



# **Comprehensive Water Department Review Final Report**

Township of Hamilton  
November 11, 2021

GM BluePlan Engineering Limited  
Contact Person: Andrea Clemencio, P.Eng.



## Table of Contents

1. Executive Summary .....	1
2. Introduction .....	2
2.1. Methodology .....	2
2.2. Future State Desired Outcome .....	3
3. Commitments & Obligations .....	4
3.1. Legislation.....	4
3.2. Strategic Plan .....	5
3.3. Sustainability Principle .....	5
4. Overall Current State .....	6
4.1. System Description .....	7
4.2. Strengths and Successes.....	7
4.3. Water Quality and System Capacity .....	8
4.4. Overall Financials .....	9
4.5. Operating Costs .....	11
5. Discussion of Opportunities .....	14
5.1. People .....	14
5.2. Culture .....	18
5.3. Network Additions and Growth .....	19
5.4. Maintaining Compliance and Applying the QMS.....	21
5.5. Operation and Maintenance .....	22
5.6. Infrastructure Planning .....	25
5.7. Revenues.....	26
5.8. Technology .....	28
6. Conclusions.....	30

## **1. Executive Summary**

GM BluePlan Engineering was engaged to undertake an operational review of Township Water Services to identify internal opportunities to strengthen service delivery effectiveness and efficiency. Given the challenging current financial state of the Water Department, the focus of exploration for this assignment was in cost savings and alternate revenues, and other opportunities for efficiencies and improvement were also reported.

The Water Department continues to maintain compliance while developing and improving its operations; maintaining public health is paramount. However, the Township Water Department is in an operational deficit position, and the water rates do not generate enough revenue to cover expenditures. The challenging raw water quality, aging infrastructure, shared/rotating staffing model, and impending growth are factors that further pressurize the current and future service levels.

Based on a comprehensive review, it is recommended that the Township establish a workplan to move towards a desired future state, that covers the following key elements:

- Increasing revenues through rates, Radio Frequency metering, reduction of non-revenue water, and application of external funding,
- Optimizing staff coverage through an improved staffing model,
- Increasing regular, open communication within the Department and to the Owner,
- Optimizing infrastructure lifecycle strategies, especially in preventive maintenance, and
- Digitizing data and communications.

These measures are likely to reduce fiscal challenges, reduce risk, improve conformance and continuous improvement, enhance long-term infrastructure lifecycles, and improve culture and staff retention.

## **2. Introduction**

GM BluePlan was engaged to undertake an operational review of Township Water Services to identify internal opportunities to strengthen service delivery effectiveness and efficiency. The review assessed the people, processes, technology, and expenditures to identify potential opportunities for improvement that would optimize service delivery and modernize the operation, while making the best use of resources. Specifically, the goal was to explore process efficiencies and identify cost reductions. It is good business practice to undertake such reviews from time to time to ensure that the Township's Water Department's process remains current in light of ever-increasing expectations, workload pressures, staffing challenges, changing Council priorities, provincial legislation and program changes. The scope of the review included internally operated water treatment and distribution systems and considered risk as well as cost.

The distribution system owned by the Township and operated by Lakefront Utilities Service Inc. (LUSI) is not included in the scope of this report. Alternate service delivery models for the department as a whole were not in scope for this assignment.

### **2.1. Methodology**

The foundation of successful business and service delivery is an optimized balance of People, Process and Technology. Examples of these optimized elements include:

- People: Organizational structure, roles, responsibilities, and accountability are defined and communicated for effective decision making, operations, and minimizing duplication. People are trained, engaged, succession planning is in place.
- Process: Efficient and effective processes in place to support service level expectations that are clearly articulated and/or documented and are appropriate.
- Technology/Data: Appropriate technology is in place to enable decisions, link people, help processes run efficiently, create records to learn and improve.

