

Clause No. 6 in Report No. 6 of the Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on March 27, 2014.

6

**CONSULTANT SELECTION FOR THE CONDITION ASSESSMENT OF
REGIONAL WATERMAINS IN YORK REGION**

Committee of the Whole recommends adoption of the recommendation contained in the following report dated, March 10, 2014 from the Commissioner of Environmental Services:

1. RECOMMENDATION

It is recommended that:

1. Council approve the award of the contract for the condition assessment of watermains to Pure Technologies Ltd. (Pure Technologies), pursuant to Request for Proposal P-13-63 at a total cost of \$10,893,611, excluding HST, and authorize the execution of the contract on behalf of the Region.

2. PURPOSE

This report seeks Council authorization to obtain consulting services to undertake condition assessments on Regional watermains to reduce service delivery impacts associated with premature failure of critical infrastructure.

The Region's Purchasing By-law requires Council authorization to award a Request for Proposal (RFP) over \$2,000,000. In this case, the sole responding proponent's bid is greater than \$2,000,000.

3. BACKGROUND

Condition assessment of infrastructure supports rehabilitation and replacement planning

Infrastructure in the Region is key to the quality of life enjoyed by residents. High reliability of water infrastructure is vital to delivering uninterrupted and quality drinking

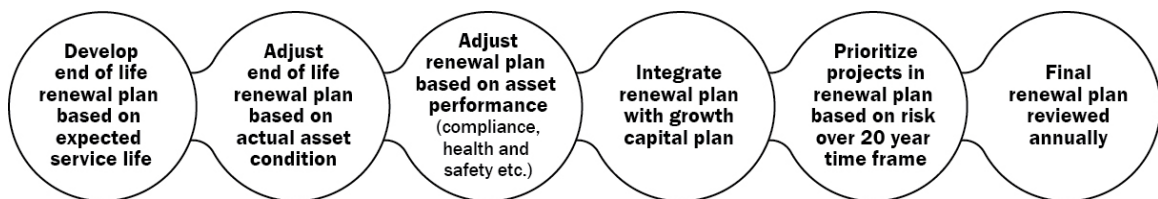
water services to customers and helps sustain a growing Region. Large diameter trunk watermains owned by the Region form the backbone of drinking water supply, transporting water from the sources (treatment plant, pumping stations, etc.) to local distribution systems, owned by the local municipalities.

Proactive asset management is a key component of the 2014 10-year Capital Plan approved by Council

The goal of the Asset Management Program is to proactively manage the lifecycle of Environmental Services' asset base by identifying non-growth related capital projects for infrastructure upgrade and replacement. Conducting regular inspections allows staff to get ahead of growing rehabilitation needs, which helps to reduce service delivery impacts associated with infrastructure degradation. As in past years, Council reaffirmed its support for proactive asset renewal through approval of \$172 million for water asset management programs in the 2014 10-year Capital Plan.

Prioritization of infrastructure renewal projects uses a five step method of evaluation that identifies and screens projects based on performance and criticality. Assessment criteria also include priority for sustaining levels of service and compatibility with achieving growth capital plan objectives as identified in the Water and Wastewater Master Plan. This process is described in Figure 1.

Figure 1
Infrastructure Renewal Planning Process



Watermain condition assessments build on existing Sanitary Sewer CCTV Inspection Program and tackles unique challenge of accessing live pressurized infrastructure

Similar to sanitary sewers, watermains deteriorate as they age and longevity depends on many factors, including external and internal operating conditions, construction and material quality and soil conditions. As a result, condition assessment is vital and required to manage watermains in a proactive manner to make informed asset management and risk mitigation decisions.

Planning of condition assessments for watermains is based on the same risk criteria as sanitary sewers, however, inspection of watermains requires one of two approaches:

1. Isolation of the infrastructure to conduct the inspection and perform re-commissioning procedures, which requires an interruption to service; or
2. Inspection of the infrastructure while pressurized and in operation, which minimizes interruption of service.

Watermain inspection technology is a specialized and rapidly evolving field. Effective leak and structural assessment technology has emerged within the last five years that allows assessments to be conducted on live pressurized infrastructure. York Region, Peel Region and other large municipalities have used these specialized water inspection technologies to conduct inspections on high risk assets where infrastructure cannot be taken offline due to criticality for maintaining continuous water service.

SmartBall and PipeDiver are complementary condition assessment technologies that detect air pockets, leaks and structural condition

SmartBall and PipeDiver are two key watermain condition assessment tools offered exclusively by Pure Technologies. While relatively new, this technology is emerging as a best-in-class technology for conducting asset inspections in the Greater Toronto Area and across North America. In 2012, York Region used SmartBall and PipeDiver to perform condition assessment of a 25 km section of the York-Peel Feedermain. Both technologies require tools to be fully inserted into a watermain and use water flow to travel the inspection length. SmartBall uses acoustic technology to detect sound anomalies caused by air pockets and leakage flow in a pressured watermain, whereas PipeDiver uses electromagnetic technology to identify breakage locations in the watermain's metal reinforcing wire. A profile of Pure Technologies with additional information about SmartBall and PipeDiver is included in *Attachment 1*.

