

Scope of Work

1. INTENT

The intent of this bid specification is to establish an annual requirements contract for internal, non-destructive, Acoustic, Electromagnetic, Closed-Circuit Television Inspection, of potable water pipelines for the City of Arlington. The Contractor must provide all equipment and labor necessary to conduct inspection of water pipelines and provide a detailed condition assessment report.

2. SCOPE OF WORK

The Contractor must furnish all labor, materials, equipment, supervision, plan and perform all work necessary to internally inspect and record the condition of designated potable water distribution system pipelines ranging in diameter from 16-inches to 54-inches. This work includes, but is not limited to:

- a) Perform site reconnaissance, plan inspection, and conduct workshop with City to review all aspects of the proposed inspection.
- b) Installation and removal of required launch and/or extraction assemblies on the access points provided by City.
- c) Calibration, operation, insertion, and extraction of all inspection tools and equipment.
- d) Maintenance of the required tools and equipment such that it is in working condition during scheduled inspection days.
- e) Removal of any debris from the interior of the water pipe introduced by inspection related work and activities.
- f) Develop pipe performance curves using 3D finite element analysis that will allow for risk ranking of pipes segments identified with breaks in wire wraps or degraded bars and steel cylinder.
- g) Provide inspection results in both tabular and geospatial GIS formats on a pipe segment basis.

At the City's request, the Contractor must be capable of conducting internal, non-destructive, potable water pipeline inspections using all the following methods:

- a) Electromagnetic Inspection on free-swimming and Robotic platforms to detect and quantify broken wire wraps on prestressed concrete cylinder pipe (PCCP), or broken bars and areas of steel cylinder wall loss on individual bar wrapped pipe (BWP). Inspection would also identify water services, mainline taps, wall defects and anomalies.
- b) Closed-circuit television camera (CCTV) on free-swimming, tethered, and Robotic platforms

- c) Acoustic leak and gas pocket detection technologies on free-swimming and tethered platforms

The City of Arlington shall not be held responsible for any delays in the work. The Contractor must work with the City of Arlington to minimize potential delays. All work will be performed in accordance with these specifications regarding quality, workmanship, hardcopy and electronic deliverables, and schedule.

This is a requirements contract. The quantities listed are based upon the best available data and serve only as a guide and in no way represents a guaranteed amount. The City reserves the right to purchase according to actual need and may or may not meet or exceed the estimated quantities shown.

3. CONFINED SPACE

The work expected under this contract involves activities in and around confined spaces. The Contractor and/or Contractor's independently retained employee or safety consultant must implement a confined space entry program in accordance with OSHA standards governing the presence and activities associated with working in and around confined spaces. The Contractor must, as a function of the Health and Safety plan, implement a confined space entry program and submit the final version to the contract administrator prior to beginning work. The Contractor must maintain a copy of the Confined Space Entry Program on site at all times. The Contractor shall take all necessary actions to ensure that his employees and subcontractors have read, understand, and follow the plan. The Contractor must supply staff with all safety equipment necessary for the inspection such as calibrated gas detectors, lifting harnesses, communication devices, safety ropes and other pertinent personal protective equipment.

4. DISINFECTION

The Contractor shall disinfect all personnel, tools, or any other objects entering a potable water pipe in accordance with AWWA Standard C651. The Contractor must maintain a disinfected staging area either directly adjacent to, or with a disinfected walkway to, any access point where either materials, equipment or personnel enters the pipe, or the interior of a potable water pipe or appurtenance is exposed. The Contractor must remove any debris introduced into the interior of a potable water pipe or appurtenance during the inspection process. Prior to the re-sealing of the water pipe access point, the Contractor must disinfect any exposed external and internal surface of potable water pipe or appurtenance in accordance with AWWA Standard C651.

5. ACCESS

The Contractor must furnish its personnel with appropriate off-road vehicle/equipment enabling the delivery of staff, materials, and equipment to rural project locations. The Contractor must install and remove required launch, operation, and/or extraction assemblies on the access points provided by the city. Prior to initiating work, the Contractor shall conduct a site reconnaissance of the pipeline to be surveyed and furnish a detailed written Work Plan to the City and hold a Workshop with the City to review all inspection protocols, logistical support requirements, project schedule and the safety plan. The Contractor will advise the City as to logistical support requirements including required flow velocity and operating pressure. The Contractor will advise The City with respect to insertion and extraction requirements of the selected Inspection tool.

6. ELECTROMAGNETIC (EM) INSPECTION REQUIREMENTS

The Contractor must be capable of providing internal, non-destructive, electromagnetic inspection of potable water pipelines capable of passing through butterfly valves. The Contractor must be able to conduct inspections using free-swimming, manned, and remote operated robotic crawler electromagnetic inspection tools.

