09.02 WATER MAIN MATERIALS

09.02.01 DESCRIPTION

A. In order to facilitate material selection and reduce confusion on what product(s) meet these specifications, the City of Monroe has produced an approved materials list for components that may be incorporated in the construction of water main facilities within the City. Note, only the manufacturer/supplier make and model will be accepted as listed where Approved Equal is not considered. The Water Resources Approved Materials List shall be made available by accessing the City of Monroe website.

B. Pursuant to the Reduction of Lead in Drinking Water Act, all water systems that provide water for human consumption must use materials, devices, and components that meet the "lead-free" requirement.

09.02.02 SHOP DRAWINGS AND SUBMITTALS

A. The City of Monroe shall have the right to request a Formal Submittal or a Subdivision Submittal.

1. Formal Submittal: As a minimum, three (3) copies of the following information shall be submitted to the City of Monroe Water Resources Department for review and approval:

    a. Shop drawings of all items to be fabricated
    b. Catalog cuts
    c. Manufacturer's specifications demonstration compliance with industry standards
    d. Manufacturer's installation recommendation for all items to be used in the works.

2. Subdivision Submittal: As a minimum, a complete list of all items including manufacturer/supplier, size, and model number proposed to be used shall be submitted to the City of Monroe Water Resources Department for review and approval. The Contractor shall reference and complete the form located at the end of this Section.

B. Any materials not listed in the following specifications may require a detailed review by the Water Resources Engineering Manager.

C. Depending on the nature of the work, the Water Resources Engineering Manager may request a sequence of work schedule, proposed methods and operations, and/or written procedures for field work.

09.02.03 PRODUCTS/MATERIALS

A. DUCTILE IRON PIPE (DIP)

1. Pipe shall be centrifugally cast ductile iron conforming to AWWA Standards for material, dimensions, tolerance, tests, markings, and other requirements.

2. All ductile iron pipe shall be cement lined of standard thickness in accordance with AWWA Standards. The interior and exterior of the pipe shall be coated at the factory with bituminous paint.

3. Twelve (12) inch and smaller diameter pipe shall be Pressure Class 350. Pipe greater then Twelve (12) inches in diameter shall be Pressure Class 250 and selection shall be based on the installation conditions. The pipe shall be cast in 18 foot laying lengths, clearly marked “ductile iron” or “D” and the working pressure class rating.

4. Joints

a. Ductile iron pressure pipe and fittings for buried applications is available with many gasketed type joints, including bell and spigot, mechanical joint, and various proprietary glandless locking/self-restraining configurations. All are available and acceptable for the noted use and application. Exceptions noted in (b.) below. The Developer/Contractor shall submit the proposed pipe joint(s) to the Water Resources Engineering Manager for review and approval.

b. All pipe within a steel casing shall be flexible restrained joint DIP, equipped with a factory applied spigot weld ring or weldment, which retains wedge-shaped locking segments. These locking segments are either inserted into the bell prior to spigot engagement or inserted after spigot engagement by caulking a snap ring into the bell or inserting segments through the slots cast into the bell face. Pipe that utilizes gaskets with embedded restraining grippers will not be accepted within the steel casing.

B. POLYVINYL CHLORIDE PIPE (PVC)

1. All PVC Pipe shall conform to the latest AWWA and ANSI standards and be certified as suitable by the NSF.

2. 2-inch PVC pipe shall be Pressure Class 315 with a minimum DR 13.5 wall thickness. All PVC pressure pipe, 4-inch through 12-inch, shall be Pressure Class 235, with a minimum DR 18 wall thickness.

3. Pipe shall bear the manufacturer's name, DR rating, and pressure rating and shall be furnished in lengths of 20 feet.

4. The outside diameter dimensions of the PVC pressure pipe shall conform to the outside diameter dimensions of ductile iron pipe.

5. Joints

   a. Joints shall be push-on in accordance with the standard for the type of material.
   b. Rubber gaskets shall be factory installed and conform to ASTM Standards
   c. The plain end of the pipe shall be marked by the manufacturer to show the depth of penetration into the bell.

C. DUCTILE IRON FITTINGS

1. All fittings shall be ductile iron, gasketed, compact style, cement lined, and have a pressure rating of 350 psi through 24-inch and 250 psi for diameters greater than 24-inch in accordance with AWWA and ANSI Standards. The fittings shall be restrained in similar fashion and materials as the pipe joint types. If flexible restraint joint fittings are used, a certain number of fittings must be mechanical joint to allow for field adjustments.

2. Fittings shall be marked "ductile iron" or "D" and the working pressure class rating.

3. Fittings shall be suitable for use with PVC pressure pipe.

4. Nuts and t-bolts shall be high strength, low alloy steel. Zinc coated hardware is not acceptable.

D. BRASS FITTINGS

1. Fittings for PVC water main up to 2-inch in diameter shall be lead free, brass, IPS threaded, self-restraining, and pressure rated at 300 psi.

E. MECHANICAL JOINT WEDGE ACTION RETAINER GLAND

1. Restraint shall be accomplished by use of a retainer gland that incorporates mechanical joint restraint into the follower gland with individually actuated wedges.

