BOARD OF COMMISSIONERS
MICHIGAN CITY SANITARY DISTRICT

RESOLUTION NO. #1307-12

APPROVING STANDARD SPECIFICATIONS FOR SANITARY SEWER SYSTEM IMPROVEMENTS

WHEREAS, there are times when engineers are required to design sewers, manholes, and associated items for sewer system improvements that will become a part of the Michigan City Sanitary District's (MCSD) facilities when fully constructed; and

WHEREAS, based on the recommendation of MCSD management, and MCSD's attorney, James B. Meyer, the Board of Commissioners finds that having and implementing standard specifications for the design of such sewer system improvements will decrease costs and increase efficiency of operations for MCSD; and

WHEREAS, the Board finds that it will be a benefit to MCSD and the City of Michigan City if standard specifications for the for such sewer system improvements are adopted for MCSD.

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners (Board) of the Michigan City Sanitary District (District) that the standard specifications attached hereto as Exhibit A are hereby approved and required to be used for the design and construction of additions and improvements to the District's sewer system. If due to unusual circumstances the use of the standard specifications are found and documented by the General Manager to cause the unreasonably excessive expenditure of funds, the General Manager may, in his discretion after consultation with the City Engineer and District's attorney, waive compliance with the standard specifications but must give a written report to the Board as to which specifications were waived and the excessive cost avoided by waiving compliance with the standard specifications.

Approved and adopted the 3rd day of October, 2012.

BOARD OF COMMISSIONERS
MICHIGAN CITY SANITARY DISTRICT

BY: Phil Jankowski
Phil Jankowski, President

ATTEST: Keith Harris
Keith Harris, Secretary

James B. Meyer
James B. Meyer, MCSD Attorney

EXHIBIT A

SANITARY DISTRICT OF MICHIGAN CITY

SANITARY SEWER SPECIFICATIONS
(Approved 10-3-2012)

GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.02 SUMMARY

A. Furnish and install materials and equipment required to complete the installation of the sanitary collection piping and appurtenances indicated on the Drawings.

1.03 DEFINITIONS

A. Regulatory agencies and their standards are referenced by abbreviation as follows:

1. American National Standards Institute.....ANSI
2. American Society for Testing and Materials.....ASTM
3. American Water Works Association.....AWWA
4. Indiana Administrative Code .....IAC
5. Indiana Department of Environmental Management .....IDEM

B. Materials and product information are referenced by abbreviations as follows:

1. Ductile Iron Pipe.....DIP
2. Polyvinyl Chloride .....PVC
3. High-Density Polyethylene .....HDPE
4. Inner Diameter .....I.D.
5. Outer Diameter .....O.D.
6. Standard Dimension Ratio.....SDR

C. Flexible Pipe: Pipes manufactured from plastics such as PVC and HDPE.

D. Non-Flexible Pipe: Pipes manufactured from rigid or semi-rigid materials including, reinforced concrete and ductile iron.

1.04 PERFORMANCE REQUIREMENTS

A. Provide materials, equipment, and labor to produce piping systems as indicated on the Drawings and as specified herein.

1. Sanitary Sewer Gravity Service Piping

1.05 SUBMITTALS

A. Shop Drawings and Manufacturer's Product Data for the following standards, except where more stringent requirements are indicated.

1. Pipe
2. Flexible Couplings
3. Manholes
4. Manhole Frames and Covers
5. Manhole Steps
6. Cleanouts

1.06 QUALITY ASSURANCE

A. General

1. Examine each piece of pipe before installing. Remove all defective material from the site. Ductile iron pipe is to be rung with a light hammer to detect cracks.

B. Testing Requirements for Gravity Sanitary Sewers

1. Prior to performing tests, the Contractor shall do the following:

a. As-Built Drawings must be on file at the Michigan City Sanitary District Wastewater Treatment Facility Administration Office at least three (3) business days prior to testing. These drawings must include all manholes, pipes and lateral locations installed as part of the project. The Contractor must provide proper documentation on official letterhead including a detailed list of material, invert elevations and total lengths installed.

