CITY OF FORT WAYNE MASTER UPDATED: 03/12/2018

SECTION 33 44 13

NTS: This Section covers information related to storm water utility construction. Included is drainage structures such as inlets and pipe end treatments. Edit to suit project specific requirements.

1. GENERAL
	1. DESCRIPTION
		1. Scope:
			1. Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all precast, including precast concrete drain inlets, plastic drainage structures, catch basins, headwalls and similar structures.
		2. General:
			1. Structures shall conform in shape, size, dimensions, materials, and other respects to the details shown on the Drawings or as directed by the Engineer.
			2. Cast iron frames, grates and covers shall be the standard frame and grate or cover, unless otherwise shown or specified in specification 05 56 00, Metal Castings.

NTS: For small projects, consider changing cast-in-place concrete reference in “3.” below to 03 00 05 Concrete.

* + - 1. All concrete shall be Class “A” and shall conform to the require­ments specified under Section 03 00 05, Concrete.
			2. Inverts shall be as shown and shall conform accurately to the size and elevation of the adjoining pipes.
		1. Related Sections:

NTS: List below only sections covering products, construction, and equipment specifically identified in this section and specified in another section and directly referenced in this specification. Do not list administrative and procedural Division 01 sections. Insert at (--1--) the number and name of the Division 33 installation section.

* + - 1. Section 03 00 05, Concrete.
			2. Section 05 56 00, Metal Castings.
			3. Section 31 00 05, Trenching and Earthwork.
			4. Section (--1--)

NTS: Section “1.2” is to be included if project is bid on unit price basis. Section to be deleted or revised if project is to be bid on lump sum basis.

NTS: Insert at (--1--), and (--2--) below the various drainage structures to be used for project. Adjust Section “1.2” below for additional work item numbers as needed. Coordinate pay items listed below with Section 05 56 00 Metal Castings. Castings are not included under this pay item. If castings are to be included with structures insert metal castings in payment description.

* 1. MEASUREMENT AND PAYMENT
		1. Drainage Structures Various Sizes and Types
			1. Work Item Number and Title

 **33 44 13-A (--1--) Drainage Structures**

 **33 44 13-B (--2--) Drainage Structures**

* + - 1. Payment for drainage structures shall be on a unit price basis for each size classification furnished and installed in place as shown and specified on the Drawings.
			2. The pay quantity shall be the number of inlets in each size classification actually furnished and installed.

NTS: Remove all items in Section “4” below that are included under a separate bid item. Include all other work as required by the project. Granular backfill shall be included in this payment and not included under special backfill.

* + - 1. This Work will be at the unit price as listed on the submitted Bid schedule each for catch basin, inlet or special structure and shall include the following Work: pavement removal, excavation, disposal of excess excavated material, base stabilization, dewatering, sheeting, riser rings, precast sections or cast in place concrete, channels, inverts, granular backfill material, connecting pipes, placing and compacting backfill, testing, utility adjustments, temporary pavement replacement, if necessary, and any other requirements to complete the construction in accordance with these Contract Documents, unless otherwise detailed by the Engineer as a separate Work item.
			2. This Work item includes connections to new structures where noted in the Drawings, including core drilling, junction gaskets, related hardware, and grouting.

NTS: Edit “B” below as necessary for project specific requirements. Drainage structure modifications can include but are not limited to core drilling, weir modifications, and raising a structure to grade. Add product specific requirements in Part 2 Products and Part 3 Execution as necessary.

* + 1. Drainage Structure Modifications
			1. Work Item Number and Title

 **33 44 13-C Drainage Structure Modifications**

* + - 1. This item is measured on a lump sum basis for work shown on the Drawings, otherwise specified, or necessary to complete work shown on the Drawings.
			2. Payment for modifications to existing manholes shall be paid based on the number of structures successfully completed per the Contract Documents or as shown on the drawings.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment, both permanent and temporary, for structure modifications associated with Work shown on the drawings including, but not limited to: cleaning existing structure as required to perform the Work, excavation, riser rings, furnishing and installing concrete for patching abandoned inlets/outlets, and core drilling existing structures to facilitate construction. The Work includes protection of existing utilities, installation of concrete plugs, site restoration, and incidentals for performing all Work as specified unless otherwise classified as a separate Work Item.
		1. Remove Existing Structure
			1. Work Item Number and Title

