CITY OF FORT WAYNE MASTER UPDATED: 1/5/15

SECTION

NTS: This section contains material pertaining to jack & bore (casing) installation. Edit specification if being used for open cut installation requiring a casing pipe.

NTS: Coordinate this specification with the details on the Drawings.

1. GENERAL
	1. SUMMARY
		1. Section Includes:
			1. Excavation for approach trenches and pits
			2. Casing pipe
			3. Carrier pipe
		2. 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 31 00 05, Trenching and Earthwork.
			2. Section (--1--).
		1. Utility pipe jacking shall comply with the following Specifications, as well as the requirements on the Drawings.

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--), below the various utility pipe jacking methods to be used for project. Adjust Section “1.2” below for additional work item numbers as needed.

* 1. MEASUREMENT AND PAYMENT

A. Utility Pipe Jacking

* + - 1. Work Item Number and Title

 **33 05 23-A (--1--) Utility Pipe Jacking**

* + - 1. The quantity of utility pipe installed by jack and bore shall be measured horizontally along the centerline of the successfully installed steel casing as shown and specified.
			2. The payment of utility pipe jacking shall be based on the unit price per linear foot as listed on the submitted Bid schedule and shall include all labor, materials, tools, excavation, and equipment needed in accordance with the Contract Documents. Payment for any backfill or associated restoration shall be paid for under their respective Work items.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment, both permanent and temporary, to install the utility pipe jacking as shown and specified. The Work includes, but is not limited to, pavement removal, boring and receiving pit excavation, disposal of excavated material, dewatering, furnishing and placement of bedding, carrier and casing pipe, casing pipe blocking plugging, end seals, casing spacers, placement of required backfill, required fittings and couplings, temporary surface, testing of materials, compaction of bedding and backfill, temporary sheeting, shoring and bracing, restoration/replacement of all disturbed items not included under other Work items, protection of existing utilities and structures, pressure and deflection testing and incidentals for performing all Work as specified unless otherwise broken down as a separate Work item.
	1. REFERENCES
		1. Standards referenced in this Section are listed below:
			1. American Association of State Highway and Transportation Officials.
				1. AASHTO M133 – Standard Specification for Preservatives and Pressure Treatment Processes for Timber.
				2. AASHTO T180 – Standard Specification for Moisture – Density Relations of Soils Using a 10-lb Rammer and a 18-inch Drop.

NTS: Coordinate design requirements with the applicable authority, railroad and/or INDOT. Eliminate Paragraph “B” or “C” if they are not applicable.

* + - 1. American Railway Engineering and Maintenance-of-Way Association.
				1. AREMA – Manual for Railway Engineering.
			2. ASTM International.
				1. ASTM A36/A36M – Standard Specification for Carbon Structural Steel.
				2. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
				3. ASTM C33 – Standard Specification for Concrete Aggregates
				4. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
				5. ASTM C150 – Standard Specification for Portland Cement.
				6. ASTM C443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
				7. ASTM D1557 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN – m/m3)).
			3. American Welding Society:
				1. AWS D1.1 – Structural Welding Code – Steel.
			4. National Utility Contractors Association:
				1. NUCA – Guide to Pipe Jacking & Microtunneling.
				2. NUCA – Trenchless Excavation Construction Equipment & Methods Manual
	1. PERMITS

NTS: Insert at (--1--) all permitting entities that apply: railroad, INDOT, county highway department, or city right-of-way department. Edit Section “A” below if owner is to obtain any permits.

* + 1. All crossing permits(s) will be obtained by the Contractor.
		2. Contractor shall follow all requirements of the permits(s) obtained from the (--1--)
		3. Contractor shall give notice to the (--1--) prior to the start of Work. Do not start Work until all arrangements are completed and permission is granted by the (--1--) to start the Work.

NTS: Modify Paragraph 1.5 as appropriate. Verify loading requirements with applicable permit and AHJ.

* 1. DESIGN REQUIREMENTS
		1. Design casing pipe and joints for leak proof construction.
			1. Highway Crossings: Verify required loadings specified in the applicable permit and design casing for earth and/or other pressure loads present, plus AASHTO H20 live loading.
			2. Railroad Crossing: Verify required loadings specified in the applicable permit and design cassing for earth and/or other pressure loads present, plus railroad E80 live loading with 50 percent added for impact.
		2. Design bracing, backstops, and use jacks of sufficient rating for continuous jacking without stoppage, except for adding pipe section and as conditions permit, to minimize tendency of ground material to “freeze” around casing pipe.
		3. Meet all design requirements of the permitting entity responsible for this infrastructure being crossed.
	2. SUBMITTALS

NTS: Edit or delete Paragraph “A” below if project requirements prohibit an experience clause.