The methodology employed for this assignment included a combination of documentation reviews, consultations, interviews, benchmarking and data analysis. This work was undertaken over a three month period commencing August 2021 with a final report in November 2021. The team assessed the current state and identified recommendations for improvement to reach a desired future state. Through this approach, the Township will have a thorough understanding

# **Township of Hamilton**

## **Comprehensive Water Department Review**

### **Final Report**



of the current state of the water department services, combined with actionable recommendations for improvement.

Given the challenging current financial state of the Water Department, the focus of exploration for this assignment was on cost savings and alternate revenues. Through the consultation and research, however, other opportunities for efficiencies and improvement were discovered and are included in this section.

## **2.2. Future State Desired Outcome**

The Township seeks to identify opportunities to strengthen the financial position of the Water Department which is currently operating in a deficit and carrying a significant debt load. The Township would like to identify ways for the Water Department to operate in a healthy fiscal position to accumulate reserves for capital needs and debt repayment.

## **3. Commitments & Obligations**

It is valuable to first note the overarching elements that drive the Township's provision of water to the community.

### **3.1. Legislation**

Under the Municipal Act, the Province has given municipalities the power to finance and provide water services. Municipalities have the responsibility for the oversight and delivery of these services. The legislative changes in the past two decades have improved water quality management in Ontario, but have significantly increased the role and responsibility of municipalities, who as owners oversee the management and operation of these services.

The Safe Drinking Water Act mandates drinking water standards, training and certification of operators, licensing of all municipal residential drinking water systems, more vigilant enforcement, and greater public transparency through the annual reports. The Act imposes responsibility for the quality of drinking water on owners and operators of drinking water systems. Maintaining compliance to legislation and conformance to the Drinking Water Quality Management Standard (DWQMS) means keeping the public safe and reducing risk, and this requires competent staff, scrutinized practices, intensive documentation, regular staff training, continual monitoring, routine infrastructure planning and Top Management communication of needs and concerns. In particular, the annual DWQMS Management Review is a process for communicating needs related to infrastructure and resources needed.

- Compliance to all of these requirements is regularly monitored through the provincial inspection program, and through DWQMS review practices.
- Conformance to drinking water quality management processes is monitored regularly through the internal and external auditing program.

The Township maintains compliance and conformance with legislative requirements despite being challenged with perpetually constrained resources and changing requirements. Annual provincial inspections have resulted in minor non-compliances related to reporting, not water quality, in the past two years which were promptly addressed.

Ontario Regulation 588/17 under the Infrastructure for Jobs and Prosperity Act requires an Asset Management Policy be in place (this was required to be approved before July 2019), and

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



an Asset Management Plan that covers the costs to maintain current levels of service (required before July 2022). Both of these documents provide a foundation for long-term investment planning of water assets. The current fiscal challenges and levels of service should be clearly documented in the Asset Management Plan when it is updated for this upcoming deadline.

The Township's existing Permit to Take Water prescribes maximum flows to be drawn through the Township wells, which are monitored and reported upon to Council. No exceedances of maximum flow allowances were reported in 2020.

Recommendations for operational changes based on fiscal savings are that much more constrained, as they must be vetted through these strict legislative considerations.

### **3.2. Strategic Plan**

The Township's Strategic Plan is established to guide the decisions and actions of Council and the municipal administration. The third pillar of the current plan is:

*“Physical Assets: to acquire and maintain necessities used to provide services to the Township”.*

One of the related priority activities under this pillar is to *“adopt a fiscally responsible long-term Capital Plan that deals with the growing infrastructure deficit, while advocating for increased funding from senior levels of government.”*

### **3.3. Sustainability Principle**

According to Township documents, Water Operations are to be full cost recovery and funded by the users.

## **4. Overall Current State**

Over the past few years, the Township Water Department has begun to operate at a deficit due to a variety of factors.