Results from condition assessment programs have avoided asset failure and improved service reliability in other jurisdictions

As part of an annual condition assessment program, the City of Calgary inspects its watermains for deterioration. In May 2013, Pure Technologies inspected a section of the Memorial Feedermain on behalf of the City and identified potentially distressed sections of the watermain. Excavation confirmed significant corrosion and structural deficiency, avoiding potential rupture of the watermain in a high consequence area. A case study is included in *Attachment 1*.

Condition assessment of watermains in York Region is a priority multi-year project in the Asset Management Program

Environmental Services is developing and implementing a best-in-class asset management program by engaging, testing and evaluating emerging technologies, practices and techniques. Condition assessment projects using specialized inspection technologies have been completed as part of the Asset Management Program. This assessment further confirmed the ability of inspection technology results to determine asset condition, measure and manage risk and provide key inputs to develop reliable asset renewal plans. Some of the key condition assessment projects included:

- Condition assessment of 25 km York-Peel feedermain using acoustic and electromagnetic technologies (acoustic leak and electromagnetic structural inspection) completed in 2013
- Condition assessment of 8 km Keele PD6 watermain using acoustic technology (acoustic leak inspection) completed in 2013
- Condition assessment of Newmarket forcemain using acoustic technology (acoustic leak inspection) completed in 2010

Asset Management Program establishes baseline condition of watermains and proactively identifies problem areas to optimize infrastructure renewal work

Environmental Services has an Asset Management Program to establish baseline condition grades and proactively identify and optimize infrastructure renewal work. The multi-year condition assessment of watermains project is planned as part of the Asset Management Program. Condition assessment projects balance risk with cost and prioritize watermains based on age, pipe type, size, depth, soil type, location (e.g. under a major road/transit corridor or river), historical break information, and consequences of failure.

As highlighted in Table 1, the scope of this project includes some of York Region's oldest watermain assets, as well as other sections that have been prioritized due to factors including their performance in the field or specific location. A location map and proposed timing of inspections for the watermains identified in Table 1 are provided in *Attachment 2*.

Table 1
 Location, Age and Length of Watermains for Condition Assessment

Map #	Watermain Name/Location	Construction Year	Scope Length (km)
1	Bayview Pumping Station - West	1979	11.06
2	Bayview Pumping Station - East	1982	6.47
3	Markham PS 16th Avenue PD6 Watermain	1993	5.48
4	Jefferson-Side Road Watermain	2008	1.65
5	Milliken Pumping Station Watermain	1981	10.4
6	East Woodbridge PS Watermain	1982	5.81
7	16th Avenue PD5 Watermain	1981	2.14
8	Keele PD6 Watermain	1984	9.18
9	Sharon Queensville Area Water System	1992	9.18
10	Keele - McNaughton Dufferin Teston PD7	2000	7.37
11	Jefferson PS PD9 Watermain	2000	6.81
12	Rutherford Road Watermain	1999	9.58
13	Langstaff Road PD6	1998	5.88
Total Length			91

This project will determine the baseline condition of approximately 27 per cent of the Region's watermains and the total length of watermains to be inspected under this project is 91 km over the next four years from 2014 to 2017.

The baseline condition assessment of watermains derived from this project will enable staff to program required repair or replacement activities to mitigate risk and schedule future condition assessment requirements.

Maintaining water services while performing condition assessment is a key criterion for this project

York Region owns and operates large diameter transmission mains that supply water to local delivery systems. Closure of major transmission mains for condition assessment can affect water services over wide areas and for many residents. A key consideration for this project is to perform the condition assessment while keeping the watermain in service, which provides the following advantages:

- No service interruption to customers

- Reduced operational adjustment including eliminating the need to isolate the target watermain to conduct the condition assessment
- Cost avoidance in recommissioning watermain (e.g. disinfection, chlorination, etc.)
- Little or no potable water drained to waste

4. ANALYSIS AND OPTIONS

Request for Proposal for the condition assessment of Regional watermains in York Region was issued through an open bid process

In accordance with the Region's Purchasing By-law, Request for Proposal P-13-63 was released to obtain engineering consulting services for the condition assessment of Regional watermains in York Region. Request for Proposal P-13-63 detailed the scope of work required, which included the following components:

- Pre-assessment work
- Field investigation
- Condition assessment and reporting
- Other requirements, including site restoration and project management

Although 18 firms obtained the bid document, Pure Technologies was the only firm to submit a proposal. Supplies and Services staff contacted the companies who received the Request for Proposal document and did not respond. The primary reasons provided for not responding were as follows:

- Insufficient capability to perform the specialized work
- Company does not provide the service as specified in the scope
- Could not submit a competitive bid

Condition assessment of buried watermains requires specialized acoustic and electromagnetic equipment and experience to perform the scope of work. Consolidations in the industry have resulted in a limited number of companies in North America and world-wide able and capable to perform condition assessments of watermains with these specialized technologies.