2. The joint restraint ring and its wedging components shall be made of grade 64-45-12 ductile iron. The wedges shall be ductile iron heat treated to a minimum hardness of 370 BHN.

3. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to AWWA Standards.

4. Torque limiting twist off nuts shall be used to insure proper actuation of the wedges.

5. Acceptable for use on PVC and DIP pipe.

6. Threaded restraining rods and bolts, and nuts and t-bolts shall be high strength, low alloy steel. Zinc coated is not acceptable.

F. TRACER WIRE & NON-METALLIC LOCATOR TAPE

1. Tracer wire shall be placed on all new water main and services.

2. Tracer wire shall be 12-gauge minimum stranded copper or 3/16-inch vinyl coated galvanized wire with thermoplastic insulation for direct burial.

3. Wire shall be tied to all valve boxes

4. Non-metallic, non-detectable locator tape shall be installed 1-foot below final grade. The tape shall be 3-inches in width and shall be blue and marked “Buried Water.”

G. FIRE HYDRANTS

1. Fire Hydrants shall conform to AWWA Standards. All fire hydrants shall be constructed with bronze main valve seat which screws into a threaded bronze connection at the base of the hydrant. All fire hydrants shall be rated at a minimum at 250 psi and be equipped with two 2-1/2” hose nozzles with National Standard Threads, and one 4-1/2” pumper nozzle with National Standard Threads.

2. All hydrants shall open by turning to the left or counterclockwise and shall have a minimum valve opening of 4-1/2”. The operating nut shall be 1-1/4” pentagon.

3. Hydrants shall be painted yellow, conforming to City of Monroe’s Color Code.

4. Hydrants will be re-touched as necessary after installation and prior to acceptance.

5. All fire hydrants located on private property that are connected to the City water distribution system but not owned or maintained by the City shall be painted a metallic silver to distinguish them from

City's fire hydrants. Connection to the public distribution system shall be not be granted until all private property fire hydrants conform to these specifications.

6. Hydrant bases shall either have mechanical joint or alpha joint ends.

7. Hydrants shall be furnished and installed with a gate valve, valve box, cover and concrete "doughnut" pad, 6-inch ductile iron branch, tee, stone or gravel drain pit, and concrete support and blocking. All pipe shall be restrained.

8. Tees for hydrant leads may be either all mechanical joint or swivel and mechanical joint. This is contingent upon the use of mechanical joint end or alpha joint end valves.

9. The use of a swivel joint fitting to adjust hydrant height may be permitted.

10. Outlet caps shall not come furnished with chains.

H. RESILIENT-SEATED GATE VALVES

1. Gate valves shall be of the resilient seat type with non-rising stems in accordance with AWWA Standards with a minimum working pressure of 200 PSI. Resilient seated gate valves must be furnished with durable opaque end shields to prevent ultra violet damage to the rubber discs.

2. Operators shall be permanently lubricated and total enclosed and be provided with a 2-inch square nut.

3. The direction of the opening shall be to the left or counterclockwise.

4. Ends greater than 4-inch shall conform to standards for ductile iron fittings as specified in Section 09.02.03-3 or be of the alpha design. Valves connected directly to a hydrant swivel tee shall have mechanical joint ends only. Valves connected by spool pieces to main line outlets (or tees (all MJ)) shall have mechanical joint or alpha ends. For water mains 2-inch in diameter, ends shall be threaded joint.

5. Inspection and factory testing shall be as specified in AWWA Standards.

I. TAPPING VALVES

1. All tapping valves shall meet the standards specified in Section 09.02.03-H, except that the ends shall be flange by mechanical joint.

J. TAPPING SLEEVES

1. All tapping sleeves shall be 14 gauge, type 304 stainless steel. The outlet flange shall conform to AWWA and ANSI Standards and be stainless steel or fusion bonded epoxy coated ductile iron. All nuts and bolts shall be type 304 stainless steel.

K. AIR RELEASE VALVES

1. All internal valve components shall be stainless steel.

2. The air release valve shall be float operated and shall incorporate a compound lever mechanism to enable the valve to automatically release accumulated air.

3. The body and cover shall be cast iron conforming to ASTM Standards.

4. Combination air and vacuum release valves shall be submitted on a case by case project and be approved by the Water Resources Engineering Manager.

L. SLEEVE TYPE, FLEXIBLE COUPLINGS

1. Center sleeve shall be fabricated of high strength carbon steel.

2. The interior and exterior shall be fusion bonded epoxy coated.

3. Nuts and bolts shall be type 304 stainless steel.

M. PIPE SPECIALTIES

1. RESTRAINT JOINT COUPLINGS

a. All cast components shall be ductile iron and fusion bonded epoxy coated.
b. Grippers shall be ductile iron, grade 65-45-12.
c. Nuts and bolts shall be type 304 stainless steel.

2. REPAIR CLAMPS

a. Repair clamps shall be full circle, 18-8 type 304 stainless steel.
b. Bands are to be single section for sizes to 12-inches
c. Nuts and bolts shall be type 304 stainless steel.

