

**REPUBLIC**  
MISSOURI  
GROWING TOGETHER

October 3, 2014

Emily Carpenter  
Financial Assistance Center, MDNR  
PO Box 176  
Jefferson City, MO 65102-176

Subject: City of Republic Standard Specifications

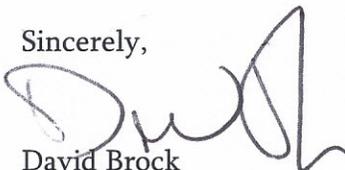
Mrs. Carpenter,

Please find enclosed:

1. Two bound copies of our revised standard specifications
2. Summary/guide for all revisions

I hope these revisions appropriately address the MDNR's review of our wastewater specifications and look forward to your response.

Sincerely,



David Brock  
Public Works Director

Cc: John Forrester, P.E., Olsson Associates (no attachments)

**RECEIVED**

OCT 9 2014

*PUBLIC WORKS DEPARTMENT*  
221 North Main  
Republic, Missouri 65738-1472  
Phone: (417) 732-3400 Fax: (417) 732-3499

**WATER PROTECTION PROGRAM**

The following narrative provides a guide to the revisions made in response to MDNR review of the Construction Specifications for Public Improvements for the City of Republic. The numbering format matches comments/issues conveyed in the June 18, 2014 correspondence from Byron Shaw, SRF Engineering Unit Chief in the Financial Assistance Center.

RECEIVED

OCT 9 2014

REQUIRED REVISIONS

1. Steep slope protection under 10CSR 20-8.120(5)(D)6

The provisions repeated below were added as Section 02620, 3.01 I., Page 02620-4. These provisions are also now referenced in 3.08 A. Page 02620-8.

WATER PROTECTION PROGRAM

Steep slope protection. Sewers on twenty percent (20%) slope or greater shall be anchored securely with concrete anchors or equal, spaced as follows:

- A. Not over thirty-six feet (36') (11 m) center-to-center on grades twenty percent (20%) and up to thirty-five percent (35%);
  - B. Not over twenty-four feet (24') (7.3 m) center-to-center on grades thirty-five percent (35%) and up to fifty percent (50%);
- and
- C. Not over sixteen feet (16') (4.9 m) center-to-center on grades fifty percent (50%) and over.

2. Curvilinear alignment under 10C CSR 20-8.120(5)(E)2

The provision repeated below was added as Section 02620 3.01 A. 3.c, Page 02620-3

Curvilinear alignment of sewers larger than twenty-four inches (24") (61 cm) may be considered on a case-by-case basis provided compression joints are specified and ASTM or specific pipe manufacturers' maximum allowable pipe joint deflection limits are not exceeded. Curvilinear sewers shall be limited to simple curves which start and end at manholes. When curvilinear sewers are proposed, the minimum slope must be increased to provide a minimum velocity of two feet (2') per second (0.6 m/s) when flowing full.

3. Ledge rock, boulder and large stones 10CSR 20-8.120(5)(H)2.C

The provisions repeated below was added as Section 02222 3.01 D 3.c, Page 02222-07.

Ledge rock, boulders, and large stones shall be removed to provide a minimum clearance of four inches (4") (15.24 cm) below and on each side of all pipe(s) with an outside diameter of sixteen inches (16") and smaller when placed in a soil trench. Figure 02222-01 provides minimum trench depths for larger diameter pipes in a soil trench and for all pipes placed in a rock trench.

The provisions repeated below replaced Section 02222 3.01 E 3.c, Page 02222-07.

Provide a minimum 4-inch clear space between outside diameter of pipe and trench wall for all pipe(s) with an outside diameter of sixteen inches (16") and smaller when placed in a soil trench. Figure 02222-01 provides minimum trench widths for larger diameter pipes in a soil trench and for all pipes placed in a rock trench.

4. Bedding under 10CSR 20-8.120(5)(H)3.C and 10 CSR 20-8.120(5)(H)3.D

The provisions repeated below were added as Section 02222 3.02 B, Page 02222-7  
References for ASTM standards D2321 and D2680 were added in Section 02222 1.02 2.c and 2.d,  
Page 02222-2

Embedment materials for bedding, haunching, and initial backfill, Classes I, II, or III, as described in ASTM D2321, shall be used and carefully compacted for all flexible pipe provided the proper strength pipe is used with the specified bedding to support the anticipated load based on the type of soil encountered and potential groundwater conditions

Except as described in ASTM D2680, the bedding, haunching, and initial backfill requirements for composite pipe shall be the same as for plastic pipe.