- Water Rates did not rise sufficiently to align to inflation or operating costs; and water rates are not at a level sufficient to recover the Township's water expenditures, or to repay the water debt owed to the Township.
- Operating costs did not fully capture all of the salaries or costs incurred from water operations.
- The Township has been loaning funds to cover the annual deficits to the water reserve.
- Aging infrastructure has significant capital needs that require addressing.
- Seven years ago, a 401 widening project triggered the Ministry of Transportation Ontario (MTO) to decommission an existing water supply a cluster of homes, forcing the Township to add an additional 70-75 connections to the existing Creighton heights system. Because the MTO did not permit infrastructure under the 401 bridge, the connection with the Town of Cobourg was severed and the water users were added to the existing Creighton Heights system. The MTO contributed to the cost of replacing the cast iron watermain and installing a Pressure Reducing Valve to regulate pressure to the cluster, however, the total costs incurred from the additional connections was not covered, and the increased demand has impacted the capacity of the system.
- The rate of new connections added from development is not sufficient to generate significant revenues.
- Finally, a full road reconstruction project triggered an opportunity to add new watermain and service new customers along Kennedy Road. This resulted in the construction of new watermain, fully funded by the Township, and no property owners opted to connect. Additional debt was incurred to fund this service, with no increased revenues. The inactive watermain will require maintenance before re-commissioning for use.

In 2015, outsourcing options for Water Operations were considered by Council, and it was decided to continue service provision internally.

#### **4.1. System Description**

The Township of Hamilton has a total population of 10,942 people (2016), including 8 rural communities. It owns three water systems, and currently services approximately 555 metered water customers. Approximately 11% of the properties within the Township are directly connected to the water systems. Drinking water provided by the Township also supplies bulk water and emergency fire services to its rural residents. The water systems are metered and utilize a rate structure with a monthly base charge and a 3-tier increasing block volume charge on a per 1,000 gallons basis. The Township also provides bulk water services on a per 1,000 gallons basis charge.

- The Camborne Drinking Water System is a treatment and distribution system that obtains its raw water from two drilled wells. The system serves the Village of Camborne, a residential community with approximately 70 properties including two institutional properties. The distribution system includes 2.5km of watermain, and not designed to provide fire flows.
- The Creighton Heights Drinking Water System is a treatment and distribution system that obtains its water from three drilled wells. The system serves approximately 485 properties in the communities of Baltimore and Creighton Heights, including two institutional properties, light industrial customers and includes 14 km of watermain with 78 hydrants. In 2015, 75 Creighton Heights properties were added to the existing Township System.

Areas on County Road 45 and areas east of Ontario Street are serviced with municipal water extensions from the Town of Cobourg, operated by LUSI. Distribution to these 163 properties is not included in the scope of this report.

There are no municipal sanitary sewer systems within the Township.

#### **4.2. Strengths and Successes**

There are many successes and milestones to note, and strengths on which the Township can build momentum to continue to make changes in water management.

From interviews, the staff competence is clearly demonstrated, especially related to the challenging and complex characteristics of the water treatment and the constrained funds for maintaining compliance. Many staff showed tremendous pride and commitment to public

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



safety, minimizing costs, and successful customer service, and showed a desire to work as a team.

According to staff, relations and communication has improved immensely between Water and Roads. The level of co-operation between the departments has improved, as there are many cross over activities, including the unplanned sharing of staff when required.

Specifically, particular strides have been made in:

- Customer communications related to customer usage monitoring and billing,
- Efficiencies and innovation in performing maintenance at the lowest cost, including plumbing,
- Monitoring and trending costs,
- Replacing water meters,
- Capturing internal water usage through Fire and Parks,
- Executing more preventive maintenance, rather than only reactive, especially related to critical control points,
- The process for installing meters in new construction,
- Capital needs assessment and planning,
- Prompt and successful completion of Camborne well rehabilitations,
- Quality Management System upgrades and improvements, and
- SCADA updates, to name just a few.

