



**Supplemental Sections and Exhibits
To
Design Standards,
Standard Specifications,
and
Standard Details
for
Water and Wastewater**

Revisions through November 20, 2014

**LIST OF SUPPLEMENTAL SECTIONS AND EXHIBITS TO
DESIGN STANDARDS, STANDARD SPECIFICATIONS, AND STANDARD DETAILS
VAN BUREN MUNICIPAL UTILITIES**

Table of Contents

GENERAL

TOC **Table of Contents**
2014-TOC-01 (11/20/14)

100 PROJECT STANDARDS

400 **Sanitary Sewer Standards**
2014-400-01 (11/20/14)

200 SITE WORK

210 **Trenching and Backfilling**
2014-210-01 (11/20/14)

300 WATER SYSTEMS

400 SANITARY SEWER SYSTEMS

500 ELECTRICAL AND INSTRUMENTATION SYSTEMS

**VAN BUREN MUNICIPAL UTILITIES SUPPLEMENTAL STANDARDS
2014-TOC-01
TABLE OF CONTENTS**

1.01 SCOPE

- A. The Table of Contents for the Van Buren Municipal Utilities Design Standards, Standard Specifications, and Standard Details, May 2014 edition, is hereby amended as follows:
 - 1. Insert page numbers in the Table of Contents for the Design Standards and Standard Specifications to read as follows:

Table of Contents

Revision History

Introduction

Design Standards	Page
100 – Project Standards	1 of 34
200 – Site Standards	9 of 34
300 – Water Standards	11 of 34
400 – Sanitary Sewer Standards	21 of 34
500 – Electrical and Instrumentation Standards	31 of 34

Forms

Sewer Facility Operation and Maintenance Agreement

Standard Specifications	Page
Section 210 – Trenching and Backfilling	1 of 106
Section 220 – Pavement Repairs.....	9 of 106
Section 230 – Site Restoration.....	19 of 106
Section 310 – Water Line Improvements	23 of 106
Section 320 – Water Valves and Hydrants	35 of 106
Section 330 – Testing of Water Line Improvements	45 of 106
Section 410 – Sanitary Sewer Line Improvements.....	49 of 106
Section 420 – Sanitary Sewer Manholes.....	57 of 106
Section 430 – Testing of Sanitary Sewer Improvements	71 of 106
Section 510 – Electrical Improvements	77 of 106
Section 520 – Emergency Standby Generator	83 of 106
Section 530 – Automatic Transfer Switch	89 of 106
Section 540 – Motor Control Center.....	93 of 106
Section 550 – Telemetry and Instrumentation	105 of 106

Standard Details

M01 – Chain Link Security Fence
M02 – Chain Link Fence Gate
M03 – Bollard
M04 – Facility Identification Sign

Table of Contents – Continued

W01 – Gate Valve
W02 – Tapping Sleeve and Valve
W03 – Fire Hydrant Assembly
W04 – Water Valve Box Adjustment
W05 – Water Service Meter Connection
W06 – Typical Duplex Meter Assembly
W07 – 1-1/2" and 2" Water Service Meters
W08 – Blowoff Hydrant
W09 – 2" or Larger Air/Vacuum/Combination Air Valve Assembly
W10 – 8 Inch Blowoff Assembly
W11 – Tracer Wire and Terminal Box
W12 – Water Line/Sewer Force Main Marker
W13 – Water Meter Vault 3" and Larger Meters
W14 – Water and Sewer Line Separation

S01 – 4-Ft. Diameter Cast-In-Place Manhole
S02 – 6-Ft. Diameter Cast-In-Place Manhole
S03 – Manhole Drop
S04 – Shallow Manhole
S05 – Manhole Grade Adjustment
S06 – Sewer Service Lateral Connection
S07 – Encasement Around Vertical Service Connections
S08 – Curb Stamp for Utility Service Location

T01 – Trenching and Bedding Notes
T02 – Trench Backfill and Gravel Surface Repair
T03 – Trench Backfill and Asphalt Surface Repair
T04 – Trench Backfill and Concrete Surface Repair
T05 – Trench Backfill and Restoration of Native Area
T06 – Trench Bedding and Backfill for 24" and Larger Gravity Sewers
T07 – Class "B" Granular Bedding and Backfill
T08 – Concrete Encasement
T09 – Encasement Pipe Notes
T10 – Encasement Pipe
T11 – Pipe Blocking for Bends and Tees