2. In accordance with 327 IAC 3-6-19 (d), all gravity sewer pipe shall be tested for infiltration/exfiltration using one of the standard methods, listed below in preferential order.

a. Low Pressure Air Test – Preferred test method for all sewer pipe materials other than concrete. (Refer to Paragraph C below.)

b. Water Infiltration Test (Weir Test) – Preferred test method for concrete sewers. Alternate test method for other sewer pipe materials when the Low Pressure Air Test is failed. (Refer to Paragraph D below.)

c. Water Exfiltration Test – Alternate test method for all sewer pipe materials when the Low Pressure Air Test is failed and environmental conditions do not allow for the Water Infiltration Test. (Refer to Paragraph E below.)

3. All proposed sewers constructed of flexible pipe and truss pipe shall be tested for deflection according to the standard method described in Paragraph F below.

4. Test Limits

   a. Infiltration/Exfiltration shall not exceed 100 gallons per inch of pipe diameter per mile per day (100 gpd/in/mi).

   b. Deflection shall not exceed 5% of the inside pipe diameter.

5. Test Scheduling

   a. Infiltration/Exfiltration shall be tested within 15 days after installation and under the supervision of the Michigan City Sanitary District.

   b. Deflection shall be tested within 45 days but no sooner than 30 days after final backfill has been placed.

6. Test Results

   a. Test results shall be submitted to the Michigan City Sanitary District within three (3) months of completion of construction.

   b. If the above limits are exceeded, the Contractor shall, at his own expense, remove and reconstruct as much of the defective work as is necessary to obtain a passing system.

   c. Regardless of the test results, the Contractor shall, at his own expense, remove and reconstruct any portion of the system exhibiting visible leaks or other obvious flaws.

7. Responsibility for Testing

   a. All testing of the installed sanitary sewer system shall be the responsibility of the Contractor, unless otherwise noted.

   b. The Contractor shall furnish, install, and operate all necessary equipment and materials.

   c. The Contractor shall notify the Owner and the City Engineer at least three (3) business days prior to any testing.

   d. The Contractor shall provide all water for testing.

C. Low Pressure Air Test

1. The Low Pressure Air Test shall be conducted in accordance with the requirements of the applicable ASTM standard.

   a. For plastic pipe, refer to ASTM F1417.

2. Leakage shall be determined by the inability to stabilize test pressure.

D. Water Infiltration Test (Weir Test)

1. A minimum two (2) feet of static head must be maintained above the sewer throughout the course of testing. If the groundwater level is insufficient, this shall be achieved by flooding the trench, if possible. Otherwise, a Water Exfiltration Test shall be conducted.

2. The infiltrated flow of water shall be measured by means of a weir set up in the inside of the sewer a known distance from a temporary bulkhead or other limiting point of infiltration, after the sewer has been pumped out. The test shall last for a minimum of four hours, with readings at 30-minute intervals.

3. A segment of sewer shall be deemed acceptable if it passes the Water Infiltration Test, even if it has failed the Low Pressure Air Test.

E. Water Exfiltration Test

1. Leakage shall be determined by constructing a bulkhead in the sewer at the lower end of the section under test, and filling the section being tested with water to a level two (2) feet above the crown of the sewer in the manhole at the upper end of the test section. Leakage will be the measured amount of water added to maintain the water at that level. The test shall last for a minimum of four hours, with readings at 30-minute intervals.

2. A segment of sewer shall be deemed acceptable if it passes the Water Exfiltration Test, even if it has failed the Low Pressure Air Test.

F. Deflection Test for Flexible Pipe

1. The deflection of all flexible pipe shall be determined after the final backfill has been in place for at least thirty (30) days in accordance with test procedures from the pipe manufacturer and AWWA standards. No pipe shall experience a vertical deflection (reduction in vertical inside diameter) of more than five percent (5%).

2. If the deflection test is to be run using a rigid ball or mandrel, it shall have a diameter equal to 95% of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices.

3. Deflection tests are not necessary for pipe identified as non-flexible. (See Section 1.03 – "Definitions ".)

G. Negative Air Pressure (Vacuum) Test for Concrete Manholes

1. All manholes shall be visually inspected after assembly and backfilling for evidence of leakage. Manholes that show evidence of leakage shall be replaced by the Contractor at his own expense and re-inspected until satisfactory.

2. All manholes installed shall be subjected to a Vacuum Test in accordance with the requirements of ASTM C 1244.

H. Inspection

1. All pipe and manhole installations are subject to inspection by the City Engineer of Michigan City, the Michigan City Sanitary District, and civil authorities having jurisdiction.

