## WASTEWATER LIFT STATION STANDARD SPECIFICATIONS

1) General Requirements: These specifications shall be considered typical requirements for a 480v 3 Phase, 20 HP lift station installation. Detailed specifications will be given once the voltage, pump horse power, wet well size, etc. are provided. 10 HP and above require a separate Soft Start and Bypass Enclosure. The City may consider alternatives for smaller lift stations serving residential developments of 50 or fewer lots or small nonresidential developments. A street or road shall be provided for all lift stations capable of supporting the City's trucks and equipment and shall be accessible during a 25 year storm event. Plans for lift stations shall be reviewed by the City for approval prior to construction. The design of all lift station shall be done by professional engineer licensed in the State of Texas. The design shall include a d

2) Pump Control Panels and Equipment:

    a) Control Panel Enclosures: The pump control panels shall be fully functional duplex pump control panels provided by a manufacturer approve by the City, including:

- NEMA 4X, 304 grade stainless steel enclosure with inner door and back plate, pad lockable;
- 3-point latch, documents pouch on back of front door. Welded brackets for rack mounting;
- Label all control wiring to match drawings;
- Provide two sets of hard copy and PDF copy of panel drawings including part and model numbers;
- 24 vdc surge protection for radar and submersible transducer;
- Power monitor with over & under voltage and phase loss protection, fuse primary;
- Control power 480v to 120v step down transformer. Primary fused with secondary circuit breaker.
- Panel heater with thermostat, Enclosure Heaters, RC 016 Series or equal;
- Pump 1 & 2 Seal Fail, light indication, NO pump shutdown;
- HOA for each pump with on and off light indication. No start or stop push buttons needed;
- Provide a two position switch on dead front soft start or bypass contactor. The soft starts will be the primary and the contactor will be the secondary;
- Time delay relays to prevent both pumps coming on at the same time after power outage;
- Soft start fault light indication (reset button to be located on soft start enclosure dead front);
- Contactor overload light indication (reset to be located on contactor enclosure dead front);
- High temperature motor winding shutdown with light indication and manual reset;
- Pump Alternator: Time Mark 261DT with toggle, 120v;
- Wiremold plastic channel, size channel for 50 percent fill;

- Label backside (terminal side) of dead front with the name of push buttons, switches and indicator lights;
- Red alarm beacon (side mounted, no top penetration; alarm horn not needed);
- Provide terminal spaces for incoming sub-transducer, radar, Devar 4-20ma output to SCADA panel and a 6 spare terminals;
- Provide a terminal strip in the control panel and a terminal strip in the soft start panel to tie both panels together;
- Furnish interconnect wiring between the pump control panel and soft start panel;
- Six inches of dead space at the bottom of Control Panel for customer use.

b) Pump Controller:

- Devar Model 3020A-4-420 analog retransmission (NO SUBSTITUTE)
  - Relay 1 - Low level
  - Relay 2 – Lead Pump On
  - Relay 3 – Lag Pump On
  - Relay 4 – High Level
- The Devar "pump on" remains latched until it reaches the "off" level. No holding circuit needed;
- Devar Low Level will shut down pump(s), manual reset, light indication;
- Primary level detection: Siemens LR250 Radar land on terminal strip;
- Secondary level detection: Siemens submersible transmitter Model 7MF1572-2HA10 land on terminal strip;
- Two position selector switch on dead front Transducer 1, Transducer 2 (input to Devar pump controller);
- There will be "High Level" alarms.ne from the Devar set-point and the other from a separate high level float;
- Momentary push button on dead front labeled "Maintenance Pump Down". This will bypass low level circuit;
- Provide dry contacts for SCADA use. Bring down to terminal strip;
- Control Panel Power Loss (get power loss from power monitor)
  - High Level Devar
  - Low Level Devar
  - High level float
  - Low level float
  - P-1 Status
  - P-2 Status
  - P-1 Motor over temp
  - P-2 Motor over temp
  - P-1 Seal fail
  - P-2 Seal fail
  - P-1 Starter overload
  - P-2 Starter overload
  - P-1 Soft Start fault
  - P-2 Soft Start fault
  - Pump 1 in Bypass

- Pump 2 in Bypass

c) Soft Start Enclosure: Cabinet that houses soft starts, bypass contactors, pump breakers, inner connecting terminal strip and soft start power supply etc.

i. NEMA 4X 304 stainless steel enclosure with back plate and a pad lockable 3 point latch and documents pouch on back of front door. Size 42”X48”X12” welded brackets for rack mounting. Soft Start Cabinet is oversized to accommodate future pump upgrades;
ii. P-1 & P-2 Pump breakers for 20 horsepower; Eaton or equal;
iii. Bypass-NEMA rated motor contactors with adjustable electronic overload. Size the overload for the 20hp to be in the middle of the current range; Eaton or equal;
iv. Soft Starts (Siemens IT S811 no substitute) no contactor needed with soft starts;
v. Soft start fault light indication on pump control panel and soft start panel; start dead front panel; P-1 &2 soft start power supply;
vi. Motor starter overload to have light indication on soft start panel dead front and pump control panel dead front. Starter overload reset on soft start dead front.

