



City of Hamilton

Water Distribution Asset Maintenance

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Prepared by: **BMA**
Management Consulting Inc.

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INTRODUCTION

In June 2019, the Province announced its Audit & Accountability Fund initiative which provides funds to municipalities to engage in a third-party review to help municipalities become more efficient and modernize service delivery. The City of Hamilton was successful in securing funding under this initiative. The City's focus is to review the use of consultants with the objective of reducing consulting costs and bringing expertise in-house.

The consultant will also use an approach that includes but is not limited to:


- ✓ Gather information to review each program area of focus;
- ✓ Conduct interviews and other engagement processes with staff;
- ✓ Review municipal service delivery reviews, best practices;
- ✓ Analysis of key issues and recommendations for service improvements and changes will the goal of finding service delivery efficiencies;
- ✓ Financial implications of the recommendations for consideration during 2020 Budget preparation;
- ✓ Supporting data, analysis and rationale including benchmarking or best practices; and
- ✓ The consultant will review the organizational structure of the focus divisions and identify what should be changed, maintained, modified or eliminated to best deploy internal resources to support recommendations of the review.

BACKGROUND

The Water Distribution and Wastewater Collection (WD&WWC) Section and contractors employed by WD&WWC install, maintain, operate and replace a variety of water distribution and wastewater collection assets on an annual basis to maintain the functionality of the water distribution and wastewater collection network to maintain or enhance customer service. More specifically, the water distribution assets installed, maintained and/or replaced by the City or its contractors are: fire hydrants, watermains, valves, and water service lines.

The current approach has proven to be effective in balancing the need for, in some cases, emergency repair and cost efficiency.

While the analysis for these services reflects an opportunity for potential savings by moving more services to be provided by the City, a greater opportunity exists in the provision of services for substandard water services related primarily to lead water service line replacement.



THE CITY CURRENTLY USES A COMBINATION OF OUTSIDE CONTRACTORS AND INTERNAL RESOURCES (4 CREWS) FOR FIRE HYDRANT REPLACEMENTS, WATERMAIN BREAKS, VALVE INSTALLATIONS, WATER SERVICE LINE REPLACEMENTS (NON-SUBSTANDARD WATER SERVICE).

City of Hamilton

Substandard water services (lead replacement program) are currently completed exclusively by outside contractors due to a shortage of internal staff resources. The cost of the City's portion of substandard water service replacement is approximately \$4.1 million annually and is the area of focus for the identification of potential efficiencies and cost reductions. With approximately 20,000 homes and an application level of 700 per year, the need for service is estimated to be in excess of 25 years and was determined to be an area worth pursuing.

SUBSTANDARD (LEAD REPLACEMENT) WATER REPLACEMENT PROGRAM

At a glance

- Currently there are an estimated 20,000 homes with lead water pipes.
- A \$2,500 interest bearing loan opportunity exists for property owners who would like to replace their lead water private line.
- Each year, the City receives approximately 700 requests to replace the public portion of the lead water line, once the private line is replaced.
- Outside contractors are performing 100% of this work, at a significant cost to the City. Based on the analysis undertaken, the estimated existing total annual cost of the program provided by contractors is \$4.1 million.

Replacing old water service pipes that are undersized usually increases water flow and removes service pipe materials that are no longer acceptable such as lead. Homeowners can upgrade the water service line inside their home to the property line. Once the private line is replaced, the City will replace the public portion of the water service pipe from the property line to the water main. The program reflects a commitment on behalf of the City to expedite water replacement of substandard pipes.

Existing City staff are focused on hydrant replacements, watermain breaks, valve installations and non-poor pressure service line replacement and do not have the capacity to complete the City's portion of the substandard water replacement program with existing resources.

As will be shown in the analysis, a movement to mixed service delivery model with contractors and staff providing services (approximately 50/50) would result in **annual savings** of approximately \$620,000.

ANALYSIS: OPTION TO MOVE TO A MIXED SERVICE DELIVER MODEL

An analysis was undertaken of the cost/benefit of moving to a mixed service delivery model for Substandard water pipes.

In-House Service Costing

There are two categories of costs associated with the City's portion of costs related to replacing substandard water services. The direct and indirect costs.

- Internal direct costs include salaries, wages, equipment and supplies.
- The indirect costs include training and meeting allowance (cell, phone, computer, etc.).
- The analysis assumes the yard facilities and supervisory staff have the capacity to oversee and accommodate the human and equipment resources and therefore no costs have been allocated in the internal costs for these items.

Based on an analysis of minimum staffing requirements to create an additional crew, the following staff positions would be required:

New Staff Position
Backhoe Operator
Water Distributor Operator
Truck Driver
Labourer/Truck Driver

In addition, there would be a need to add equipment to perform these activities as follows:

Equipment
Backhoe
Float
2 Trucks

The following is an analysis to determine the number of substandard water replacements that could reasonable be undertaken with a new crew.

Available Hours	Staff
Available working days in a year	260
Less:	
Stat. holidays	(12)
Average vacation # of days	(20)
Sick leave	(7)
Other Leave (Comp, Union, Other)	(4)
Training Time	(6)
Total Working Days Available	211
<u>Available Working Hours In a Day</u>	8.00
Less	
Travel Time	(0.5)
Admin. Time	(0.5)
Breaks	(0.5)
Net Available Working Hours in a day	6.5
Available hours per year per person	1,371.5
Hours to complete per job	4
Estimated # of jobs to complete annually	343

As illustrated above, a new crew can complete 343 jobs per year, assuming the average job takes 4 hours to complete.