The Contractor must use electromagnetic (EM) inspection tools capable of detecting and quantifying the number of broken wires or bars within all types of prestressed concrete cylinder pipe (PCCP) and bar-wrapped pipe (BWP); and locating areas of concern in metallic pipelines. The Contractor must be capable of providing EM inspection tools or equipment that meet the following requirements:

- a) Perform the non-destructive EM inspection that can quantify the number of broken wires within all types of Prestressed Concrete Cylinder Pipe (PCCP) and broken bars of Bar-Wrapped Pipe (BWP) while the pipe remains in service.
- b) Detect localized wall loss on the steel cylinder in BWP, DIP, steel and broken wraps in BWP and PCCP.
- c) Collect CCTV video data for visual assessment.
- d) Inspect potable water pipelines with a distance of 10,000ft or greater between access points
- e) Detect a minimum of five (5) consecutive broken wire wraps on all configurations of PCCP and BWP, including where the prestressed bars or wires are located such that the steel cylinder is in between the electromagnetic inspection tool and the wires or bars. Detect a defect at least 3-inch diameter 30% defect in the cylinder of steel, ductile iron or BWP.
- f) Inspect pipelines that are 16-inch and larger in diameter.
- g) Pass butterfly valves, gate valves and other configurations common to potable water pipelines during the inspection.
- h) Track all testing equipment from above ground during the inspection. Supply and install any equipment necessary for tracking.
- i) Classify anomalies found based on a detailed signal library as features, damage or other as applicable.
- j) Quantify the extent of damage found and provide the location of the defect.
- k) Compare results to previous inspections, where applicable, using the same calibration curve for both data sets.
- l) Provide examples of calibration curves generated from various pipe types including BWP, DIP, steel, and PCCP. The vendor must be able to provide detailed data regarding how these curves are used to estimate the pipe damage.

- m) Provide five (5) examples of electromagnetic/wall thickness free swimming inspections projects where the tool is capable of passing butterfly valves. The vendor must provide where data quality and accuracy has been verified.
- n) Provide evidence with bid packet that the technology has been utilized on a minimum of 200 miles of pipeline.

7. ACOUSTIC BASED LEAK AND GAS POCKET DETECTION INSPECTION REQUIREMENTS

The Contractor must be capable of providing internal acoustic based leak and gas pocket detection inspections of potable water pipelines with ability to pass through butterfly valves. The Contractor must be capable of conducting acoustic inspections on both free-swimming and tethered equipment platform/method options. The leak and gas pocket inspection must be performed internally while the pipeline remains in service. The Contractor must be capable of providing internal acoustic based leak and gas pocket detection tools or equipment that meets or exceeds the following requirements:

- a) Such method/device must be capable of being deployed into a fully operating and flowing pipeline, whereby the pipeline remains in service.
- b) Such method/device must be able to detect multiple leaks and/or gas pockets over the entire length of a pipeline inspected under a single deployment.
- c) Such inspection must be performed in a non-destructive manner.
- d) Such method/device must have the ability to survey pipelines with an inside diameter of six (6) inches or larger.
- e) The Contractor shall locate and mark, on the ground surface, the location of all identified leaks and pockets of trapped gas, or air pockets. Locating resolution to be +/- 6 feet.
- f) Preliminary analysis identifying large leaks shall be available to City within twenty-four (24) hours following completion of inspection. Locations of large leaks will be marked by the Contractor within 72 hours following submittal of the preliminary analysis.
- g) Track all testing equipment from above ground during the inspection. Supply and install any equipment necessary for tracking (access by others).
- h) Such method/device must be able to enter and conduct the inspection through a minimum access of four (4) inches equipped with a corresponding full port valve (provided by the city).
- i) The free-swimming method/device must be capable of inspecting up to fifteen (15) miles inside the pipeline from a single insertion point.
- j) Such method/device must be capable of inspecting all pipeline material types including PCCP, RCCP, AC, PVC, HDPE, GRP, steel, cast iron, and ductile iron pipe.

8. NOTIFICATION/RESPONSE FOR SERVICE

The Contract Administrator shall be notified of all work. At the City's option, a City representative may be present during the Contractor's inspection of each project location. The Contractor shall inform the

Contract Administrator with sufficient time to be present should the Contract Administrator deem necessary.

9. INSPECTION LOCATIONS

The City shall provide maps showing the scope limits of the inspection project(s). The Contract Administrator shall provide the approximate lengths, estimated pipe diameter, plans (if available), shop drawings/lay schedules (if available) for all water pipelines to be inspected. These lengths shall be measured, agreed upon by the Contract Administrator and Contractor, prior to the commencement of any work. All pipelines within one project shall be inspected for a project to be considered complete. If any main is unable to be inspected due to field conditions, these conditions must be noted when the project is submitted for review.

10. MOBILIZATION

Mobilization is subsidiary to each bid item.