



**DATA SHEET**  
**Agenda Item No. 16.**

**Meeting Date: April 5, 2018**

**Agenda Item:**

Authorize Executive Director to enter into a Purchasing Agreement with Pure Technologies U.S., Inc., using their proprietary technology for inspection and analysis of fittings, appurtenances, leaks and air pockets on Lakeview Water Reclamation System force mains and connections near Swisher Road and IH35E.

<b>Placement:</b>	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Individual Consideration	<input type="checkbox"/> Executive Session
<b>Vote:</b>	<input type="checkbox"/> Non-Weighted	<input checked="" type="checkbox"/> Weighted Capital	
<b>Recommending Department:</b> Engineering and Operations			

**Background:**

In October 2016, the Board received a report from Halff Associates, Inc. that recommended system improvements at the highly congested intersection of Swisher Road and IH-35E, where multiple wastewater force mains converge. A key recommendation from the report was to perform leak and gas pocket detection analyses to help evaluate the location and condition of the fittings and appurtenances within these force mains. As you may recall, this is the location of a significant pipeline failure that occurred in 2012 that lead to a \$100,000 emergency repair.

The proposed purchase order with Pure Technologies U.S. Inc. will utilize proprietary leak detection technology to identify and locate potential leaks, gas pockets and metallic fittings, which may be causing deterioration to force mains that deliver wastewater to the Lakeview Regional Water Reclamation Plant. The field assessment also includes mapping the location of the pipelines, especially as they cross under I-35E and into the congested swisher intersection. The final report will include the results of the field assessment in a Geographic Information System (GIS) format to improve mapping accuracy. The location of any gas pockets, leaks and other information collected during this project will determine where air release valves and other system improvements are needed. The total amount of the proposed agreement is \$271,992.80.

**Financial:**

Funding for the project is available in the Lakeview Regional Water Reclamation System FY 2018 Capital Budget with project number 539.

**Recommendation:**

Staff recommends that the Board authorize Executive Director to execute a purchase order with Pure Technologies U.S., Inc.

**Enclosures:**

Proposal

Submitted By: Kurt Staller, Acting Director/ Engineering & Construction

Date: March 30, 2018



March 23, 2018

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RE: Assessment of Lakeview Wastewater Force Main System