Labour for the new crew costs were based on the 2019 hourly rates for the various positions. Equipment costs include the City's 2019 hourly charge out rates for various pieces of equipment to ensure sufficient funds for the maintenance and replacement of the equipment. The new equipment would be purchased and amortized over 10 years (at 3%). Other costs include material costs, other staff costs (soil disposal and final restoration costs).

The following table summarizes the estimated cost of service and associated assumptions for a typical service line replacement to be provided in-house resources. This analysis reflects that the average cost per job would be \$4,039.

In-house	Cost Per Job
Salaries, Wages, Benefits per Job	\$ 947
Vehicles	\$ 355
New Vehicle Amortization	\$ 205
Materials	\$ 450
Other Costs	\$ 222
Soil Disposal	\$ 60
Final Restoration	\$ 1,800
Total	\$ 4,039

Assumptions

4 hours per job on average

\$600,000 in equipment expenses, amortized over 10 years at 3%

Other costs includes tool charge out costs, staffing ancillary costs

Soil disposal of 5 tonnes

Final restoration costs have been assumed to be the same under both scenarios

Contract Service Costing

The following table summarizes the estimated cost of service and associated assumptions for contracted services per job. This reflects an average cost per job of \$5,845.

- Under the Safe Drinking Water Act, 2002 – O. Reg. 128/04, there is a requirement for a licensed operator to be on site (the Operator-in-Charge (OIC)), on completion of the excavation, to conduct a visual inspection to determine the nature of the break. The OIC assesses the evidence of Contamination or potential Contamination of the watermain before and during the repair procedure. Based on the existing work practice, the City has an inspector available at each replacement. Under the In-House option the new crew includes a licensed operator, thereby creating some efficiencies.

Contract	Cost Per Job
Salaries, Wages, Benefits per Job - City	\$ 322
Vehicles - City Inspector	\$ 38
Contract Costs	\$ 3,685
Final Restoration	\$ 1,800
Total	\$ 5,845

Assumptions

Salaries, Wages, Benefits is for City inspector

Vehicle charge out rate related to Inspector

Contracts Costs is average per job - actuals

Soil disposal is included in the contract costs

Final restoration costs have been assumed to be the same under both scenarios

Cost Comparative Analysis and Potential Savings – Mixed Service Delivery Model

Based on an average of 700 substandard installations per year, the following is a comparison of a mix of contracted and in-house installations.

Comparative Analysis	Contracted Service	In-house	Total
Existing			
# of Substandard jobs completed annually	700		700
Avg Cost per Unit	\$ 5,845		
Estimated Cost of Service	\$ 4,091,842		\$ 4,091,842
Mix of Inhouse Crew and Contract			
# of Substandard jobs completed annually	357	343	700
Avg Cost per Unit	\$ 5,845	\$ 4,039	
Estimated Cost of Service	\$ 2,086,839	\$ 1,385,499	\$ 3,472,338
Estimated Annual Savings			(\$619,504)

As shown above, the estimated total annual cost under the existing service delivery model is approximately \$4.1 million compared with the mixed service model which includes the addition of one crew of four staff that would undertake approximately half of the jobs is \$3.5 million, an estimated savings of \$620,000 annually.

SUMMARY OF BENEFITS

The following summarizes the benefits of moving to a mixed contract and in-house staff model for the delivery of substandard water pipe replacement:

- Having a combination of internal and external resources for allows for more timely response to substandard water service requests;
- Should the need arise, the new crew provides the City with additional flexibility to address emergency watermain breaks;

Annual Savings

Savings of approximately \$ 620,000 annually

- A new crew would provide the City with additional flexibility to deal with emergency situations on a timely basis. An analysis shown in Appendix A provides the costs for internal versus external contracted services per job for other activities where the crew could be redeployed; As shown in the tables, internal resources provide a potential cost savings in all instances; and
- A combination of internal and contracted services would allow the City to continually monitor the costs of associated with insourcing and outsourcing.

RECOMMENDATIONS

- 1. Employ a hybrid of in-house and contract services for the Substandard Water Program. Results of the financial analysis reflect a significant savings by adding a new City crew to undertake approximately 50% of the Substandard Water Program replacements.**
- 2. Continue to monitor costs of in-house versus outside contractors for substandard watermain replacement to determine the optimum mix.**

APPENDIX A

Additional Cost Analysis of Internal vs. External Contracted Water Services

Activity	Avg. Cost Hamilton Water	Avg. Cost Contractor	Cost Savings per Job
Hydrant Replacement	\$ 12,330	\$ 23,090	\$ 10,760
Watermain Break - Ring Break/Hole	\$ 6,470	\$ 12,640	\$ 6,170
Watermain Break - Split	\$ 8,870	\$ 14,390	\$ 5,510
Valve Replacement	\$ 7,990	\$ 18,380	\$ 10,390
Valve Replacement - New	\$ 7,990	\$ 16,270	\$ 8,270
Service Replacement - without drive nozzle	\$ 11,260	\$ 16,500	\$ 5,240
Service Barrel Replacement - VACTOR	\$ 910	\$ 3,860	\$ 2,940