#### **4.3. Water Quality and System Capacity**

The aquifer water is challenging to treat. Naturally occurring minerals and organics are complex parameters to treat. The Creighton Heights raw water contains methane and ammonia, and the characteristic green colour poses aesthetic challenges that undermine the public's perception of water quality. Although regulatory quality requirements are consistently met, non-regulatory expectations related to colour and iron lead to customer satisfaction challenges.

The capacity of the Creighton Heights system is estimated at approximately 80%, according to staff. Capacity of the Camborne system is not currently approaching limits.

A Water Master Plan project proposed by staff for 2021 was postponed by Council, but this type of long-term planning is essential to plan for growth in the community in a fiscally responsible

# Township of Hamilton

## Comprehensive Water Department Review

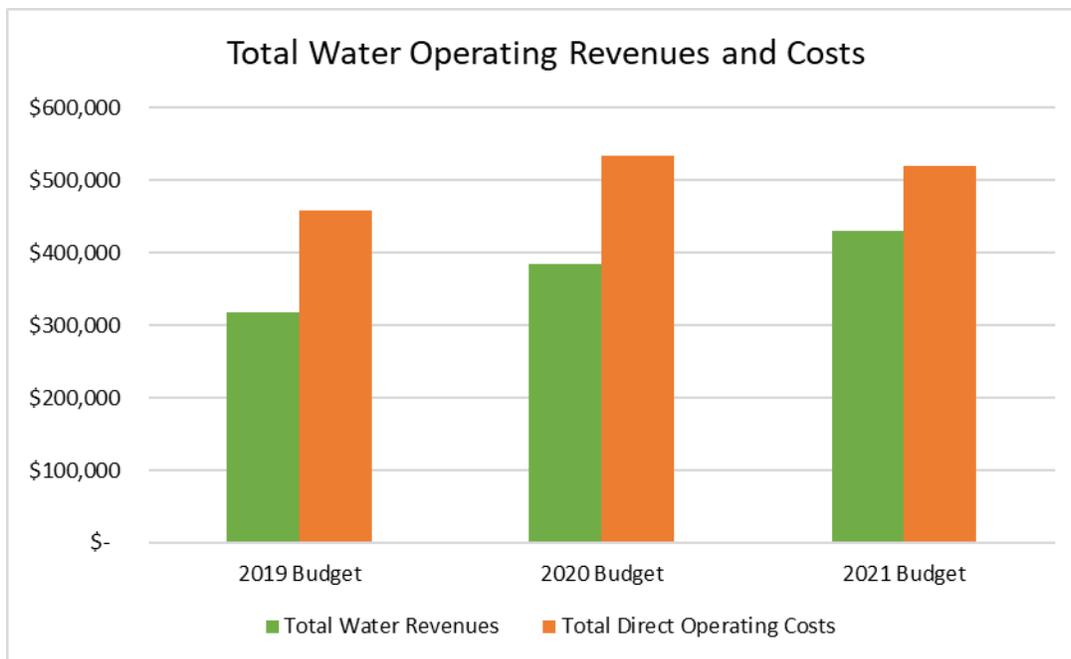
### Final Report



manner, especially considering current capacity of the Creighton Heights system. Capital planning based on capacity is fundamental to support growth, and growth in turn generates revenue for the Township. An elevated water reservoir has been considered and discussed as a potential option for addressing capacity and reliability needs, and would be included as a consideration in a Water Master Plan.

#### 4.4. Overall Financials

Overall, the Township Water Department is in an operating deficit position, and in addition, the water rates do not generate enough revenue to cover expenditures<sup>1</sup>.



To address this, the recent rate study recommended the Township increase water rates in accordance with the rate study presented in January 2021.

### Debt Position

The Township has substantial debt, relative to the scale of the Water operation.

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



- In 2021, “The Township’s water system will be in a net financial debt position of \$516,175”.<sup>1</sup>
- As of Dec.31, 2020, the General Water Reserve was a deficit of \$355,029.
- Additional debt of \$280,000 was incurred in 2018 for the Kennedy Road water main project, which remains an inactive branch of the water distribution system.
- No development charges have been assessed or charged for any water-related growth to date, although a new Development Charge Background Study is underway.
- Interest charges were not defined in the financial data reviewed.