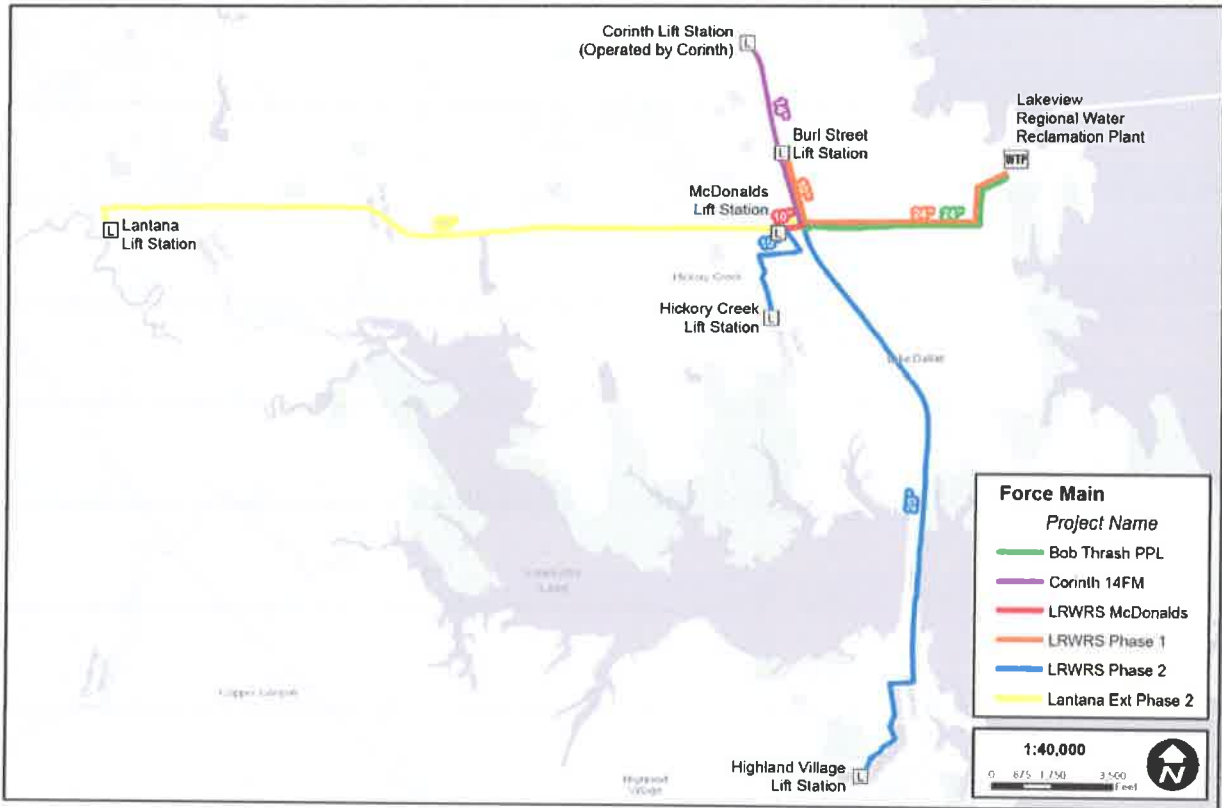
Dear Kurt,

Pure Technologies U.S. Inc. (Pure Technologies) is pleased to present this proposal to support Upper Trinity Regional Water District (UTRWD) with the assessment of the Lakeview Wastewater Force Main System. The scope of the proposed work includes the assessment of up to five force mains using the proprietary SmartBall inspection tool. The assessment will include the following:

1. Providing two pressure recorders to UTRWD for temporary pressure monitoring
2. Site Reconnaissance, Planning Document, Planning Workshop, Mob/Demob of SmartBall equipment and personnel, Assistance with GPS Data collection and pump draw down tests where applicable for flow measurement
3. SmartBall inspection field work including leak and gas pocket inspection, identification of metallic anomalies within PVC piping where applicable, and X-Y map reporting where applicable.
4. Traffic Control where applicable and as required by local authorities.

The five force mains identified by UTRWD all terminate at the Lakeview Regional Water Reclamation Plant and originate at the following lift stations:

1. Corinth Lift Station
2. Burl Street Lift Station
3. Highland Village Lift Station
4. Hickory Creek Lift Station
5. Lantana Lift Station



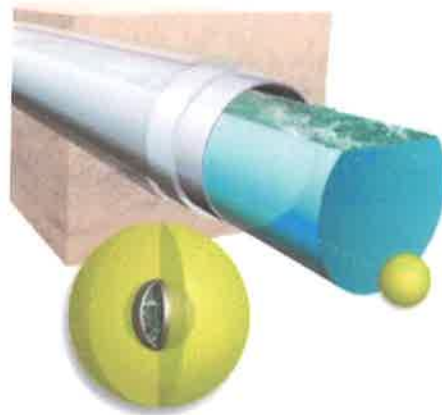
Map showing the approximate locations of the Lakeview Force Main System

## Inspection Methodologies

### SmartBall® Leak and Gas Pocket Inspection

Pure Technologies proposes to utilize the SmartBall tool to detect leaks and gas pockets on the five force mains. The SmartBall survey tool consists of an aluminum core containing acoustic and other sensors which are inserted into a foam shell. The tool travels in the pipeline with the flow of water, detecting leaks and gas pockets as it rolls. Leaks are obvious defects that require attention and can be a precursor to failure.

Gas pockets are important in assessing the condition of a wastewater force main as it can indicate areas of hydrogen sulfide buildup which is highly corrosive to the ductile iron fittings, joint restraints and all metallic appurtenances. In non-corrosive materials such as PVC, hydrogen sulfide is ordinarily not a major concern in the pipe however, the primary concerns for these materials are ductile iron bends, joint defects (leakage), deflection, fatigue from cyclical pressures, and collapse due to vacuum. Collapse due to vacuum has a higher risk of occurrence at gas pocket locations should a transient





pressure wave traverse the pipeline. With the exception of deflection and fatigue, these potential failure modes can be evaluated using inline leak and gas pocket detection tools.

Gas pockets can also impact the operation of a pump station system by reducing capacity of the pipeline. Pure Technologies has performed an analysis of force mains inspected using acoustic based technologies in order to better characterize the frequency and location of gas pockets. Based on historical inspections, it has been found that 72% of gas pockets were not at known high points or air release valves.

#### SmartBall Work Detail

Under this item, Pure Technologies will provide all necessary equipment, software, and manpower to execute the leak detection field work per the planning document except for the items identified below in the UTRWD Responsibilities section.

It is envisioned that the SmartBall will be deployed from the pig launch flanges or other valves at each of the lift stations. UTRWD will be responsible for flange removal to facilitate launch of the SmartBall. Pure Technologies and UTRWD may elect to run a “dummy ball” in advance of running the SmartBall to ensure passage of the tool through the force mains to the treatment plant. UTRWD will not be responsible for SmartBall tools that do not make it to the plant. However, if a “dummy ball” or SmartBall does not make it to the plant, Pure is not responsible for its removal.