d) Sacrificial Panel:

i. Hoffman A36H2410SS6LP continuous hinge w/ clamps, pad lockable, Type 4X,
ii. 36Hx24Wx10D, stainless steel, with backplate. Or equal
iii. Square D Mfr **#:** 9080GH110, channel, 1 piece
iv. Square D Mfr #: 9080GR6, terminal Blk Section, quantity 20
v. Square D Mfr #: 9080GH10, end caps, quantity 2
vi. Square D Mfr #: 9080LBA362101, Distribution block, quantity 2
vii. Thomas & Betts # ADR25-21 AL, #6 to 250 kcmil
viii. MTL Surge Technologies Model # ZD16104, 277/480V, 3 Phase
ix. MTL Surge Technologies Model # ZD16100, 120/240V, 1 Phase
* See detail drawing

e) Pressure Transmitter:

i. Siemens DS3 Pressure Transducer part # 7MLF4033-10A10-1NC6-Z+21 (0-232PSI);
ii. Siemens Block and bleed valve Part # 7MF9011-4F;
iii. 2pr, 18ga. shielded twisted pair control cable;
iv. Rittal JB060604H4-Junction Box-Hinged Cover 6x6x4 NEMA 4X (This box is for the Pressure transducer located in the check valve vault. Mount box close to the 1 inch tap on the common pipe downstream from the check valve. Install ½ inch seal tight flex from the box to the pressure transmitter. Run a 2 pair #18 ga. Shielded twisted pair the SCADA panel to the pressure transducer.

f) Submersible Transducer:

i. 2-Siemens Submersible Transducer, part # 7MF1570-1NA01;
ii. Range-0-30 ft h2o, O/P 4-20ma, Standard 82ft cable;

iii. 2- Siemens submersible Transducer cable hangers Part number 7MF1572;
iv. 2-J-hook float bar hangers (5 J hooks on each);
v. 2- Keller Bellow assembly p/n 900001.0009;
vi. No splices in the transducer cable will be permitted;
vii. There will be a two position switch located on the pump control panel dead front marked Transducer 1 and Transducer 2. Both submersible transducers will be run to the wet well. Transducer 1 will be dropped down and hung one foot off wet well floor. Transducer 2 will be coiled up and hung on the float hanger bar.

3) Panel Rack and Canopy:
   a) An electrical equipment rack shall be constructed in accordance to and at the location specified in the plans and specifications. The exact location and orientation shall be approved by the City prior to installation;
   b) The equipment rack shall include all posts, racks, members, connecting hardware, roofing, concrete slab, and other parts as designated by the plan details;
   c) The concrete slab shall be slope to drain and be a minimum of two (2) inched above grade;
   d) Racks shall be grounded per the National Electric Code currently adopted by the City of Weatherford;
   e) Panel mounting members shall be Unistrut or approved equal;
   f) Roof frame, columns and supports shall be 4”x4”x14 gauge square steel tubing, painted with Sherwin-Williams Pro Industrial Acrylic Coating Color SW6741, and shall be constructed in accordance City’s standard detail drawing;
   g) All members and required connecting hardware shall be zinc plated;
   h) All members shall be welded with 3/16” fillet and partial penetration grove welds, 4/32” effective throat;
   i) Roof shall be Galvalume R-panel or approved equal.

4) Concrete Transformer Pad: A 6' x 6' concrete slab with a 5” minimum thickness shall be constructed at the location indicated on the plans in accordance with the plan details, Weatherford Electric specifications and the applicable provisions of the NCTCOG specifications.

5) Lift Station Site Electrical Systems: The following shall furnished and installed the following items per plan details:

   a) Conduits from Transfer switch to Utility Transformer.
   b) Conductors from Utility Transformer to Transfer Switch.
   c) Load Center and breakers
   d) Transfer Switch
   e) 15kva 480-120/240v Transformer
   f) Fiber Enclosure on panel rack
   g) Ground rod
   h) All power, SCADA, pump control, and fiber conduits. Fiber conduit shall be 2 inch PVC w/ long sweep elbows from panel rack fiber enclosure to hand-hole next to Utility Transformer. Hand-hole provided by City Electric Utilities.
   i) All power, SCADA, and pump control wires. Trac-n-Trol shall provide list of

conductors and cables that need to be pulled for SCADA.

j) Interconnect wiring between the Pump Control Panel and the Soft Start Panel. The interconnect wiring list will be provided by the Pump Control Panel Contractor.