## Capital Plan

The existing infrastructure requires significant capital for rehabilitation and renewal in the short term.

- Forecasted Capital Expenditures for the water systems for 2021-2030 is \$3,181,100.<sup>2</sup>
- Staff refinements of this forecast of Capital Expenditures 2021-2030 inflate the total 10-year need to \$3,629,400<sup>3</sup>. This equates to annual capital expenditures forecasted to \$363,000 each year from 2021 to 2030.
- The annual water capital deficit in the 2016 Asset Management Plan is identified at \$98,000.

## Operating Deficit

Current water rates do not generate sufficient revenue to meet the annual water expenditure requirements.<sup>1</sup>

- Direct Operating Expenditures Budget for 2021: \$519,650 (Operating Budget)
- Direct Revenues Budget for 2021: \$429,457
- Annual Operating Deficit: \$90,193

In addition to this annual operating deficit, the 2021 capital budget request identified \$234,900 capital requirement for water related capital expenditures<sup>4</sup>.

---

<sup>1</sup> Watson & Associates, Financial Plan, February 12, 2021

<sup>2</sup> GM BluePlan, Capital Needs Assessment, 2021

<sup>3</sup> Township of Hamilton 2021 – 2030 Water Capital Budget Replacement Program

<sup>4</sup> Township of Hamilton Council Report January 28, 2021

#### **4.5. Operating Costs**

In 2019, almost half (48%) of total water expenditures incurred were related to the direct operation and maintenance of the treatment plants and distribution systems. This included costs directly allocated to the Camborne and Creighton Heights systems, and pooled costs related to overall operation and maintenance.

Some operating costs are tracked separately for each facility and some of the operating costs are pooled. The actual financial results for 2019 illustrate how direct operating costs are distributed:

- Direct Camborne Operating Costs: 16.3% of total Operating costs
- Direct Creighton Heights Operating Costs: 44.3%
- Pooled Operating Costs: 39.3%

For optimized monitoring of spending, operating and maintenance costs are continually reviewed and validated before approval by the Water Manager, using a tracking and reconciliation spreadsheet for invoices.

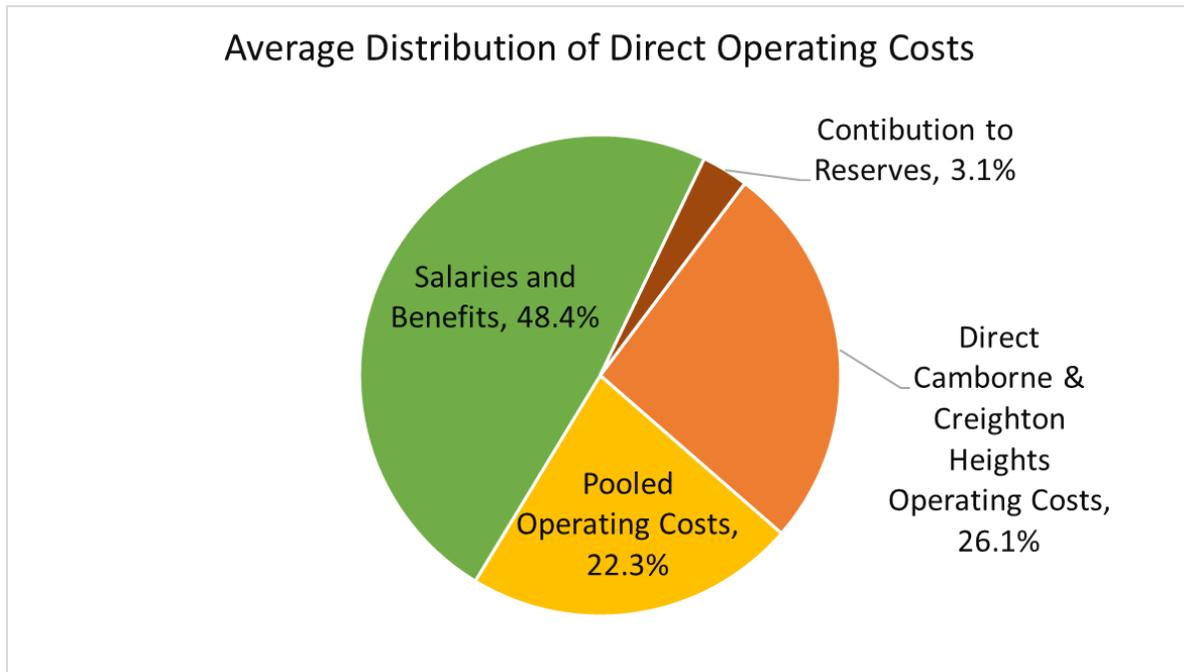
#### **Breakdown of Operating Expenditures**