5. Update deflection test requirements under 10CSR 20-8.120(5)(H)5.C

Section 02620, Paragraph 3.11 A.4.d was replaced with the provision repeated below, Page 02620-14

The rigid ball or mandrel used for the deflection test shall have a diameter not less than ninety-five percent (95%) of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM specification, including the appendix, to which the pipe is manufactured. The test shall be performed without mechanical pulling devices. A mandrel must have nine (9) or more odd number of flutes or points.

6. Drop connections for pre-cast manholes 10CSR 20-8.120(6)(B)3

The provision repeated below was added as Section 02605 3.01 A.1.f, Page 02605-3

When using precast manholes, drop connections must not enter the manhole at a joint.

7. Bench requirement for manholes 10CSR 20-8.120(6)(E)

The provision repeated below was added as Section 02605 3.01 D.6, Page 02605-5. Note that the local standard exceeds CSR minimum bench slope of .5 in/foot.

A bench shall be provided on each side of any manhole channel when the pipe diameter(s) are less than the manhole diameter. The bench should be sloped no less than one and eight tenths inch per foot (1.85 in/ft), or three inches (3") for a four foot (4') diameter manhole with a 8" sewer pipe. No pipe shall discharge onto the surface of the bench.

8. Corrosion protection 10CSR 20-8.120(6)(H)

The provisions repeated below was added as Section 02605 3.01.F, Page 02605-5

Corrosion Protection for Manholes. Where corrosive conditions due to septicity or other causes are anticipated, corrosion protection on the interior of the manholes shall be provided.

9. Manholes shall not interfere with free discharge (stream crossings) 10CSR 20-8.120(8)(A)3

The provision repeated below was added as Section 02620 3.10.D.4, Pg. 02620-11

Sewer outfalls, headwalls, manholes, gate boxes, or other structures shall be located so they do not interfere with the free discharge of flood flows of the stream

10. Construction materials for stream crossings 10CSR 20-8.120(8)(B)1

The provision repeated below was added as Section 02620 3.10.D.1, Pg. 02620-10

Materials. Sewers entering or crossing streams shall be constructed of ductile iron pipe with mechanical joints; otherwise, they shall be constructed so they will remain watertight and free from changes in alignment or grade. Material used to backfill the trench shall be stone, coarse aggregate, washed gravel, or other materials which will not readily erode, cause siltation, damage pipe during placement, or corrode the pipe.

11. Silt and erosion for stream crossings 10CSR 20-8.120(8)(B)2

The provision repeated below was added as Section 02620 3.10.D.2, Pg. 02620-11

Siltation and erosion. Construction methods that will minimize siltation and erosion shall be employed. The design engineer shall include in the project specifications the method(s) to be employed in the construction of sewers in or near streams. Such methods shall provide adequate control of siltation and erosion by limiting unnecessary excavation, disturbing or uprooting trees and vegetation, dumping of soil or debris, or pumping silt laden water into the stream. Specifications shall require that clean-up, grading, seeding, planting, or restoration of all work areas shall begin immediately. Exposed areas shall not remain unprotected for more than seven (7) days.

12. Aerial stream crossings 10CSR 20-8.120(9)

The provision repeated below was added as Section 02620 3.10.D.3, Pg. 02620-011

Aerial Crossings.

- (A) Support shall be provided for all joints in pipes utilized for aerial crossings. The supports shall be designed to prevent frost heave, overturning, and settlement.
- (B) Precautions against freezing, such as insulation and increased slope, shall be provided. Expansion jointing shall be provided between above-ground and below-ground sewers. Where buried sewers change to aerial sewers, special construction techniques shall be used to minimize frost heaving.
- (C) For aerial stream crossings, the impact of flood waters and debris shall be considered. The bottom of the pipe should be placed no lower than the elevation of the fifty (50)-year flood.
- (D) Aerial crossings shall be constructed of ductile-iron pipe with mechanical joints; otherwise, they shall be constructed so that they will remain watertight and free from changes in alignment or grade.