N. CASING PIPE AND APPURTENANCES

1. CASING PIPE

a. Steel casing pipe shall be in accordance with ASTM A139, Grade B or ASTM A252, Grade 2 and shall meet a minimum tensile strength of 60,000 psi, minimum yield strength of 35,000 psi , and minimum wall thickness as follows:

Carrier Pipe	**DOT Size**	**DOT Thickness**	**Railroad Size**	**Railroad Thickness**
6-inch	12.75"	.250"	16"	.281"
8-inch	16"	.250"	18"	.312"
10-inch	18"	.250"	20"	.344"
12-inch	24"	.250"	24"	.406"
16-inch	24"	.250"	30"	.469"
18-inch	30"	.312"	30"	.469"
20-inch	36"	.375"	36"	.562"
24-inch	36"	.375"	36"	.562"
30-inch	42"	.500"	48"	.750"

2. BRICK BULKHEADS

a. Brick shall meet the requirements of ASTM C32, Grade MS.
b. Mortar shall be composed of Portland Cement, hydrated lime, and sand (not to exceed 3 times the sum of the volumes of cement and lime).

3. CASING SPACERS

a. 14 gauge, type 304 stainless steel with 5/16'' type 304 stainless steel fasteners.
b. Runners shall be high molecular weight polyethylene.
c. Spacers shall electrically insulate water main from casing pipe to provide proper cathodic protection.

O. WATER SERVICE MATERIALS

1. BURIED TUBING/SERIVCE LINE

a. Service tubing shall be Type K soft temper copper with compression joints and fittings conforming to ASTM Standards. All service lines 1-1/2" and larger shall be PVC SDR-13.5 as specified in 09.02.03-B.

2. SERVICE SADDLES

a. Bodies shall be ductile iron conforming to ASTM Standards and fusion bonded epoxy coated for corrosion resistance.
b. Straps shall be type 304 stainless steel. Single bar straps are not acceptable.
c. All saddles for taps smaller than 1-1/2" shall have threads to accept standard AWWA Corporation valve inlet thread "CC". Services saddles for taps 1-1/2" and 2" taps shall have IPS Threads.

3. CORPORATION STOPS

a. Corporation Stops shall be lead-free, brass and comply with AWWA Standards and shall be high pressure rated at 300 psi. Inlet threads shall be "CC" standard AWWA taper. Outlets shall be compression style. All corporation stops shall be installed with a service saddle. No direct taps into water mains shall be allowed.

P. WATER METERS AND ASSEMBLIES

1. WATER METERS

a. All meters either to be furnished by the Contractor or supplied by the City of Monroe shall be consistent with the current fiscal year bid specification used for City meter procurement. The specification is made available at the office of the Water Resources Engineering Manager.

2. ASSEMBLIES

a. Meter Yoke Assembly

i. Meter yokes shall be angle type, with vertical inlet and horizontal outlet, with compression connections for water service tubing. Yokes shall be equipped with a brass angle stop cutoff valve and coupling. The angle stop for 5/8-inch meters (3/4" services) shall be 5/8-inch x ¾-inch with a 5/8-inch x ¾-inch coupling for the tail piece. The yoke shall be of Cast or Ductile Iron and factory painted to prevent corrosion. Horizontal type meter yokes may be used for special situations, as approved by the Water Resources Engineering Manager. Meter yoke assemblies shall be provided for all 3/4-inch 5/8" and through 1-inch" meters.

b. Copper Setters

i. Brass components and copper tubing shall be in accordance with ASTM and ANSI/AWWA Standards. Copper setters shall be of the horizontal style with compression inlet/outlet and equipped with a ball valve and dual check valve, supplied by the same manufacturer. Copper setters shall be provided for all 1-½-inch and 2-inch meters.

c. Ball Angle Valves

i. The components shall be lead-free, brass and comply with AWWA Standards and shall have a minimum pressure rating of 300 psi. Outlets may either be flare or compression connection.

d. Dual Check Valves

i. Shall be constructed of lead free, heavy brass components meeting AWWA, ASSE, and CSA Standards and shall have a minimum pressure rating of 175 psi.

e. Meter Boxes

i. Meter Boxes for ¾-inch through 2-inch meters shall conform to Standard Details 10.08.00, 10.08.01, and 10.09.00.

ii. Meter Boxes greater than 2-inch shall conform to Standard detail 10.10.00.

Materials List

Project Name:_____
Form Submitted By:_____
Supplier:_____
Address:_____
Supplier Contact Person:_____
Phone Number:_____

MATERIALS	MANUFACTURER	MODEL #	SIZE
LOCATOR TAPE			
TRACER WIRE			
WATER MAIN			
FIRE HYDRANTS			
RESILIENT SEAT GATE VALVE			
VALVE BOX			
TAPPING SLEEVE			
TAPPING VALVE			
FLEXIBLE/RESTRAINED COUPLINGS			
FITTINGS			
RETAINER GLANDS			
SERVICE SADDLES			
CORPORATION STOPS			
SERVICE LINE			
WATER METER			
BALL VALVE			
COPPER SETTER/YOKE			
DUAL CHECK VALVE			
METER BOX			
STEEL CASING PIPE			
AIR RELEASE VALVE			

Approved By City of Monroe ***Date***