Operating expenditures budgeted over the last three years were reviewed, for 2019, 2020 and 2021. It is good practice to focus on the areas with the greatest proportion of the total costs. The largest portion of water operating costs is related to salaries and benefits (48.4% on average, over the past 3 years). Pooled operating costs average 22.3% of direct costs and the combined direct operating costs of Creighton Heights and Camborne systems average 26.1% of total operating costs. Lastly, contribution to reserves are 3.1%.

**Township of Hamilton**  
**Comprehensive Water Department Review**  
**Final Report**



The analysis highlights that salaries and benefits make up most of the costs, which is typical in water municipal services, shown in the figure below.



The table below provides a breakdown of how operating expenditures have been budgeted over the past 3 years. The focus of this analysis was on the direct costs of operating the water treatment plants and distribution systems.

Type	2019 Budget	2020 Budget	2021 Budget	% of Total Costs (3 yr avg)
Water Billing Revenues	-\$317,153	-\$323,496	-\$419,457	
From Reserves		-\$60,000	-\$10,000	
<b>Total Water Revenues</b>	<b>-\$317,153</b>	<b>-\$383,496</b>	<b>-\$429,457</b>	
Direct Camborne & Creighton Heights Operating Costs	\$126,125	\$124,000	\$144,300	26.1%
Pooled Operating Costs	\$92,395	\$148,795	\$95,350	22.3%
Salaries and Benefits	\$211,374	\$250,100	\$270,000	48.4%
Contribution to Reserves	\$27,485	\$10,000	\$10,000	3.1%
<b>Total Operating Costs</b>	<b>\$457,379</b>	<b>\$532,895</b>	<b>\$519,650</b>	<b>100%</b>
<b>Net Operating Deficit</b>	<b>\$140,226</b>	<b>\$149,399</b>	<b>\$90,193</b>	

Note: this analysis does not include hydrant revenues, maintenance costs or reserves.

