

SECTION 02773
ULTRASONIC PIPELINE INSPECTION

1.0 GENERAL

1.1 DESCRIPTION

A. Scope

1. The Contractor shall perform external inspections of the project cast iron pipe (CIP) and ductile iron pipe (DIP) pressure mains and record the estimated pipe wall thickness using ultrasonic technologies. The pressure mains will remain in service during the ultrasonic inspection. The intent of the inspection is to obtain data of sufficient quality and quantity to identify areas of pipe wall material loss due to internal corrosion, particularly at high points of the pipeline. Ultrasonic thickness testing shall be completed at locations identified in the contract documents.

B. Requirements

1. The Contractor shall prepare the exterior of the pipeline for inspection including any pipe cleaning and surface grinding to provide a good contact surface for the ultrasonic probe.
2. Calibrate the ultrasonic testing (UST) equipment using a section of pipe similar to the test pipe in terms of material and original wall thickness. The UST equipment shall be calibrated to match the measured wall thickness of the sample.
3. The Contractor shall conduct an external inspection of the identified project ferrous pipe main sites using ultrasonic testing equipment and shall document the site of each test and the measured wall thickness at each site. A minimum of six locations around the circumference of the pipe shall be tested at each test site. These shall include a minimum of three locations at the pipe crown at the 1:00, 12:00 and 11:00 positions, one at each side of the pipe at the spring line and one in the lower half of the pipe circumference depending on ease of access.
4. Prepare a report for submittal to the Engineer which documents the testing conducted on the pipe at each site, with test results referenced to each site and at each test location. The documentation will present the test results of the UST including an evaluation of the data from each test and an assessment of the thickness of the pipe wall at each location around the pipe circumference. The draft reports should be prepared monthly.
5. The Contractor shall also provide daily field reports to the Engineer.

1.2 QUALITY ASSURANCE

A. Consider incorporating the following in Section "00200 - Instruction to Bidders" Article 4:

1. *Contractor's Qualifications: The Contractor shall have a minimum of five years of experience in such work necessary to successfully meet this specification and provide references for five ferrous pipe inspection projects involving the ultrasonic testing (UST) equipment to be used on this project.*
2. *Supervisor's Qualifications: The Contractor shall assign a qualified field inspection team with a supervisor having a minimum of three years of experience in such work necessary to successfully meet this specification and provide references for three ferrous pipe inspection projects involving the UST equipment to be used on this project.*

B. Equipment Calibration:

1. The Contractor must calibrate the UST equipment to work on the type of pipe to be inspected in this project. The Contractor must submit a plan for calibrating the equipment on site prior to beginning the first inspection. Alternatively, the Contractor must provide documentation that the equipment to be used has been calibrated on identical pipe. The documentation should confirm that the equipment operator during the calibration is the same operator on the project work.

1.3 SUBMITTALS

A. The following submittals shall be provided in the proposal:

1. Submit with bid resumes and project references a list of five similar projects within the past 5 years that required UST inspection.
2. Submit with bid resumes and project references for the field personnel who will be employed for this project.
3. Submit an example of previous work for approval. The example shall consist of one hard copy, CD or DVD of previous pipeline inspection work complete with inspection results, evaluation, and conclusions. The submitted example shall be the work of the field supervisor or foreman to be used on this project and shall be for ferrous mains. Contractor shall be responsible for modifications to equipment and/or inspection procedures to achieve report material of acceptable quality.
4. Submit a work plan for calibrating the UST equipment prior to starting the inspection work. Alternatively, submit evidence of recent calibration of the UST equipment on the same type of pipe as for this project.

2.0 PRODUCTS

2.1 ULTRASONIC TESTING EQUIPMENT

A. The ultrasonic testing (UST) equipment shall be capable of measuring wall thickness in both cast iron and ductile iron pipe from *{Engineer to specify range}* in diameter, the range of sizes expected for this project.

3.0 EXECUTION

3.1 GENERAL

A. The Contractor will be responsible for the following:

1. Preparing access to the pipeline for the inspection including all excavation to expose the pipeline at the indicated test sites.
2. Provision of ventilation of the access pits for the duration of the inspection if needed.
3. Traffic control if needed.
4. At the conclusion of the inspection, backfilling of any excavation and restoration of the site.

3.2 ULTRASONIC TESTING

A. The Contractor shall conduct an ultrasonic survey of the project ferrous pipe segments identified in the contract documents and evaluate the ultrasonic data obtained to estimate the wall thickness at each location on the pipe circumference at each test site.

B. The field notes from the ultrasonic survey shall clearly identify each test location around the pipe perimeter and the measured wall thickness at each test location. Copies of the original field notes shall be provided as part of the documentation. The field notes shall include date and time, weather conditions, names of the inspection team members, and the identification of the inspection site. The notes shall include the identification number of the pipe segment being inspected as provided by the Owner or Engineer.

3.3 PREPARATION

A. The Contractor shall undertake all measures needed to prepare the ferrous pipelines for inspection using the Contractor's equipment. This shall include any additional cleaning of the pipe exterior and any smoothing of the pipe wall as required to obtain an accurate measurement.

3.4 PIPELINE IDENTIFICATION

A. The Contractor shall use the Owner's pipeline identification numbering system and the segment identification system when performing the inspections for this project, as provided by the Engineer.

3.5 INSPECTION REPORT

A. The Contractor shall provide an Inspection Report to the Engineer which will include the following at a minimum:

1. Identification of the test site by street address, intersection, or easement. The report shall provide the pipe segment identification numbers assigned by the Engineer and the Owner as well as the date of the inspection and any other pertinent information.
2. A description and documentation of the calibration of the ultrasonic equipment used for this inspection.
3. A description of the inspections performed including the location along the pipe perimeter of each ultrasonic inspection and the resulting wall thickness measurements. This data should be presented in tabular form.

B. Five hard copies and one electronic copy of the Inspection Report shall be delivered to the Engineer within 14 calendar days of completing all inspections or testing on each pipeline segment.

C. Within 10 business days of receipt of any comments from the Engineer, the Contractor shall incorporate any comments and submit 5 hard copies *{Engineer to verify the need for paper copies}* and 2 electronic copies of the Final Inspection Report to the Engineer.

END OF SECTION