END OF SUPPLEMENTAL STANDARD 2014-TOC-01

**VAN BUREN MUNICIPAL UTILITIES SUPPLEMENTAL STANDARDS
2014-400-01
SECTION 400 – SANITARY SEWER STANDARDS**

1.01 SCOPE

A. Section 400 of the Van Buren Municipal Utilities Design Standards, May 2014 edition, is hereby amended as follows:

1. Delete the last sentence of paragraph 1.10.E, and replace with the following:

The Sewer Facility Operation and Maintenance Agreement shall be filed with the Crawford County Circuit Clerk, and a copy of the filed document with filing marks shall be submitted to Van Buren Municipal Utilities.

END OF SUPPLEMENTAL STANDARD 2014-400-01

**VAN BUREN MUNICIPAL UTILITIES SUPPLEMENTAL SPECIFICATIONS
2014-210-01
SECTION 210 – TRENCHING AND BACKFILLING**

1.01 SCOPE

- A. Section 210 of the Van Buren Municipal Utilities Standard Specifications, May 2014 edition, is hereby amended as follows:
 - 1. Delete the entire Section 210 and replace with the following:

SECTION 210 – TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required; and perform all trenching for pipelines and appurtenances including excavation, bedding, backfilling, disposal of surplus or unsatisfactory spoil material, and restoration of trench surfaces and easements.

1.02 RELATED SECTIONS

- A. Section 310 – Water Line Improvements
- B. Section 410 – Sanitary Sewer Line Improvements

1.03 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials (AASHTO), latest edition:
 - 1. AASHTO T 99 Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop
 - 2. AASHTO T 180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
 - 3. AASHTO T 310 Standard Specification for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- B. American Society for Testing and Materials (ASTM), latest edition:
 - 1. ASTM C33 Standard Specification for Concrete Aggregates
 - 2. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³))
 - 3. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))

4. ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 5. ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- C. Occupational Safety and Health Administration (OSHA), latest edition:
1. All excavation, trenching and related sheeting, bracing, etc., shall comply with the requirements of OSHA safety standards (29 CFR Part 1926.650 Subpart P – Excavation) and any applicable State requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.
 2. The current edition of Occupational Safety and Health Administration Standard for Excavation and Trench Safety Systems, 29 CFR 1926, Subpart P, is specifically incorporated and made a part of these specifications and contract documents as required by Arkansas Code Annotated 22-9-212.

1.04 SUBMITTALS

- A. Submit the proposed method of backfilling and compaction to the Engineer for review.
- B. Submit an excavation and trench safety plan to the Engineer for review.
- C. Furnish test data to indicate compliance of backfill, bedding and compaction with this specification to the Engineer for review.

1.05 QUALITY ASSURANCE

- A. Furnish the Engineer with supplier certifications and quality assurance testing of all materials from offsite sources including select material, topsoil, sand, rock, and crushed stone.
- B. Conduct quality assurance testing in accordance with the following:
 1. Determine a moisture-density relationship for each type of subgrade and backfill material encountered, and conduct testing in accordance with AASHTO T 99 (ASTM D698) or AASHTO T 180 (ASTM D1557).
 2. Conduct field density and moisture testing of initial trench subgrade and all backfill in accordance with AASHTO T 310 (ASTM D6938). Minimum compaction limits for trench backfill material are defined under paragraph 3.01.D, Backfilling.
 3. Testing frequencies for in-place density and moisture are indicated in the Table below.

Minimum Compaction Testing Frequencies for
Trench Backfill Material

Location	Required Frequency
Within 25 feet of buildings and structures	One (1) moisture-density test per 50 linear feet, every lift of backfill, minimum of (2) tests
Within Van Buren city streets and alleys	Trench backfill shall be with slurry, in accordance with the Van Buren Street Cut Standards, latest edition
Within parking lots, paved and gravel driveways, under sidewalks	Trench backfill shall be with slurry, and in accordance with applicable regulatory agency's requirements, e.g. County or State rights-of-way
When noted on the Drawings	One (1) moisture-density test per 400 linear feet, every lift of backfill
Areas under turf, sodded, planted, or seeded non-traffic areas	Conduct moisture-density tests at the locations and frequencies as directed by the Engineer

4. Should any moisture-density test fail to meet the specified requirements, the Contractor shall perform corrective work necessary to bring the material into compliance and retest the failed area at no additional cost to the Utility.