* + 1. Qualification Data: Submit the following:
			1. Submit history of previous Work completed of equivalent nature and scope. Include qualification and experience of key personnel.
			2. Submit list of references upon request.
		2. Installation Plan: Submit the following:
			1. Description of proposed construction plan, dewatering plan and plan to establish and maintain vertical and horizontal alignment. Construction plan shall include general layout and location of all bore pits, receiving pits, and material lay down areas required.
		3. Project Record Documents:
			1. Record actual locations of casing or tunnel liner, carrier pipe, and invert elevations. Refer to Section 01 78 39 Project Record Document.
	1. QUALITY ASSURANCE

NTS: Insert at (--1--) all applicable permitting entities that apply: railroad, INDOT, county highway department, city right of way department.

* + 1. Perform Work in accordance with (--1--), NUCA Trenchless Excavation Construction Equipment & Methods Manual, NUCA Pipe Jacking & Microtunneling Design Guide, AREMA, and Association guidelines.
		2. When boring, jacking, or tunneling under (--1--) property, make application for and obtain occupancy permit as required in the (--1--) Specifications and requirements.
	1. QUALIFICATIONS

NTS: Edit or delete Paragraph “A” below if project requirements prohibit an experience clause. Select applicable installation method (s).

* + 1. Installer: Company specializing in performing Work of this section with minimum of (5) years documented experience.
			1. Work Experience: Include projects of similar magnitude and conditions.
			2. Furnish list of references upon request.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Material delivery, storage and handling must conform to requirements in
		2. Contract Documents. Refer to Section 01 65 00 Product Delivery Requirements and Section 01 66 00 Product Storage and Handling Requirements.
		3. Protect piping from entry of foreign materials and water by temporary covers, completing sections of Work, and isolating parts of completed system.
		4. Accept system components on site in manufacturer’s original containers or configuration. Inspect for damage.
		5. Use wooden shipping braces between layers of stacked pipe. Stack piping lengths no more than 3 layers high.
		6. Support casing and carrier pipes with nylon slings during handling.
	2. FIELD MEASUREMENTS
		1. Verify invert elevations of existing Work prior to excavation and installation of casing.
1. PRODUCTS
	1. CASING AND JACKING PIPE MATERIALS

NTS: Insert at (--1--) the permitting entity that applies: railroad, INDOT, county highway department, or city right of way department.

* + 1. Furnish materials in accordance with the Specifications and requirements of (--1--).

NTS: Review and include in (--2--) and (--3--) below the minimum requirements of the permitting entity. Edit Section 3. Below if joint requirements differ from what is stated. Enter in (--4--) below any other requirements of the permitting entity.

* + 1. Steel Casing Pipe:
			1. (--2--) psi minimum yield strength,
			2. (--3--) inch minimum wall thickness
			3. Full circumference welded joints in accordance with AWS D1.1. and able to withstand excavation forces.
			4. (--4--)

NTS: Review and include in (--5--) and (--6--) below the minimum requirements of the permitting entity. Enter in (--7--) below any other requirements of the permitting entity.

* + 1. Concrete Casing Pipe:
			1. Pipe Class (--5--)
			2. Joints shall meet the following requirements: (--6--)
			3. (--7--)

NTS: Insert at (--1--) the appropriate Division 33 pipe material specification(s).

* 1. CARRIER PIPE MATERIALS
		1. Refer to Section (--1--) for pipe material requirements.
	2. END SEALS AND COVER MATERIALS
		1. Cover Materials
			1. Soil Backfill for Trench Approaches and Pits to Finish Grade: Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.
		2. End Seals:
			1. Brick and Mortar Grout Mix: One part Portland cement, and 6 parts mortar sand mixed with water to consistency applicable for brick and mortar grouting.
			2. Mortar Sand: ASTM C33
			3. Portland Cement: ASTM C150
			4. Carrier Pipe Padding: 15 pound Building Felt
	3. ACCESSORIES
		1. Casing Spacers:
			1. Products and Manufactures: Provide casing spacers from the following:
				1. CCS Series by Cascade Waterworks Mfg.
				2. Or approved equal.
		2. Steel Strapping: ASTM A36/A36M.

NTS: Delete Section “C” below if project does not include water piping installation.