Since 2010, Pure Technologies has acquired four companies, including a key competitor (Pressure Pipe Inspection Company), that perform advanced pipeline inspections. Currently, there are no other companies able to provide the required expertise and meet the scope required for the watermain condition assessment project.

Proposals evaluated using the two-envelope system

The proposal was evaluated using the two-envelope system with technical and financial information submitted in two separate envelopes. The overall proposal score was evaluated based on a weighting of 80 points for the technical proposal and 20 points for

the financial proposal. The technical proposal was evaluated prior to any knowledge of financial information.

The Region's proposal evaluation team reviewed the submitted technical proposal based on the following criteria as listed in Request for Proposal P-13-63:

- Proponent project team experience
- Corporate experience including similar work with the Region
- Project Manager's experience
- Professional and technical support staff experience
- Staff training
- References
- Project implementation plan
- Completeness and comprehensiveness of the proposal submission
- Understanding of the project and the services to be provided
- Viability of the approach methodology
- Understanding of the deliverables to be provided
- Approach to health and safety
- Value added services
- Innovative concepts/ideas

Technical components of the proposal must achieve a minimum score of 60 per cent (48 points out of the potential 80 points) to have the financial portion of the proposal considered. If a proponent does not achieve this minimum technical score, their financial proposal is returned unopened. Technical and financial results are summarized in Table 2.

Table 2
Consultant Proposal Evaluation Summary

Consulting Engineering Firm	Technical Score (out of 80)	Financial Score (out of 20)	Total Score (out of 100)	Total Price (\$)
Pure Technologies Ltd.	58.5	20	78.5	\$27,413,237

Evaluation of proposals revealed Pure Technologies as the successful bidder with required skills to deliver the project

The Region's proposal evaluation team, including Supplies and Services evaluated the proposal. The technical score assigned to Pure Technologies was attributed largely to the specialized technology to be used for condition assessment, experience of the team and resources assembled for this project. The Region reviewed the initial price submission and entered into negotiations with Pure Technologies in accordance with the RFP process

with a revised scope of inspections primarily focused on those watermains with longer inspection lengths as detailed in Table 1.

Watermain condition assessment project costs include system modification and actual inspection costs

The total condition assessment cost includes two key components, which is explained in further detail below:

- System Modifications
- Inspection Services

System modification to watermain infrastructure is required to allow inspection equipment to be inserted into a pressurized watermain. These modifications are designed specifically for each watermain and may include modifying existing chambers or installing access points. System modifications are designed to consider future re-inspection.

Inspection costs include the field work required to conduct the actual inspection, engineering analysis of collected data and reporting of assessment recommendations. The most significant impact on inspection costs is the effort required to insert and retrieve acoustic and electromagnetic detection equipment for each inspection. As a result, longer lengths of watermain included in each condition assessment inspection results in a lower cost per km for inspection and improved cost efficiency.

Watermain length covered by a single inspection has significant impact on the overall project cost

Similar to the sanitary sewer inspection program, the original scope of work included an assessment target of 10 per cent of the Region's watermains annually. After reviewing the original bid it was determined that the cost of conducting inspections on short sections of watermain significantly increased the overall project costs and did not necessarily represent good value given the age and criticality of these assets. System modification and mobilization costs for inspections are comparable regardless of pipe length and represented a significant portion of inspection costs.

Reduced condition assessment scope does not represent increased risk to York Region

After negotiating with Pure Technologies, it became apparent that assessing watermain segments greater than 5 km provided significantly increased value based on the lower cost per kilometre. The scope was then revised to remove 21 of 23 sections less than 5 km that were identified as lower risk, resulting in a revised total inspection length of 91 km or 6.75 per cent of the Region's watermains annually over the next four years. The inspection length reduction from 10 to 6.75 per cent will be monitored as part of the Asset Management Program and does not result in increased risk to the Region.

Condition assessments on smaller sections of watermain continue to be part of the Asset Management Program and will be re-evaluated as part of a future watermain condition assessment project.

Change to project scope by focusing on increased inspection lengths results in increased cost effectiveness with no change in risk to the Region

The original project scope included 35 inspections, of which 23 segments had pipe lengths less than 5 km each, significantly increasing the average cost per kilometer of watermain inspected. As part of the negotiation undertaken with Pure Technologies, inspections were reduced to prioritize pipe lengths greater than 5 km. The price negotiation and adjustment to the project scope has reduced the per kilometer cost from \$116,205 to \$84,331. Table 3 summarizes the cost breakdown including system modifications required to complete the revised condition assessment scope.