 **33 44 13-D Remove Existing Structure**

* + - 1. Payment shall be made on the contract unit price in accordance with the bid schedule.
			2. The removal of existing structures and pipes shall be done in accordance with the drawings or as determined by the Engineer.
			3. Contractor shall dispose all removed pipes and structures away from the project Site.
			4. This item shall include costs to furnish labor, materials, tools, and equipment, both permanent and temporary, for removal of existing structure including surface patching and backfill.
		1. Pipe End Treatments
			1. Work Item Number and Title

 **33 44 13-E Pipe End Treatments**

* + - 1. Payment for End Treatments shall be made on the contract unit price in accordance with the Drawings.
			2. The pay quantity shall be the number of end treatments actually furnished and installed.
			3. This item shall include costs to furnish labor, materials, tools, and equipment, both permanent and temporary, to install pipe end treatments.
	1. REFERENCES

NTS: Retain applicable standards below. Add others as required.

* + 1. Standards referenced in this Section are listed below:
			1. ASTM International.
				1. ASTM C443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
				2. ASTM C478, Specification for Precast Reinforced Concrete Manhole Sections.
				3. ASTM C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
				4. ASTM C990, Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealant.
				5. ASTM F949, Standard Specification for PVC Corrugated Sewer Pipe With a Smooth Interior and Fittings
				6. ASTM F2648, Standard Specification for 2 to 60 inch Annular Corrugated Profile Wall Polyethylene Pipe and Fittings for Land Drainage Applications.
			2. American Association of State Highway and Transportation Officials .
				1. AASHTO-M198, Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
				2. AASHTO-M252, Standard Specification for Corrugated Polyethylene Drainage Pipe
	1. SUBMITTALS
		1. Action Submittals: Submit the following:
			1. Shop Drawings:
				1. Submit manufacturer’s Shop Drawings showing design and construction of all precast concrete.
	2. QUALITY ASSURANCE
		1. Qualifications
			1. Manufacturer
				1. Storm Drainage Manholes shall be from a source listed in the INDOT List of Certified Precast Concrete Producers, in accordance with ITM 813.
		2. Component Supply
			1. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer. Such inspection may be made at the place of manufacture, or on the Project Site, or at both places and the materials shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein. Material rejected after delivery to the Project Site shall be marked for identification and shall be removed from the Site immediately. All materials, which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor’s expense.
			2. At the time of inspection, the materials will be carefully examined for compliance with the ASTM standards specified in this Specification Section and with the approved manufacturer’s Drawings. All precast manhole sections shall be inspected for general appearance, dimension, “scratch-strength,” blisters, cracks, roughness, soundness, etc. The surface shall be dense and close textured.
		3. Imperfections in precast manhole sections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that a strong and permanent repair will result. Repairs shall be carefully inspected before final approval.
	3. DELIVERY, STORAGE, AND HANDLING
		1. Any manhole section damaged in the process of transportation or handling, shall be rejected and immediately removed from the Site, and the damaged manhole sections shall be replaced at no increase in Contract Amount.
		2. Material delivery, storage and handling must conform to requirements in Contract Documents. Refer to Section 01 65 00 Product Delivery Requirements and Section 01 66 00 Product Storage and Handling Requirements.
1. PRODUCTS

NTS: Delete Articles 2.1, 2.2 and/or 2.3 below if not applicable. Add other articles and products as required.

* 1. PRECAST CONCRETE PRODUCTS
		1. Where shown or otherwise approved by Engineer, precast concrete shall be used for items such as area drains, catch basins, inlets, splash pads, etc. Layout and details shall be as shown and specified in Drawings. Design shall be adequate to withstand all loads imposed, including earth pressure, vehicle loads and construction loading.
		2. Precast concrete manhole sections shall conform to ASTM C 478, where applicable.
		3. Where precast structures are manufactured of various precast concrete components such as base sections, riser sections and top sections, the joint between sections shall be the tongue and groove type.
		4. Contractor shall be solely responsible for the proper height of all structures necessary to reach the final grade at all locations. Contractor is cautioned that Engineer's review of Shop Drawings for components will be general in nature and Contractor shall have at its disposal an adequate supply of random length precast riser sections to adjust any structure to meet field conditions for final grading.