Based on our review of the pipeline drawings, it appears that several of the force mains tie into a 24-inch force main at Swisher Road. It is our understanding that the 24-inch pipeline stays full or mostly full during normal operation. Review of the pipeline drawings for the 24-inch continuation pipeline shows a manhole approximately 1,000 feet from where the 18-inch force main ties into the 24-inch pipeline. If we are unable to capture the SmartBall at the manhole location, we may need to capture it via a discharge structure at the treatment facility. We will be able to verify the extraction location once we have completed a site reconnaissance of the pipeline and adjust the scope/fee if required. Some leaks may not be detected if the pressure differential between the inside of the pipe and the outside of the pipe is less than 15 psi. However, low pressures will not affect the detection of gas pockets or large metallic joints.

Pure Technologies requests that UTRWD consider providing a supplemental water source at the lift stations to ensure an uninterrupted and steady flow of water from the wet well through the force main over the entire duration of each inspection run. Maintaining a full and flowing pipeline eliminates the potential for air slugs and entrained air to potentially affect the acoustic signal. The supplemental flow is not required but having a constant flow for the duration of the inspection run also provides greater location accuracy of acoustic events and X-Y mapping of the force mains.

#### **Identifying and Locating Metallic Fittings, Restraining Joints & Appurtenances**

Pure Technologies will analyze data collected by instrumentation housed in the SmartBall to identify the presence of metallic fittings, joint restraints and other metallic appurtenances incorporated as part of the PVC force main. Collection of said data is accomplished in conjunction with the deployment of the SmartBall to identify and locate leaks and gas pockets.

The SmartBall contains sufficient battery capacity to traverse the expected inspection distances, each under a single deployment. To accommodate correlation of data collected we anticipate running the SmartBall twice for each force main.



### **Collect GPS Coordinates**

Pure Technologies will collect GPS coordinates (sub-meter mapping grade – sub-foot upon request at an additional fee) at all accessible appurtenances and pipeline features. As an alternative, Pure Technologies staff can accompany UTRWD staff collecting survey grade GPS during the site visit.

### **GIS Deliverable**

Using GPS coordinates captured in the field as well as existing GIS data and/or record drawings provided by UTRWD, Pure Technologies will create a planning level GIS map of each force main. Because PVC does not utilize metallic joint rings, our technology cannot detect the pipe joints nor verify joint lengths or locations using data from the SmartBall (unless there is a metallic restraining joint or in line fitting). The GIS deliverable will include the following:

1. Polyline layer representing the pipeline centerline incorporating fixed reference nodes based on GPS coordinates collected in the field.
2. Point layer of GPS locations collected during the inspection and planning process.
3. Point layer representing locations of leaks and other points of interest detected during the inspection such as metallic fittings, material changes, etc. These locations are based on distances from known and fixed reference points and the distances as determined from the pipeline mapping layer.
4. Line layer representing gas pocket locations and extents. These locations are based on distances from known and fixed reference points and the distances as determined from the pipeline mapping layer. Including a point layer that estimates the highest point in the pipeline. The highest will be estimated by the sound intensity and other factors.
5. X-Y mapping of the entire pipeline will be supplied on specific force mains where the “mapping deliverable” is specified by UTRWD and agreed to in the planning document.

GIS results will be delivered in a shapefile format (or another common GIS format if requested).

### **Final Report**

Pure Technologies will furnish a preliminary written report summarizing the results of the inspection conducted under the proposed scope of services. Following receipt of comments from UTRWD, Pure Technologies will issue a Final Report and meet with all parties to review the results. The report will also include mapping grade GPS coordinates of accessible pipeline appurtenances, features, leaks, gas pockets, locations and extents.

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## **UTRWD Responsibilities**

- ✓ Furnish access to all documentation, drawings and specifications, and geographic information related to the subject pipeline.
- ✓ Make existing air valves ready for Pure to attach external sensors to the pipeline for tracking SmartBall. This preparation work may include de-watering and debris removal from air valve manholes. An alternative may include requesting UTRWD perform excavations to accommodate sensor tracking or removal of air valves for insertion of tracking sensors into the pipeline.