I. Separation of Sewer and Water

1. Separation of sewer and water piping, structures, and appurtenances must comply with 327 IAC 3-6-9 and with applicable IDEM Standards.

2. Parallel Installation

a. Normal Conditions

(1) Water lines shall be at least 10 feet horizontally from any existing or proposed sewer lines and at least 8 feet horizontally from any existing or proposed sewer manholes, whenever possible. These distances shall be measured edge to edge.

b. Unusual Conditions

(I) When local conditions prevent a horizontal separation as described above for parallel installation under normal conditions, then maximum horizontal separation shall be provided with a vertical separation such that the bottom of the water line is at least 18 inches above the top of the sewer. The water line shall be laid in a separate trench or on an undisturbed earth shelf to one side of the sewer.

(2) In these circumstances, any proposed sewers shall be constructed of waterworks grade ductile iron pipe, pressure rated to 150 psi, with compression type joints, in accordance with Part 2 of this section.

3. Crossing

a. Normal Conditions:

(1) When water lines and sewer lines cross, a vertical clearance of at least 18 inches shall be provided, whenever possible, between the edges of either pipe, and the water line should be above the sewer line. In instances where such separation is not possible, the sewer line will need to meet water grade piping specifications.

(2) One full length of water pipe shall be placed at the crossing such that maximum separation is achieved between either pipe joint and the sewer.

(3) The above conditions must be maintained for a minimum distance of 10 feet on either side of the water line, measured edge to edge.

(4) All sewer pipe joints within 10 feet of the outside edge of the water line must be compression type joints.

b. Unusual Conditions

(1) When local conditions prevent a vertical separation as described above for crossing under normal conditions, then the sewer must be constructed of waterworks grade ductile iron pipe, pressure rated to 150 psi, with compression type joints, in accordance with Part 2 of this section.

4. No water line shall pass through or come in contact with any part of a sewer or sewer manhole.

1.07 JOB CONDITIONS

A. The Contractor is responsible for site conditions and no extra cost will be allowed for failure to visit the site and ascertain existing conditions.

1.08 EXCAVATION, BEDDING AND BACKFILL

A. Excavation, bedding and backfill shall be as specified as shown on the Drawings.

1.09 REQUIREMENTS OF REGULATORY AGENCIES

A. All sanitary sewer utility work must conform to the requirements of the Michigan City Sanitary District, and the applicable rules and regulations of the Indiana Department of Environmental Management (IDEM), and federal and local agencies.

B. In every case the latest formally adopted version of the applicable standards shall be used.

C. The Contractor shall secure all necessary permits and approvals and shall assume any associated costs and fees.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Sanitary Sewer Piping

1. Sanitary sewer gravity pipe shall be selected in accordance with the pipe schedule below, unless otherwise indicated on the drawings. The X's designate acceptable standard dimension ratios (SDR) and pressure classes for given depths of bury.

EXHIBIT A

SANITARY SEWER GRAVITY PIPE SCHEDULE

Depth (ft.)	Ductile Iron Pipe (Pressure Class) 350	PVC Pipe SDR 35	PVC Pipe SDR 26
0-14	X	X	X
14-19	X		X
19-24	X		

2. Polyvinyl Chloride (PVC) Plastic Pipe

   a. Polyvinyl chloride (PVC) gravity piping shall be constructed of polyvinyl chloride (PVC) sewer pipe and fittings in accordance with the requirements of ASTM D 3034. Pipes shall be joined with integral bells and bell and spigot type rubber gaskets. Joints shall conform to ASTM D 3212. Gaskets shall conform to ASTM F 477.

3. Polyvinyl Chloride (PVC) Corrugated Sewer Pipe

   a. Polyvinyl chloride (PVC) corrugated sewer piping with smooth interior and fittings shall meet the requirements of ASTM F 949.

B. Mechanical Couplings

1. Flexible couplings shall be of a gasketed, sleeve type. Each coupling shall consist of a steel middle ring, two steel followers, two rubber compound wedge section gaskets, and a galvanized track having sufficient steel bolts to properly compress the gaskets. Couplings shall be manufactured by Dresser Manufacturing Company, Rockwell International, or an approved equal.