PART 2 PRODUCTS

2.01 PIPE BEDDING

- A. Pipe bedding shall conform to the class specified by the Engineer. When no bedding class is specified, the requirements for Class "D" bedding shall apply. If trench conditions are mucky, bedding shall be Class "B".
- B. CLASS "B" GRANULAR BEDDING
 1. Class "B" Granular Bedding: Crushed stone or gravel, well graded, and containing several sizes of particles ranging from 3/4-inch maximum to No. 4. Unless otherwise approved by the Engineer, the material shall meet the requirements of ASTM C33, Gradation 67
- C. CLASS "D" BEDDING
 1. Class "D" Bedding: Firm soil excavated from the trench and free of rocks, which will provide uniform bearing for the full length of the pipe barrel.
 2. Excavate bell holes in the trench at each joint to permit proper jointing and to prevent the joint of the pipe from being a point of support. Correct over excavation of any portion of the trench with thoroughly compacted soil material approved by the Engineer.

2.02 TRENCH BACKFILL

- A. Trench backfill under un-paved areas shall consist of on-site backfill or select backfill. When no material requirements are specified, the Contractor may use soil material excavated from the trench as backfill, provided that it meets the requirement of On-Site Backfill. If trench spoil is

wet, rocky, or contains other objectionable materials, the Contractor shall furnish and install Select Backfill. Unacceptable trench spoil shall be wasted in a manner approved by the Engineer.

- B. Unless otherwise indicated on the Drawings, backfill for trenches and structures in paved areas, parking lots, paved and gravel driveways, alleys, under sidewalks, and under curb and gutter shall be Slurry Backfill.
- C. On-Site Backfill: Backfill shall consist of on-site material excavated from the trenches except where the Drawings require the use of special backfill materials or as directed by the Engineer. On-site backfill material shall be free of rocks, clods or frozen masses over 3 inches in diameter or organic matter. The Engineer will approve backfill material prior to placement in the trench.
- D. Select Backfill: Granular material with a maximum particle size of 3 inches, graded from coarse to fine, conforming to AASHTO classification A-1, A-2-4 or A-2-5, or a sandy or gravelly clay conforming to classification A-2-6 or A-6 with the exception that the plasticity index shall not exceed 15. The Contractor shall furnish, at his expense, test data to indicate compliance of select material with this specification.
- E. Slurry Backfill: A plant mixed slurry of sand, cement, and fly ash in a ratio of 3.400 lb.: 150 lb.: 100 lb., respectively. The slurry mixture shall achieve a minimum compressive strength of 300 psi at 28 days.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION AND BACKFILL

- A. General:
 - 1. Excavate the trench so that the pipe can be laid to the required lines and grades as indicated on the Drawings. Do not deviate from the required line or grade except with the written consent of the Engineer.
 - 2. Grade the trench to the approximate depth shown on the Drawings and maintain a depth that will provide not less than 30 inches of cover from the top of the pipe to the finished surface of the ground. Install the pipe to a grade such that the entire line will have a minimum number of high and low points. At utility or street crossings requiring greater line depth, install the pipe approach to the crossing on a gradual and uniform grade.
 - 3. Whenever obstructions not shown on the Drawings are encountered during the progress of the work and interfere to such an extent that an alteration in the Drawings is required, the Engineer shall have the authority to change the Drawings and order a deviation from the line and grade or arrange with the owners of the structures for the removal, relocation or reconstruction of the obstructions,
 - 4. Furnish temporary support and provide adequate protection and maintenance of all underground and surface utility structures, drains, conduits, sewers and other structures encountered in the progress of the work at no additional cost to the Utility. Where the grade or alignment of the pipe is obstructed by existing structures, the Contractor shall permanently support, relocate, remove or reconstruct the obstruction in cooperation with the owners of such utility structures. Determine the location of existing underground utility structures, including coordinating utility location services, examining available

records, and making all explorations and excavations necessary to determine the exact location of the underground utility.