NTS: Listed below are manhole boot type connections that are required for all sanitary sewer projects to protect against infiltration. The majority of storm sewer projects do not need to install the flexible pipe joint and can delete Article “2.2” below. For projects that require the flexible seal maintain Article “2.2” below. Flexible connections for stormwater manholes are warranted when there is concern with soil migrating from the soil matrix surrounding the manhole and creating a void. Require boots for stormwater projects that are next to building foundations, basements, sensitive environmental areas, contaminated soils and downtown urban areas. If project requires the boot, coordinate with the pay items drawings and standard details.

* 1. FLEXIBLE PIPE JOINT AT INLET TO PIPE CONNECTION

NTS: Flexible pipe joints listed below, meeting requirements of ASTM C923 are tested and rated to 13 psi (30’). If deeper installations are required, specifier must provide other approved materials or methods.

* + 1. An approved flexible joint shall be provided between each pipe entering and exiting the inlet. The joint into the inlet base shall be completely watertight.
		2. Provide products manufactured as listed below and meeting requirements of ASTM C923:
			1. For pipes 36 inch diameter and smaller:
				1. Press-Seal PSX: Positive Seal
				2. NPC Kor-N-Seal II 306 Series
				3. Or Equal
	1. MISCELLANEOUS METALS
		1. Metal frames, covers, grates, troughs and similar required items shall be provided as shown and in accordance with Section 05 56 00, Metal Castings, and applicable sections on metals.

NTS: Remove 2.3 if not required. Add the specific sizes and products as necessary for the project.

* 1. PLASTIC DRAINAGE STRUCTURES
		1. Plastic drainage structure shall be adequate to withstand all loads imposed, including earth pressure, vehicle loads, and construction loads.
		2. Plastic drainage structures shall be shown or approved by the Engineer. The following materials are acceptable:
			1. ADS Inc. Nyloplast structures
			2. Or equal

NTS: Edit or remove Paragraphs “2.4.A”, “2.4B” or “2.4.C” as required for project.

* 1. PIPE END TREATMENTS
		1. Metal End Treatments
			1. Metal end treatments shall be in accordance with AASHTO M 36. The galvanized steel sheet material used in the fabrication of the metal end treatments shall conform to the applicable material requirements of AASHTO M 218 and ASTM A 929.
			2. Metal end treatments shall be manufactured to show careful finished workmanship and have no loosely formed seams and no ragged shear edges,
			3. The markings on the sheets as received from the steel supplier shall be legible.
			4. The metal end sections shall have the standard toe plate.
		2. Precast End Treatments
			1. Precast concrete end treatments shall be in accordance with ASTM C76. Precast concrete end treatment shall have a tongue and groove joint to pipe.

NTS: If project does not require cast in place end treatments delete Paragraph “C” below. If included coordinate the requirements for concrete with Section 03 00 05 Concrete and include in the project manual.

* + 1. Cast In Place End Treatments
			1. Cast in place concrete end treatments shall be in accordance with the materials and requirements listed in Section 03 00 05 - Concrete.
1. EXECUTION
	1. RISER RINGS
		1. Riser rings must conform to the requirements in the Contract Documents. Refer to Section 05 56 00 Metal Castings.
	2. PRECAST CONCRETE ITEMS
		1. Precast concrete products shall be placed on a crushed stone bed or as shown and detailed, set at the proper grade, and carefully leveled and aligned.
		2. Backfill shall be carried up evenly on all sides of the structures to prevent overturning forces.
	3. PIPE JOINT IN STRUCTURE BASE
		1. An approved joint shall be provided between each pipe entering and exiting the structure. Pipe to structure connection shall conform to the details shown in the Drawings.
		2. Pipes shall not protrude inside the structure, but shall be cut in an approved manner to be flush with the inside wall of the structure.
	4. BEDDING AND BACKFILLING AT STRUCTURES
		1. Conform to applicable requirements of the Contract Documents. Refer to Section 31 00 05, Trenching and Earthwork.

NTS: Edit/remove Article “3.5” below, based on type of erosion control and materials used for project.

* 1. PIPE END TREATMENTS
		1. The metal end treatments shall attach to the pipe by means of a strap unless shown otherwise on the plans.
			1. The strap or rod shall be securely tightened around the pipe.
			2. The toe wall shall be placed in narrow trench. The invert of the metal end treatment shall be supported evenly by the bedding.
			3. The alignment of the end treatment shall match that of the pipe.
			4. The installation shall be completed by proper compaction of the backfill around the pipe end treatment
		2. Provide anchoring for all non-concrete pipes to protect against floatation.
		3. Provide energy dissipation to protect against erosion.

+ + END OF SECTION + +