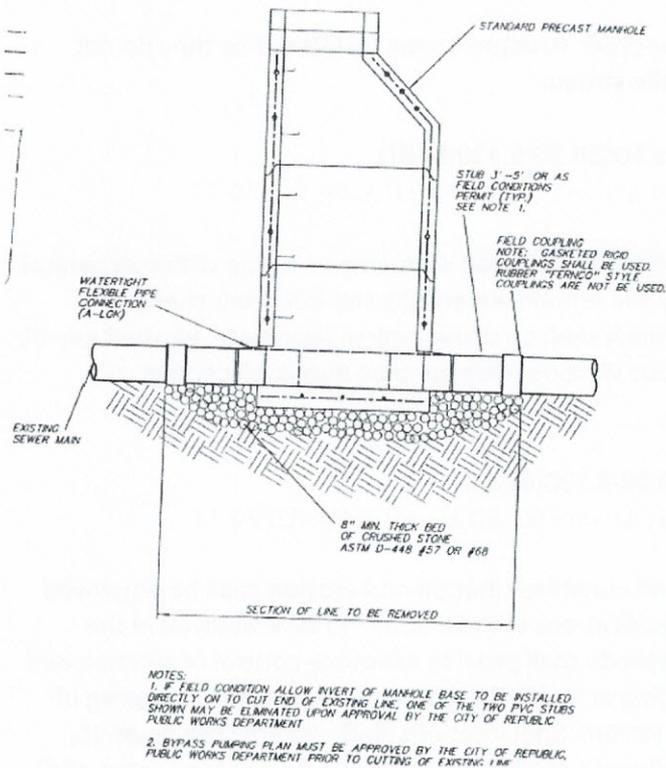
## RECOMMENDED CHANGES

1. High velocity protection 10CSR 20-8.120(5)(D)5

The provision repeated below was added as Section 02620 3.01 J, Page 02620-05

High velocity protection. Where velocities greater than fifteen feet (15') per second (4.6 m/s) are attained, special provision shall be made to protect against displacement by erosion and impact.

2. Details



a. Doghouse manhole – Our experience is that doghouse manholes quickly develop I&I problems due to concrete/grout not bonding to PVC and also due to differential settlement. In these situations, we require a section of the existing pipe to be removed, a precast base set to grade and then piping is reconnected using rigid fittings, an example is shown to the left.

b. Concrete anchor – A typical slope anchor detail has been added as Figure 02620-6

c. Typical Bore detail – A typical encased bore detail has been added as Figure 02222-4. In the course of our review of specifications for encasement bores; other inconsistencies were identified are corrected. Those were:

Section 02222 2.05A.2; Minimum wall thickness for encasement pipes was changed from .375 to .250 to match MoDOT standard

### utility specifications

Section 0222 2.05B Stabilized Sand Backfill; This paragraph deleted. Stabilized sand backfill is used when carrier pipes are supported on wood skids and not the specified casing spacers.

Section 02222 3.04.B; Deleted paragraph pertaining to stabilized backfill.

- d. Stream crossing - These are rarely utilized and will be developed through normal design process specific to the project.
- e. Aerial crossing – These are rarely utilized and will be developed through the normal design process specific to the project.
- f. Standard water and sewer separation – We believe the standards are clearly described in Section 02620 3.10

### OTHER REVISIONS

A standard detail for a vertical thrust block was added as Figure 02620-6.

Figure 02620-3 was edited to remove an outdated detail for a standard water service connection (water).

In response to construction requirements included in [HB1867](#), the provisions repeated below were utilized to replace Section 02620 3.01 H, Page 2620-04. Figure 2620-2 was revised accordingly.

## Tracer Wires:

A minimum 12 gauge single strand conductive tracer wire shall be installed directly above and adjacent to all pressure pipe and water/sewer laterals during backfill operations. All wire splices shall be made with either rigid fittings or weatherproof connectors specifically designed for direct burial.

Tracer wires for water mains shall be extended to the surface into valve boxes at each gate valve and fire hydrant isolation valve. Construct additional access points as described herein to obtain a maximum spacing of 1000 feet.

A 4' copper grounding rod shall be driven into the trench bottom at 1000 foot spacing and secured to the tracer wire with rigid fittings

Tracer wires for water laterals shall be rigidly affixed to the water main's tracer wire and extended into each meter pit.

Tracer wires for sewer laterals shall extend from the point of connection to the sewer main to the clean out. Ground shall be established using a minimum 1' grounding rod driven into the trench bottom near the sewer main. The tracer wire shall be extended to the surface adjacent to the building clean out and housed within a protective enclosure constructed of schedule 40 PVC pipe and a schedule 40 PVC threaded clean out. The protective enclosure shall be extended to grade and installed so that it is easily accessible.

Tracer wires for all other pressurize pipe shall be extended to the surface within a protective enclosure constructed out of a suitable length of 6 inch diameter class 200 PVC and a cast iron mushroom cap. This protective enclosure shall not be located within any driving or parking surface.

A 4' copper grounding rod shall be driven into the trench bottom at 1000 foot spacing and secured to the tracer wire with rigid fittings.