k) Distribution Panel

l) The power panels and conduit runs shall meet the following specifications/details:

   a) Transfer Switch
      (1) Siemens FR355DTK, NEMA 3R, 600v, 400 amp 3/P fused Transfer Switch, On-Off-On ( normal-off-generator)
      (2) DS468GK Ground Lug Kit
      (3) 6- FR325DTK Lugs
      (4) 9- Ferraz Shawmut A6T225 fuses
      (5) DS200EK2 Aux switches 2-n/o, 2-n/c

   b) Distribution Panel
      (1) Wiegmann Cat# N4242408WW Junction Box with back plate. NEMA 3R, 24”x24”x8”, padlock compatible.
      (2) ILSCO PDH-19A-600-3, 3 phase Power Distribution Block
      (3) NSI Industries 8-350T4 Ground Lug
      (4) NSI AL-P2-K6 Neutral Block
      (5) Eaton circuit breaker WMZT2C30, 2P/30A/240v (CB-1)
      (6) Eaton circuit breaker WMZT3C30, 3P/30A/480v (CB-2)
      (7) Schneider Electric Circuit Breaker C60H, 24733, C60H-2P-63A-B curve (CB-3)
      (8) Schneider Electric Circuit Breaker part # 27727, cat # MG24457, 2P/63A/480v (CB-4)

   c) Panel Rack
      (1) One light switch mounted in a bell box with an Intermatic WP1000 weatherproof cover
      (2) 8- Globed Incandescent Light Fixtures, Lithonia VC150I
      (3) 4- single gang bell boxes with duplex receptacle and Intermatic WP1000 weatherproof cover, two on each side of panel rack

   d) Load Center
      (1) 12 circuit, NEMA 3R, 120/240 Breaker Stab Load Center
      (2) 10- 20amp s/p breakers

   e) Conduits
      (1) ¾ inch PVC stubbed up 12 inches out of the antenna base. The conduit on the other side to stub up on the panel rack near the ground rod. Install # 6 copper and bond to the panel rack and at the base of the antenna. Bond Panel rack and antenna tower to ground rod.
      (2) 1-¼ inch PVC from SCADA panel to Antenna tower. Rough in conduit to stub out of the center of the antenna concrete base 12 inches. SCADA integrator will install antenna cable.
      (3) ¾ inch PVC conduit from Load center to Odor Control System. 2-20 amp circuits, 1 for the odor control system and 1 circuit for well pump (if needed). Mount 2 gang bell box next to the Odor Control System. Leave well pump circuit in junction box if not needed.
      (4) ¾ inch PVC from SCADA panel to inside the check valve vault. Core drill 12

inches below finished grade into the side of check valve vault and run PVC over to the common header of the discharge valves close to the 1 inch tap for the pressure switch.

6) SCADA System Setup and Integration (By Others): The SCADA RTU Control Panel for all SCADA functions at the proposed Lift Station shall be provided and installed by the City's SCADA system integrator. The system shall include:
    a) One (1) Remote Terminal Unit (RTU) for the purpose of monitoring the proposed lift station. The RTU will include the following material:
        - NEMA 4X stainless steel enclosure with 3pt latching mechanism
        - Schneider Electric P357 Programmable Controller
        - GE/MDS Transnet Spread Spectrum Radio
        - Omron 24VDC/4A Power Supply
        - Altech UPS Module & Batteries
        - 120V Surge Suppression for incoming 120V branch circuit
        - 24V Surge Suppression for all analog current signals
        - SPDT Isolation Relays for both input and output signal wiring
        - 120V/15A duplex convenience outlet
    b) One (1) Rohn 25G Free-Standing Antenna Tower as required for telemetry communication. Antenna tower will shipped to the project site for installation by others. Antenna tower base will require a 4ft x 4ft x4ft excavated hole. See attached tower drawing for reference.
    c) Yagi Directional Antenna, coax and polyphasor as required.
    d) RTU programming as required

7) SCADA Antenna Tower: Shall include concrete antenna tower base and antenna tower per plan details. Antenna tower and hardware shall be provided by SCADA integrator. This item also includes the installation of an LED station light fixture and light switch to the antenna tower at a height of 15' above ground level. Light switch shall be housed in an Intermatic WP1000 weatherproof cover.

8) Pigging Point Installation: A pigging point assembly shall be installed at the location specified in the plans. The exact location and orientation shall be approved by the City prior to installation. The assembly shall include all wyes, fittings, pipe, valve, and concrete slab associated with the pigging point, as designated by the plan details.

9) Lift Station Site Surface: The lift station site surface shall consist of 2" washed gravel on 4" flexible base. Flexible base shall conform to the requirements of NCTCOG, Item 301.5 "Flexible Subbase or Base (Crushed Stone/Concrete)". Prior to placing the flexible base, the existing subgrade shall be proof rolled & compacted. A geo-textile filter fabric shall be installed between the compacted subgrade and the flexible base.

10) Lift Station Site Gate, 6' Chain Link Fence w/ Barbed Wire Security Top, & Mow Strip: This item consists of the work and materials required to install a gate, 6' chain link fence w/barbed wire security top and 12" wide mow strip around the limits of the proposed lift station site. Materials and installation for the fence shall meet the requirements of NCTCOG Item 801.4 "Chain Link Fence", NCTCOG Item 801.5 "Wire Fence" and the plan details.

Materials and installation for the mow strip shall meet the requirements of NCTCOG Item 303 “Portland Cement Concrete Pavement” and the plan details.