Table 3
 Original Bid and Revised Scope Project Costs Negotiation

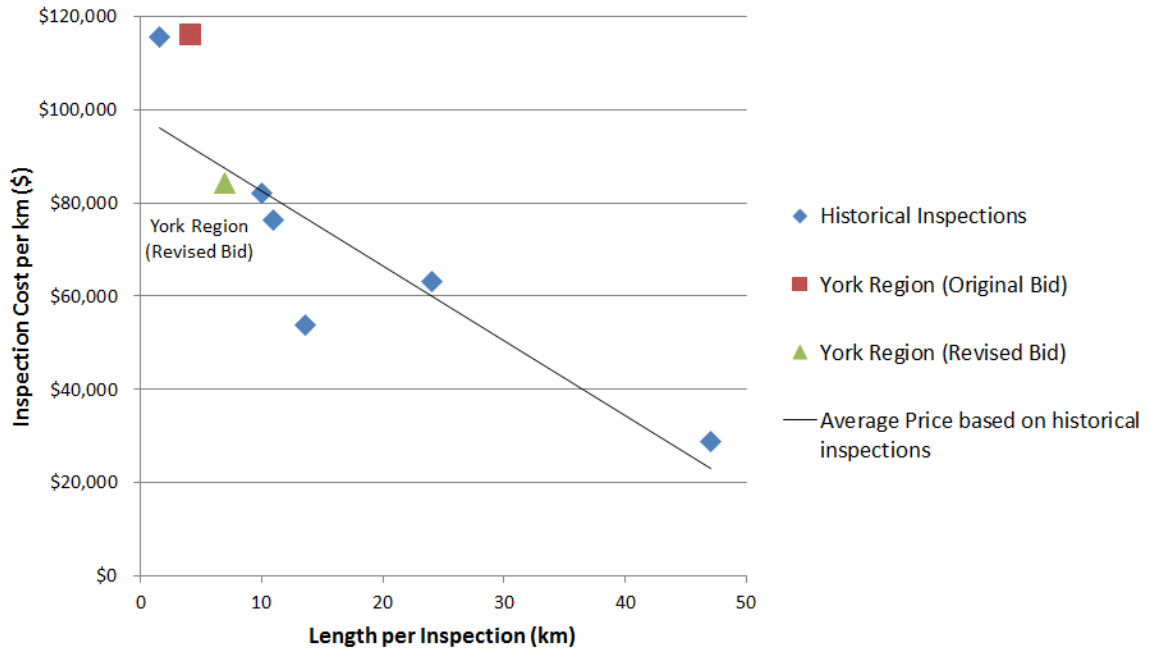
	Length (km)	Inspection Cost	Inspection Unit Cost (\$/km)	System Modification Cost	Total Cost
Original Bid	148.26	\$17,228,021	\$116,205	\$10,185,216	\$27,413,237
Revised Bid (Reduced Scope)	91.01	\$7,674,975	\$84,331	\$3,218,636	\$10,893,611

Revised bid represents good value to York Region and is competitive in comparison to prior condition assessments conducted by Pure Technologies

The proposal submitted by Pure Technologies will provide critical services required to optimize proactive rehabilitation work for over \$700 million worth of the Region’s watermains to identify any potential sources of future failure.

Inspection costs for this project and the average price for similar work completed by Pure Technologies within the past five years in other jurisdictions are presented in Table 4. A comparison of these costs confirms that longer inspection lengths result in improved cost efficiency whereas shorter inspection lengths result in a significantly higher cost per kilometre. The unit cost of the revised bid is competitive with similar inspections and represents good value for York Region due to the large number of segments being investigated, the assessment data being collected and the potential to avoid extraordinary costs associated with emergency repairs.

Table 4
Comparison of Inspection Costs by Pure Technologies



Cost savings from the avoidance of a single large emergency repair is greater than the value of the condition assessments of watermains project

Emergency repair work is very costly due to the need to accelerate repair works required to mitigate unanticipated service disruption. Previous emergency repairs to a single watermain break have cost over \$15 million to complete. Condition assessments will provide important information to plan for the timing and location of future rehabilitation work to minimize emergency projects. Proactive asset management reduces the risk of watermain failure, preserves the life of these critical assets, alleviates the cost for emergency repairs and minimizes water service interruption to customers.

Supplies and Services has reviewed the evaluation summary and confirms that Pure Technologies be recommended as the successful proponent to undertake the condition assessment of Regional watermains.

Link to Key Council-approved Plans

This project aligns with the Region’s 2011 to 2015 Strategic Plan objective of continuing to deliver and sustain critical infrastructure.

5. FINANCIAL IMPLICATIONS

The fee for the proposed work is \$10,893,611, excluding HST. Funds for this project are included in the approved 2014 10-year capital plan and this project is funded through water rates.

6. LOCAL MUNICIPAL IMPACT

One of the key objectives of this project is to ensure the security and reliability of drinking water services to local municipalities. This project will benefit local municipalities by minimizing closure of major water transmission mains for condition assessment, which can affect water services over wide areas and for many residents. The approach described in this report will help maintain expected levels of service and assist staff with proactively managing risks associated with operating large critical infrastructure.