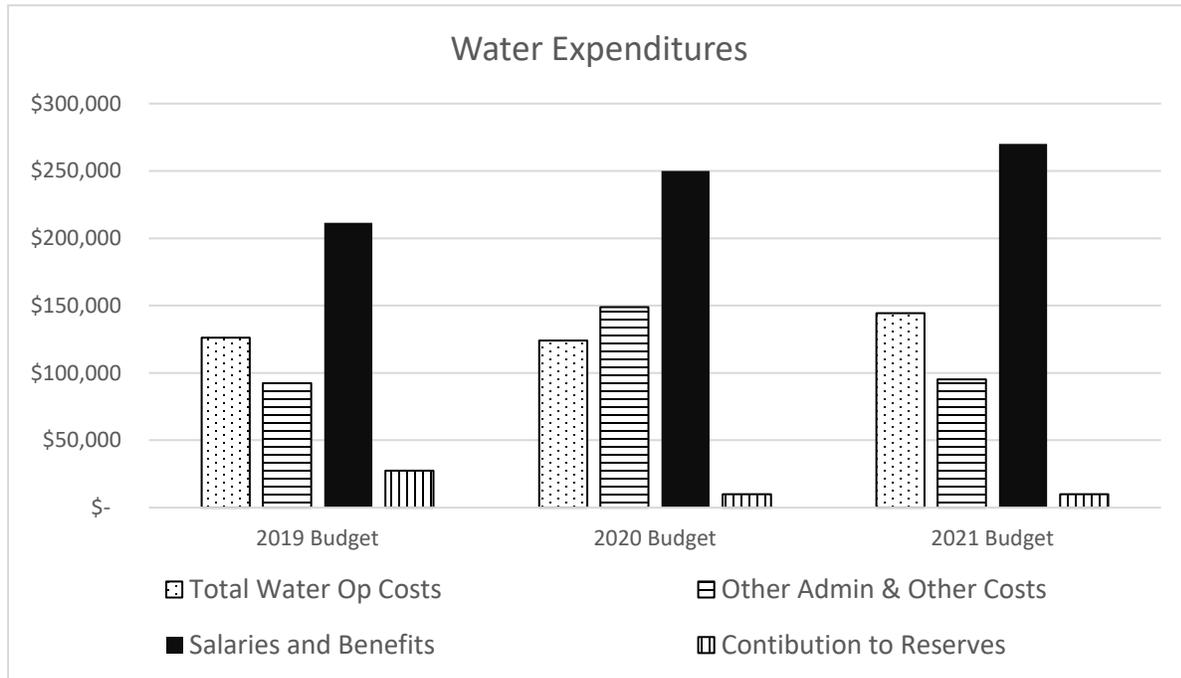
# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



The comparison of budgeted expenditures from 2019 to 2021 is shown graphically below.



The direct water operating costs for operating the Camborne and Creighton Heights treatment and distribution facilities account for 25% of the total operating costs with a budget of \$144,300 in 2021. Any potential process improvements of running these facilities are typically related to the highest risk. By general industry practice, process improvements could potentially yield a 5-10% cost reduction which might save the Township up to \$14,000 per year. Direct operating costs are explored further in Section 5.

Therefore, the potential cost savings that may be realized from process efficiencies could make up only about 15% of the annual actual operating deficit of \$90,193 projected for 2021 in a best-case scenario. In reality, the cost of operating these aging water facilities is likely to increase over time. The potential savings from efficiencies would likely do little to address the annual capital requirements or repay the debt.

## **5. Discussion of Opportunities**

Given the challenging current financial state of the Water Department, the focus of exploration for this assignment was in cost savings and alternate revenues. Through the consultation and research, however, other opportunities for improvement were discovered and are included in this section.

It should be noted that in general, comparison of operating costs or rates to other municipalities is challenging, especially because specific treatment challenges (raw water quality) can skew data. Also, as the Township continues to find cost efficiencies in its operations, savings may not scale down linearly, especially as costs approach a minimum base value. That is, some costs such as salaries, utilities or maintenance reach a baseline “cost to keep the lights on.” This may be the case with exploration of further cost savings for the Township, however all suggestions, regardless of potential impact, are included below.

### **5.1. People**

#### **Salary Apportionment**

A range of roles contribute to the delivery of drinking water.

- Salaries related to some staff whose duties include water responsibilities have been accounted for in budgets, apportioned to estimates of time spent on ‘water tasks’. Not all salaries are captured in the budget at this time.
- Apportioning for staff with shared Township duties is adjusted each year based on forecasted time required.
- Water Operators possess Class 1, 2 or 3 certificates, as reflected in the compensation structure.

**Township of Hamilton**  
**Comprehensive Water Department Review**  
**Final Report**



Roles with regular water duties are listed in the table below, with average estimates of time spent on water duties, noting which salaries are captured in the current budget.