- ✓ Provide ¼-inch or ½-inch threaded outlets to accommodate installation and monitoring of the Telog transient pressure monitoring unit.
- ✓ Install and move two Telog transient pressure monitoring units to each force main as needed. Pure Technologies will furnish two monitors to UTRWD for a maximum of 60 days and provide UTRWD with the raw data.
- ✓ Provide site support to verify access to pig launcher exiting the lift station to accommodate insertion of the SmartBall device.
- ✓ Provide site support to verify access via the manhole on Swisher Street to verify passage of the SmartBall.
- ✓ Open facilities and verify access via the manhole or wet well at the WWTP extraction of the SmartBall and need for custom extraction grates.
- ✓ Furnish a consistent and non-interrupted flow rate around 2 to 3 feet per second throughout the entire duration of the SmartBall survey. If requested by Pure, provide the same services for a 2<sup>nd</sup> SmartBall run to ensure adequate data collection.
- ✓ Provide personnel during all field activities to coordinate activities with Pure Technologies and to accompany Pure Technologies' personnel on private property.
- ✓ Provide opportunity to verify flow velocities recommended in this document prior to performance of the inspection using existing flow meters or wet well draw down tests.
- ✓ Operate valves as required for insertion and extraction of the tools;
- ✓ Provide and maintain safe and reasonable access to all insertion and extraction sites throughout the inspection and obtain client-required permits, as required.
- ✓ Provide support for confined space areas, including locking and tagging pumps, valves, and motors.
- ✓ Assist with SmartBall launch and retrieval. Remove and replace all pipeline flanges and appurtenances associated with the insertion and extraction of the SmartBall at pig launcher facilities, manholes and/or the treatment plant. Pure does not anticipate needing any special equipment or grates.
- ✓ Provide Pure Technologies with a minimum of 1 weeks notice of schedule change.

## Proposed Fee and Invoice Schedule for UTRWD

Pure Technologies proposes to perform the scope of work presented herein according to the following fee schedule:

Task Description	Qty	Unit	Unit Price	Total
<b>Site Reconnaissance, Planning Document</b> (Payable on receipt of final planning document and completion of planning workshop)	1	EA	\$13,250	\$13,250
<b>Mobilization for field work</b> (Payable on completion of field crews to site)	1	EA	\$9,750	\$9,750
<b>Transient Pressure Monitoring Rental</b> (Payable on return of monitoring equipment)	2	Month	\$1,500	\$3,000
<b>SmartBall reinsertions during same Mobilization</b> (Payable if completed and upon completion of field crews to site)	7	EA	\$5,245	\$36,715
<b>SmartBall Leak &amp; Gas Pocket Survey Field Work</b> (Payable on completion of field work, verification that quality data was collected and on field work summary)	66,614	FT	\$1.76	\$117,240
<b>Traffic Control</b> (Payable after day of work performed)	7	Day	\$2,000	\$14,000
<b>SmartBall Leak &amp; Gas Pocket Analysis</b> (Payable on receipt of final inspection report)	66,614	FT	\$0.44	\$29,310
<b>Data Analysis to Identify and Locate Metallic Fittings, Joint Restraints, Appurtenances</b> (Payable on receipt of final inspection report)	21,120	FT	\$1.00	\$21,120
<b>X-Y Mapping Analysis for SmartBall</b> (Payable on receipt of final inspection report)	21,120	FT	\$0.85	\$17,952
<b>Final Inspection Report and Workshop</b> (Payable on receipt of final report review workshop and final metallic fitting and X-Y report)	1	LS	\$9,655	\$9,655
<b>NOT TO EXCEED FEE</b>				<b>\$271,992</b>

### Fee Schedule Notes:

- 1) The fees in above table based on performing field work in a continuous manner. The site reconnaissance task is planned to take no more than two days. Pure intends to perform two SmartBall runs per force main to ensure data integrity. There will not be an extra charge for the second SmartBall run unless there are unanticipated delays caused by others.
- 2) If the project is delayed by those other than Pure and remobilization is required a remobilization fee of \$9,750 may be requested. Additional remobilizations are not anticipated.



- 3) Large leaks will be reported to UTRWD within 24 hours of completing the field work. Preliminary leak and gas pocket reports will be submitted to UTRWD within six weeks of completing the field work. Preliminary metallic feature and X-Y mapping reports will be submitted to UTRWD within twelve weeks of completing the field work. Pure Technologies will coordinate a workshop with UTRWD staff to review the draft reports and receive comments for revision of the reports.
- 4) Pure Technologies will provide a project engineer to assist with locating and marking of pipeline locations to verify potential issues (i.e., leak, gas pocket, etc.). One day of field work is included.

Pure Technologies appreciates this opportunity to present our capabilities and services related to the subject project. If you have any questions, please do not hesitate to contact me.

Respectfully,

PURE TECHNOLOGIES U.S. INC.

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