7. CONCLUSION

The condition assessment of Regional watermains in York Region is important to ensure that the Region's critical water transmission infrastructure is managed efficiently to deliver reliable water services.

The proposal was received through an open bid and evaluated in accordance with the Region's Purchasing By-law. The proposal from Pure Technologies represents good overall value to the Region as it will assist with mitigating emergency repairs and service disruptions. It is recommended that Pure Technologies be engaged to undertake the condition assessment of Regional watermains in York Region at a cost of \$10,893,611, excluding HST.

For more information on this report, please contact Lucas Cugalj, Director, Strategy and Business Planning, Environmental Services at 905-830-4444 Ext. 75041.

The Senior Management Group has reviewed this report.

Company Profile

Pure Technologies is the world leader in the development and application of innovative technologies and strategies for inspection, monitoring and management of physical infrastructure.

About Pure Technologies

Since inception, we have thought about innovative ways to assess infrastructure that is difficult to inspect. Growing challenges in the water, wastewater, power and oil and gas pipeline industries have pushed our Research and Development efforts to provide the best solutions available. Today, we have the most sophisticated and complete technology portfolio geared primarily toward the pipeline inspection market; our technologies and expertise are being used around the world to help manage deterioration and reduce loss.

Our Industries

Our solutions are applicable to a variety of markets that rely on large-diameter pressure pipe to operate.

Water and Wastewater Utilities

Proactive pipeline management and condition assessment programs are now at the heart of many municipalities long-term maintenance programs. Utility personnel and others working to preserve their water and wastewater infrastructure are understanding and utilizing the benefits of advanced inspection techniques, leak detection and monitoring technologies to assess the condition of pipelines and take the proper precautions in making repairs.

Oil and Gas Pipelines

Operators of oil and gas pipelines are tasked with the difficult challenge of maintaining long pipelines that carry precious and hazardous materials. Pure's leak detection service using SmartBall® technology is a perfect complement to existing pipeline integrity programs. The tool is capable of completing lengthy inspections and can locate small leaks that go undetected using most conventional oil and gas leak detection systems.

Power Plant Operations

While plant operators maintain shorter pipe distances, safe operation and regular maintenance is extremely important because of their criticality. Our patented and proven pipeline integrity solutions provide power plant operators with the necessary asset management tools to rehabilitate or replace pipes as needed, thereby extending the life cycle of pipelines.

Through the management of critical pipeline infrastructure across multiple industries, Pure is committed to helping operators build a sustainable future that protects the environment and our natural resources.



SmartBall[®] Leak Detection

Free-swimming leak detection for long inspections and accurate location of leaks and gas pockets

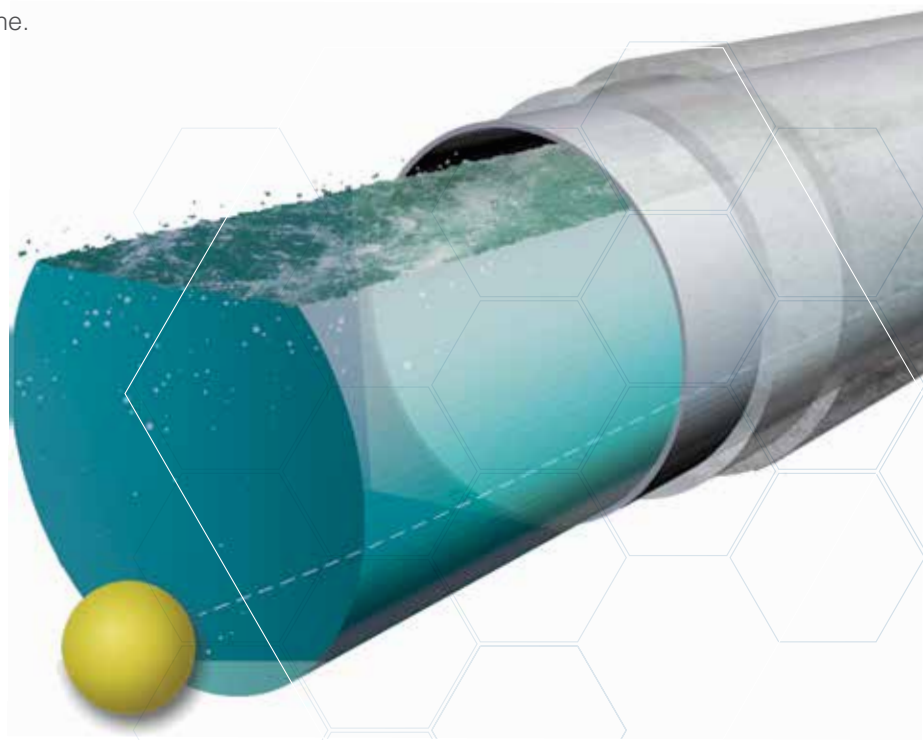
SmartBall Technology

SmartBall leak detection is a free-flowing tool used to locate leaks and gas pockets in pressurized pipelines. It can complete long leak detection surveys in a single deployment without disruption to regular pipeline service. The tool is equipped with a highly sensitive acoustic sensor that is able to locate 'pinhole' sized leaks.