C. Flanged Adapters

1. Flanged adapters for joining plain-end-pipe to flanged items shall be 128 or 127 as manufactured by Dresser Manufacturing Division of Dresser Industries or Rockwell International, Type 912 or 913, Uniflange or approved equal.

D. Cleanouts

1. Cleanouts shall be constructed in accordance with the details for the type and size of sewer indicated on the Drawings.

E. Manholes

1. Manholes shall be constructed in accordance with the details for the type and size of manhole indicated on the Drawings.

2. Manhole frames and covers shall be provided in accordance with the details for the type of frame and cover indicated on the Drawings.

3. Manholes shall be constructed in accordance with ASTM C 478, with joints meeting the requirements of ASTM C 443.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Depth of Cover Over Sewer Pipe

1. Depth of cover over sewer pipe shall be as shown on the plans, but in no case shall be less than four (4) feet.

B. Laying Pipe

1. Take all precautions necessary to insure that pipe, fittings, and related items are not damaged in unloading, handling, and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged material.

2. Keep pipe clean. Exercise care to keep foreign material and dirt from entering pipe during storage, handling and placing in trench. Close ends of in-place pipe at the end of any work period to prevent entry of animals and foreign material.

3. Bed pipe as specified by the manufacturer and as shown on the Drawings.

4. Gravity lines must be laid at a constant and uniform slope from the beginning of the line to its end. The constant and uniform slope shall be maintained through all manholes.

5. Do not lay pipe when weather or trench conditions are unsuitable.

6. Underground detectable warning tape shall be placed above the sewer approximately three (3) feet below finished grade. Tape to be two (2) inches wide, metallic lined, with the wording "CAUTION SEWER LINE BURIED BELOW" continuously printed, as manufactured by the Seton Name Plate Corp. (New Haven, Connecticut) or approved equal.

C. Gravity Lines

1. Lay gravity sewers so that true alignment and grade, as indicated on the Drawings, are maintained. All sewer pipes shall be laid using a laser beam method to control alignment. All sewer pipes shall be laid true to both horizontal and vertical alignment, and will be subject to review by the Project Representative. After completion the pipe shall exhibit a 100% full circle of light when lighted at one manhole and viewed from the next. Pipes that do not "Lamp" shall be removed and re-laid to a true line and grade. An Owner's representative must be present for viewing the lamping of each segment.

2. Commence laying gravity sewers at the lowest point on a section of line and lay pipe with the bell ends uphill.

3. Prior to making pipe joints on gravity sewer lines, clean and dry all surfaces of joint pipe and jointing material. Use lubricants, primers, adhesives and similar materials as recommended by the manufacturers. Place, fit, join and adjust the jointing materials or factory-fabricated joints as recommended by the manufacturer to obtain the degree of water tightness required. As soon as possible, after the joint is made, place sufficient backfill material, as in accordance with manufacturers recommendation with the pipe and on the Drawings along each side of the pipe to resist forces that might tend to move the pipe off line and off grade.

4. Backfill shall be in accordance with pipe manufacturer's recommendation and on the Drawings. Place backfill over the pipe immediately after the pipe has been laid.

D. Joint Assembly

1. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joint pipe to remove oil, grit, excess coating, and other foreign matter. Flex the rubber gasket and insert it in the gasket recess of the bell socket. Apply a thin film of gasket lubricant, as supplied by the pipe manufacturer, to either the gasket or the spigot end of the joining pipe.

2. Start spigot end of pipe into socket with care. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or jacked type device. Field-cut pipe shall be filed on the cut end to match the manufactured spigot end.

3.02 CONNECTION TO THE MICHIGAN CITY SANITARY DISTRICT SEWER SYSTEM

A. Notice shall be given to the Michigan City Sanitary District at least three (3) business days before any connection to the City's sewer system is to be made.

3.03 PAVEMENT, CURB & SIDEWALK REPLACEMENT

A. All pavement, curbs or sidewalks (or other structures) damaged or removed during the course of the work performed by the contractor and/or subcontractors must be replaced to a condition equal to or better than its condition at the time it was damaged, removed, or replaced. Additionally, any improvements must be made to such pavement, curbs or sidewalks (or other structures) in accordance with any ADA Standards or other applicable rules and/or regulations.