5. Proceed with caution in the excavation and preparation of the trench to determine the exact location of underground structures and utilities, both known and unknown. The Contractor is responsible for the repair of structures broken or otherwise damaged because of careless construction procedures.
6. Do not advance the excavation of trenches more than 150 feet ahead of the completed pipe work and completed backfill without permission from the Engineer. Refer to other sections of these Specifications for the requirements for cutting and replacing pavements.
7. Lay water mains at least 10 feet horizontally from any existing or proposed gravity or pressure sewer. Measure the distance from edge to edge. In cases where it is not practical to maintain a 10-ft. separation, deviation must be specifically approved by the Arkansas Department of Health and the Engineer. Vertical separation of water and sewer mains at crossings shall provide for a minimum of 18 inches of distance from the outside of the water line to the outside of the sewer line. At crossings, one full section of water pipe (18 or 20 feet long) shall be laid such that both joints are installed as far from the sewer as possible. Special structural support of the water and/or sewer line may be required by the Design Engineer, i.e., clay, concrete, or pipe encasement.
8. Cut and repair street crossings in accordance with the Van Buren Street Cut Ordinance, county road crossings in accordance with the Crawford County Road Standards, and highway crossings in accordance with the requirements of the Arkansas State Highway and Transportation Department (AHTD). Obtain street or road cut permits for any and all such cuts from the appropriate authority.

B. Excavation:

1. Excavate all the material encountered within the lines and grades shown on the Drawings and as specified and directed by the Engineer. Saw all paved driveway, parking lot and street cuts at the trench limits or as indicated on the Drawings.
2. Below a point 12 inches above the outside top of the pipe, the trench shall have vertical sides and shall have a minimum width as detailed on the Drawings. If no details are shown on the Drawings, the minimum trench width shall be equal to the outside pipe diameter plus 18 inches and a maximum width equal the outside pipe diameter plus 30 inches.
3. At any point where the width of the lower portion of the trench exceeds these limits, the Contractor shall take corrective measures. As directed by the Engineer, the Contractor shall provide either pipe of adequate strength, special pipe embedment, or a concrete cradle as required by the loading conditions. The Contractor shall furnish and install these corrective items at no additional cost to the Utility.
4. Stockpile material suitable for backfilling in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Remove or waste all excavated materials not required or unsuitable for backfill as indicated in the Specifications or as directed by the Engineer.
5. Where necessary to protect the labor, the work or adjacent property, the Contractor shall provide and install shoring. The material used shall be of suitable dimensions and strength to prevent the settlement or movement of the ground adjacent to the trench and to prevent

damage to surface or subsurface structures. The adequacy and need of the sheeting and bracing shall be the complete responsibility of the Contractor. The shoring shall remain in place until the backfill has proceeded to a point where it can safely be removed, except that, if in the opinion of the Engineer, damage is likely to result from withdrawing shoring, it shall remain in place. No separate payment will be made for sheeting, shoring and bracing.

6. If the soil at the bottom of the trench is unstable and in such condition that it cannot be properly graded, excavate the trench to a depth determined by the Engineer and backfill to grade with crushed stone or gravel well compacted by tamping.
7. Dewater all excavation before any construction is undertaken therein. Lay all pipe in dry trenches and place all concrete only upon dry and firm foundation material. The Contractor shall pump, bail, or temporarily provide drainage for any water encountered.
8. Should the specified methods of dewatering the trenches be unsuccessful, excavate the trench to a depth of approximately 6 inches below grade. Backfill the trench to grade with gravel bedding. Form a sump below the gravel to provide a place for a pump to take suction and thus lower the water level to a point below the bottoms of the pipe joints. Continue the pumping until the joints have been placed and the presence of water will not injure them. Do not commence backfilling until the trench has been dewatered.
9. If rock is present at the grade line of the trench, excavate it to an elevation approximately 6 inches below grade. Rock shall consist of sedimentary or other types of rock that cannot be excavated without the use of rippers or impact hammers. Rock excavation shall include boulders and deposits of concrete with a volume of 1/2 cubic yard or more. Backfill the trench to grade with crushed stone or gravel. Place this backfill prior to laying the pipe. Remove and dispose of all excavated rock from the site.
10. When indicated on the Drawing or as directed by the Engineer, construct an impervious dam or bulkhead in the trench to interrupt the unnatural flow of groundwater after construction. Key the dam into the trench bottom and sidewalls. Where directed, provide at least one (1) clay or other impervious material dam in the trench line every 300 linear feet of pipe or between each manhole.
11. Avoid heavy machinery traffic above installed pipe until trench backfill is placed and compacted. Monitor pipe deflection during trench backfill.