The SmartBall tool is inserted into a pipeline and travels with the water flow for up to twelve hours while collecting information about leaks and gas pockets. It requires only two access points for insertion and extraction, and is tracked throughout the inspection at predetermined fixed locations on the pipeline.

Inspection Benefits

- Easy to deploy through existing pipeline features
- No disruption to regular pipeline service
- Long inspection capabilities from a single deployment
- Under optimal operating conditions, SmartBall technology has located leaks as small as 0.028 gal/min; however, leak sensitivity is determined based on each pipeline's operational conditions
- Typical location accuracy within 6-feet



PipeDiver[®] Condition Assessment

An innovative, free-swimming condition assessment tool that operates while a pipeline remains in service

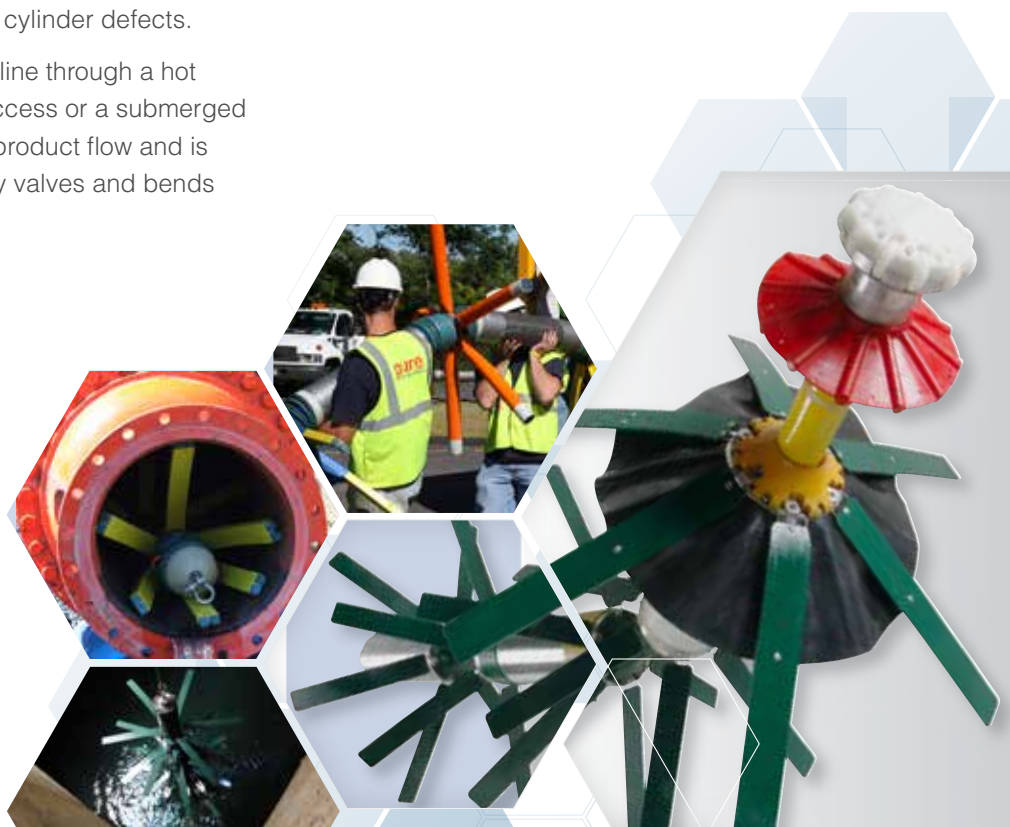
PipeDiver Technology

The PipeDiver platform is ideal for critical large-diameter pipelines that cannot be removed from service due to lack of redundancy or operational constraints. It can be effectively deployed for long inspections on several types of pipe to determine baseline condition; on concrete pressure pipe, the tool can identify and locate broken wire wraps, which are the main indication that this type of pipe will eventually fail; for metallic pipes that utilize a steel cylinder as the main structural component, the tool can locate and detect areas of corrosion and cylinder defects.

When inserted into a live pipeline through a hot tap connection, an existing access or a submerged tank, the tool travels with the product flow and is able to navigate most butterfly valves and bends in the pipeline.