* + 1. Buried Piping Identification: Refer to Section 33 11 00, Water Piping Installation, for tracing wire and marking post requirements.
1. EXECUTION
	1. EXAMINATION
		1. Verify connection to existing piping system size, location, and invert elevations are in accordance with Drawings.
	2. PREPARATION
		1. Identify required lines, levels, contours, and datum locations.
		2. Locate, identify, and protect utilities indicated to remain from damage.
		3. Protect plant life, lawns, and other features remaining as portion of final landscaping.
		4. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
		5. Establish minimum separation from other services sanitary sewer piping, water, etc. piping in accordance with local code.
	3. DEWATERING
		1. Intercept and divert surface drainage precipitation and groundwater away from excavation through use of dikes, curb walls, ditches, pipes, sumps, or other means.
		2. Develop substantially dry sub-grade for prosecution of subsequent operations.
		3. Comply with State or Municipality requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.
	4. EXISTING WORK
		1. Maintain access to existing facilities and other remaining active installations requiring access. Modify installation as necessary to maintain access.
	5. PITS OR APPROACH TRENCHES
		1. Excavate approach trenches or pits in accordance with installation plan or in accordance with Shop Drawings and as Site conditions require.
		2. Ensure casing, entrance face as near perpendicular to alignment as conditions permit.
		3. Establish vertical entrance face at least 1 foot above top of casing.

NTS: Insert at (--1--) permitting entity’s name.

* + 1. Install adequate dewatering measures and excavation supports as required to prevent damage to the (--1--) property.

NTS: Insert at (--1--) permitting entities requirements for setback distances.

* + 1. Setback distances of pits or approach trenches:
			1. (--1--)
	1. CASING END SEAL
		1. The ends of the casing pipes shall be bulkheaded using brick and mortar construction in such a manner as to prevent entrance of foreign material, but not tightly sealed as to prevent escape of water in case of carrier pipe failure.
		2. Place bricks and mortar as required to seal the casing pipe.
		3. Pad carrier pipes at end seal with two layers of 15 lb. building felt.

NTS: Edit or delete Section “3.7” below based on project requirements. Not required on all projects. If required for project consider heat of hydration of the grout and any additional cooling that may be required.

* 1. PRESSURE GROUTING
		1. Pressure grout annular space between casing pipe and surrounding earth.
	2. CARRIER PIPE INSTALLATION
		1. Clean, inspect, and handle pipe accordance with Contract Documents.
		2. Place carrier pipe in accordance with Contract Documents. Exercise care to prevent damage to pipe joints when carrier pipe is placed in casing.
		3. Support pipeline within casing so no external loads are transmitted to carrier pipe. Attach supports to barrel of carrier pipe; do not rest carrier pipe on bells.
		4. Brick and mortar ends of casing to seal.

NTS: Delete Section “3.9” below if project does not include water piping installation.

NTS: Include tracing wire standard details (STR-43, W-17, and W-48) from the City of Fort Wayne’s Design Standards Manual, in the Drawings. If project is a Sanitary or Storm Sewer Installation include the tracing wire requirements that are listed in Section 33 11 00- Water Piping Installation in the appropriate Div 33 installation section.

* 1. BURIED PIPING IDENTIFICATION
		1. Tracing wire for water piping identification will be required for all utility pipe jacking.
		2. Marking post, for attaching tracing wire, will be required at both the receiving pit and the bore pit.
		3. Refer to Section 33 11 00, Water Piping Installation for tracing wire and marking post requirements.
	2. BACKFILL
		1. Backfill materials and execution for open cut sections of installation, boring and receiving pits, and other incidental excavations related to utility pipe jacking installation shall follow the backfill requirements of Section 31 00 05, Trenching and Earthwork.
		2. No rock, boulders or stone larger than 8 inches in its greatest dimension may be used in backfilling within 1 foot of the top of the pipe.
		3. Any deficiency in the quantity of material for backfilling trenches, making restoration, or filling depressions caused by settlement or caused by the rejection of unsuitable excavated material, shall be provided by the Contractor.

NTS: Edit tolerance(s) below to suit the project and material requirements. Coordinate with details on Drawings.

* 1. TOLERANCES
		1. Do not over cut excavation by more than 1 inch greater than outside diameter of casing pipe.
		2. Install casing pipe to vertical and horizontal alignment on Drawings within plus or minus 3 inches prior to installation of carrier pipe. The steel casing shall be installed so as not to restrict the installation of the carrier pipe to plan line and grade. Vertical and horizontal alignment shall be checked every 20’ to 40’.
		3. Install pipe bells with minimum 1/2-inch clearance to casing.
		4. Carrier pipe shall be installed to line and grade, as shown on the Drawings.
	2. FIELD QUALITY CONTROL
		1. Compaction Testing: In accordance with ASTM D1557.
		2. When test indicate Work does not meet specified requirements, remove Work, replace and retest.
		3. Frequency of Compaction Testing: One for each lift.
	3. REMOVAL OF FACILITIES AND CONTROLS
		1. Remove temporary facilities for casing installation and jacking operations in accordance with Contract Documents.
	4. OBSTRUCTIONS
		1. If anobstruction is encountered during installation which stops the forward progress of the pipe, and it becomes evident that it is impossible to advance the pipe, the Engineer shall be notified in writing immediately.

+ + END OF SECTION + +