C. Bedding:

1. Bed all pipe accordance with Subsection 2.01.
2. Prior to installation of the pipe, shape the bedding to provide uniform support for the bottom quadrant of the pipe barrel.
3. Accomplish the placement of material on each side of pipe (haunching) and immediately above the top of the pipe (initial backfill) in a manner that will prevent displacement or deflection of the pipe.

D. Backfilling:

1. Backfill all trenches immediately after the pipe is laid and approved. Install backfill by methods that will not disturb the pipe. Repair pavement cuts with paving materials of the type and design of the original surface. Do not commence pavement repair until the

Contractor has achieved proper subgrade compaction. Such backfilling, before pipeline testing, shall not relieve the Contractor of responsibility for correction of leaks in the line.

2. Place backfill up to a level of 12 inches above the top of the pipe by hand shoveling or other approved methods, and deposit backfill in maximum layers of 4 inches. Compact each layer by mechanical tamping. Do not displace pipe during tamping of the backfill. Control the moisture content of the backfill material as required to obtain the specified compaction.
3. From a point 12 inches above the top of the pipe, place backfill by any approved method that will not injure or disturb the pipe and will result in the specified compaction.
4. Unless otherwise noted on the Drawings or more stringent requirements are established by other specification sections, place and insure backfill and fill material to achieve an equal or greater degree of compaction than undisturbed material adjacent to the work. However, in no case shall the degree of compaction fall below the percentages of the maximum density, at optimum moisture content, as indicated in the Table below.

Minimum Compaction Limits for Trench Backfill Material	
Location	Required Density
Within 25 feet of buildings and structures	100% of the maximum dry density by Standard Proctor test, AASHTO T 99 (ASTM D698)
Within Van Buren city streets and alleys	Trench backfill shall be with slurry, in accordance with the Van Buren Street Cut Standards, latest edition
Within parking lots, paved and gravel driveways, under sidewalks	Trench backfill shall be with slurry, and in accordance with applicable regulatory agency's requirements, e.g. County or State rights-of-way
When noted on the Drawings	95% of the maximum dry density by Standard Proctor test, AASHTO T 99 (ASTM D698)
Areas under turf, sodded, planted, or seeded non-traffic areas	90% of the maximum dry density by Standard Proctor test, AASHTO T 99 (ASTM D698)

5. When conflicts exist between the densities due to location or depth of trench, the higher specified density shall be required. Compaction densities and testing frequencies for pavement sections are defined in Section 220, Pavement Repairs.
6. All trenches shall be backfilled, settled, and the ground restored to its original condition as soon as possible after the pipe is installed. Any unnecessary delay in restoring trenches to their original condition shall constitute just cause for stopping all other work until the trenches are so restored. The Contractor also shall refill trenches as often as necessary to bring them back to original grade, and during the period when settlement is occurring shall refill them frequently to maintain traffic.
7. If at any time within 12 months after the completion and final acceptance of the work embraced in this Contract, there shall be any settlement of the trenches requiring repairs to be made, the Utility may notify the Contractor to make such repairs as may be necessary. Should the Contractor fail to do so within 15 days after the date of such notice, or should

the nature of such defect be such as to require immediate attention, the Utility shall make such repairs as may be necessary, and bill the actual cost of such repairs to the Contractor.

3.02 SLURRY BACKFILL

- A. Under city streets and alleys, parking lots, and paved and gravel driveways, backfill trenches with Slurry Backfill. The Contractor shall use this material to help facilitate the reapplication of traffic over the trenches across streets and driveways where dictated by the Engineer. The Engineer may modify the design as required by the construction conditions. Place slurry to neat trench lines as indicated on the Drawings, not to exceed a trench quantity 24 inches wider than the diameter of the pipe in the trench or as indicated on the Drawings.
- B. The Engineer may direct the Contractor to place a temporary surface over the slurry. The Contractor shall consult the trenching details in the Drawings as to the required depth of bedding, slurry and surface material depths. This procedure may be used for water lines, sanitary sewer lines, or other pavement crossings.
- C. Allow utility backfill to achieve a 24-hour set before allowing traffic on it, or before the placement of base course or paving materials. Protect utility backfill against frost and rapid drying.

3.03 EXPLOSIVES

- A. Explosives are prohibited for excavation unless a plan for such use is approved by the Engineer and the Utility, proof of blasting insurance is submitted, and experienced blasting personnel are utilized and licensed in the State of Arkansas.

END OF SECTION 210 – TRENCHING AND BACKFILLING

END OF SUPPLEMENTAL SPECIFICATION 2014-210-01