Inspection Benefits

- No disruption to regular pipeline service
- Long inspection distances can be covered in a single deployment
- Accurate results that pinpoint areas of distress help optimize repair planning
- Effective on a variety of pipe materials
- More cost-effective than methods that require shutdown and dewatering





Case Study:

CITY OF CALGARY - MEMORIAL FEEDERMAIN

The City of Calgary completes successful condition assessment and verification on C303 pipeline

- PureRobotics™ Condition Assessment
- Pure Engineering Services - Verification

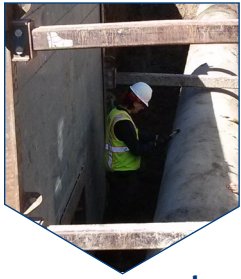


Program Benefits

✓	3 out of 232 inspected pipes identified with bar breaks
✓	City of Calgary verified and repaired 1 section of BWP
✓	Data analysis showed 3 additional pipes with cylinder anomalies



PIPE MATERIAL	LENGTH	DIAMETER	TRANSMISSION TYPE
C303 Bar Wrapped Pipe	1.5 miles (2.2 km)	30-inch (750-mm)	Water



The City of Calgary provides water and wastewater services for over 1 million people in the Greater Calgary area. For many municipalities, accurate and regular condition assessment of large-diameter pressure pipelines has become more important in recent years as these assets continue to age and risk of failure increases. The Memorial Feedermain is a 30-inch (750-mm) Bar-Wrapped Pipe transmission main that supplies potable water to residents in Calgary.

CHALLENGE:

In an annual condition assessment program, the City of Calgary inspects its Prestressed Concrete Cylinder Pipe (PCCP) and Bar-Wrapped Pipe (BWP) for deterioration.

By identifying isolated pipe sections with deterioration, the City is able to make selective repairs in favor of full-scale replacement, which carries a high cost and may replace pipe sections with significant remaining useful life.

Pure Technologies' data from over 8,000 miles of pressure pipe condition assessment indicates that only a small percentage of pipes (less than 5 percent) are in need of repair and therefore have a significant remaining useful life. Condition assessment data also suggests that pipe distress is localized and a significant ROI can be achieved by locating and addressing isolated problems through structural inspection.

SOLUTION:

To inspect the Memorial Feedermain, the City used PureRobotics™, which is a powerful robotic system equipped with PureEM™ technology that can be configured to inspect a variety of pipelines and materials with different operational conditions.

In BWP, the technology identifies and locates broken bars and areas of corrosion on the steel cylinder, which are the main indication this type of pipe will eventually fail.

Although BWP looks similar to PCCP in cross section, their design and materials are significantly different. PCCP is a concrete pipe that remains under compression because of the prestressing wires, with the thin-gauge steel cylinder acting as a water membrane. With BWP, the cylinder plays a much larger role in the structural integrity of the pipe. BWP is essentially designed as a steel pipe with mild steel used to manufacture the steel cylinder and steel bars.

PCCP utilizes mild steel for the cylinder, but high strength steel is utilized for the wire, which is wrapped under high tension. As a result, the bar in BWP and wire in PCCP respond differently to environmental conditions that facilitate corrosion. The high strength steel wire in PCCP is smaller in diameter and wrapped under higher tension, therefore corrosion makes it quite vulnerable to breakage. The mild steel bars in BWP are thicker in diameter and wrapped under less tension, therefore corrosion takes significantly longer to lead to breakage.

The type of failure is also much different; PCCP tends to fail suddenly with a large dispersion of energy. This type of failure is less likely in BWP



In August 2013, The City of Calgary and Pure Technologies verified distress on a section of BWP on the Memorial Feedermain, finding broken bars and a large area of cylinder corrosion.

where failures are similar to steel pipe with long periods of leakage occurring prior to rupture.

Because of the differences in make-up, BWP and PCCP are inspected using unique methods to determine their structural condition.

PROCEDURE:

In May 2013, the City inspected 1.6 miles (2.2 km) of the 30-inch (750-mm) BWP Memorial Feedermain using PureRobotics. In August 2013, the City verified the results with Pure Technologies by excavating a pipe section that was identified as distressed during data analysis.

RESULTS:

The results from the inspection identified 3 of 232 BWP pipe sections with evidence of bar breaks, as well as 3 additional pipe sections with evidence of cylinder anomalies.

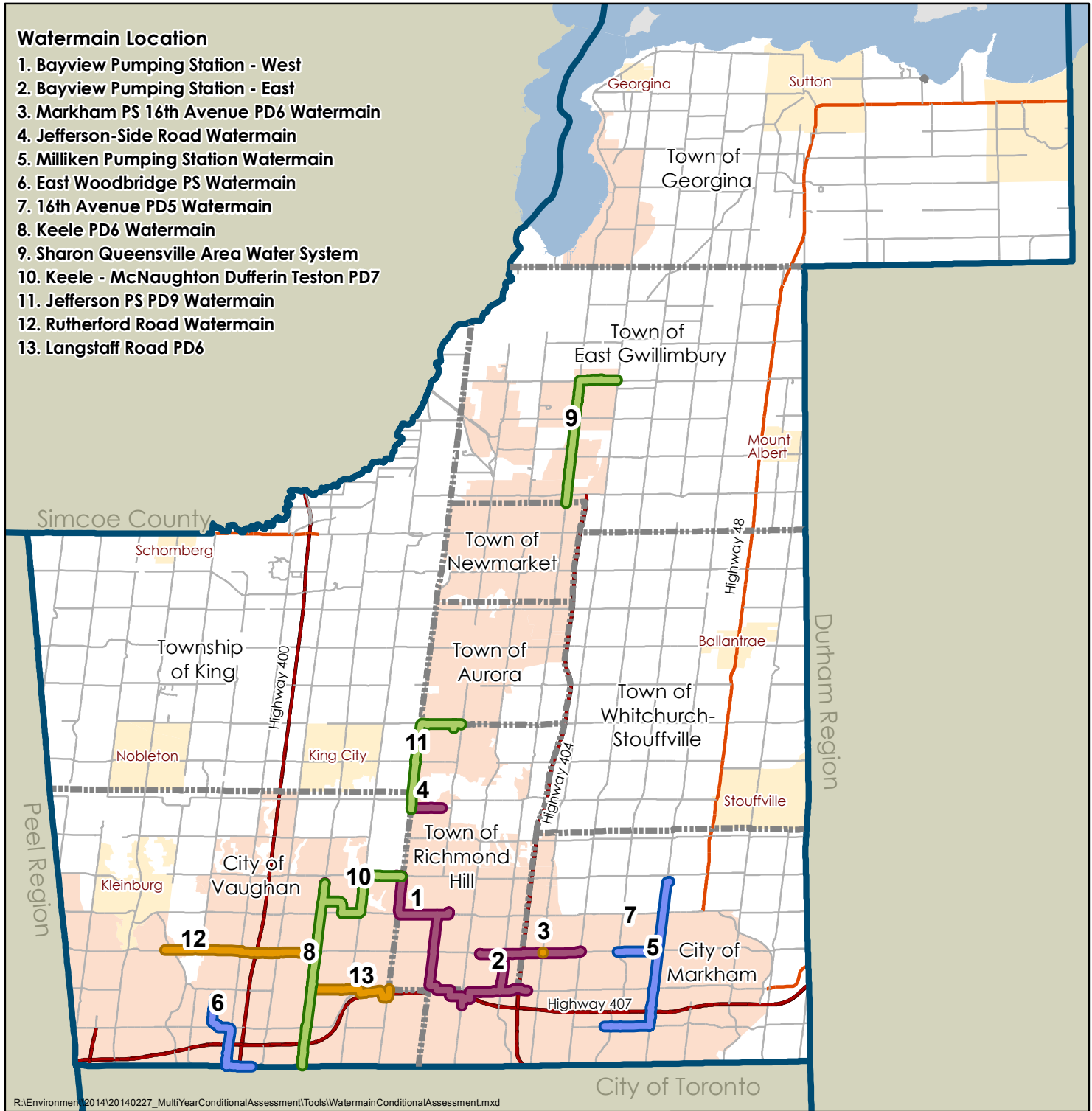
In August 2013, the most distressed pipe section was excavated for verification. The results had predicted bar breaks and cylinder corrosion, which can eventually lead to pipe failure if not repaired or replaced. The validation confirmed the broken bars and a large area of cylinder corrosion.

The City of Calgary was pleased with the results, and through condition assessment, has been able to identify and address individual distressed pipe sections on an otherwise serviceable transmission main. This has allowed the City to avoid a potential rupture of the main in a high consequence area while increasing service reliability and the useful life of the Memorial Feedermain.

The other sections identified in the inspection have been prioritized and will be verified in a future repair cycle.

Watermain Location

1. Bayview Pumping Station - West
2. Bayview Pumping Station - East
3. Markham PS 16th Avenue PD6 Watermain
4. Jefferson-Side Road Watermain
5. Milliken Pumping Station Watermain
6. East Woodbridge PS Watermain
7. 16th Avenue PD5 Watermain
8. Keele PD6 Watermain
9. Sharon Queensville Area Water System
10. Keele - McNaughton Dufferin Teston PD7
11. Jefferson PS PD9 Watermain
12. Rutherford Road Watermain
13. Langstaff Road PD6



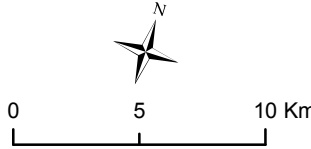
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Multi-Year Condition Assessment Project

Consultant Selection for the Condition Assessment of Regional Watermains in York Region
 March 20, 2014



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Legend

Inspection Plan (Year)

- | | | | |
|------|------|------|------|
| 2014 | 2015 | 2016 | 2017 |
| | | | |

- | | | | |
|--|--------------------|--|--------------------|
| | Road | | Towns and Villages |
| | Freeway | | Urban |
| | Provincial Highway | | First Nations |
| | Municipal Boundary | | Waterbody |
| | Regional Boundary | | |