<b>Role</b>	<b>Actual % Time on Water Duties</b>	<b>Budgeted* % Time on Water Duties</b>	<b>Note</b>
Manager of Water Operations	100%	100%	Assumes 35 hours/week
1 Water Operator	100%	100%	1 FTE, 4 Operators in rotation, includes standby, planned overtime
1 Water Technician	Ad hoc	42%	1 part time position
1 Licensed Heavy Equipment Operator	50%	25%	1 part time position approved in 2020 budget
CAO	7.5%	0%	12.5% in 2021 due to 4 water studies
Treasurer	5%	0%	10% in 2021 due to 4 water studies
Accounts Payable	10%	0%	-
Receptionist	5%	0%	Water bill inquiries, work order input, general customer communications
<b>Total</b>		<b>\$270,000</b>	

\* Includes benefits

If the budget were to capture all the noted apportioned salaries above, to cover actual time spent on water responsibilities, the annual budget would be estimated at \$307,920.

**It is recommended that the Township prepare a fulsome review of actual recent hours worked for all water-related roles to provide a baseline for comparison to alternate complement models for personnel coverage.**

**Complement and Coverage**

Given the small staff complement of 1 Manager and 1 Water Operator FTE, it is not feasible to reduce the staffing without going to a part-time staffing model and introducing significant risk. Rather, the water systems may benefit from additional staffing, in terms of reducing corporate risk and reactive maintenance costs, and increasing continuity and lifecycle benefits. The average hours of coverage are:

- One full time Manager (40-50 hours/wk)
- One full time Operator (40 hours/wk)
- One part time Operator (20 hours/wk)

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



- Weekend coverage to perform planned plant checks (6-9 hours/wk, overtime, only in months outside of winter operations)
- Emergency / unplanned response – varies
- Succession planning for Water Operators is an important consideration, based on tenure of existing staff

#### Additional observations:

- A legislated 72 hour maximum applies to frequency of checking data, and the general operating principle is to physically check the plant daily.
- From a cost perspective, efficiencies found in the 4 day work week may be negated by additional overtime costs in monitoring the plants on weekends. Costs to cover plant checks performed on overtime are estimated at approximately \$23,000/year, not including benefits.
- There may be opportunity to consider reliance on alarms/notification for weekends or Sundays.

The Manager is considering ways to increase efficiencies and maintain compliance through the creation of a lead hand position and addition of a part-time (20%) administrative support position. With this model, it is proposed that the lead hand position would cost an additional \$2/hour, with the benefit of continuity, coverage for quality management system responsibilities, and increased capital project oversight.

Additional challenges regarding staff resources are imminent, and will further tax existing resources. These challenges are related to staff tenure and succession planning, continuity and communication between rotations, administrative requirements related to legislation and water license, and a substantial increase in upcoming capital water projects which require operational support for inspection and support.

Current allocation of staff resources also does not allow sufficient time for increased preventive maintenance practices. Preventive maintenance activities reduce infrastructure lifecycle costs and operating costs borne by the Township and ratepayers. Preventive tasks such as regular valve inspections and raising/repairing curbstops can lower operating and reactive maintenance costs. This is further discussed in Section 6.5.

The Township may consider an alternative staffing model as described below, with dedicated Water Operator staff, in consultation with the Union. As specific salary and overtime details

# **Township of Hamilton**

## **Comprehensive Water Department Review**

### **Final Report**



were not provided for privacy reasons, a detailed cost comparison of the proposed model was not prepared. The second FTE could assist the Manager with administrative duties, especially as more processes and forms are digitized. Automate and digitize data entry into forms and maintenance planning/communication using available provincial modernization or efficiency funding so that staff can refocus on value-add preventive maintenance tasks.

Two unshared full time licensed Water Operators working five 8-hour shifts, one with OIC responsibilities. With suitable licensing, these can be staff transitioned from the current shared roles into dedicated full time roles. The two Operators may overlap and work together three days per week: one Operator working Monday-Friday, rotating regularly with a second Operator in a swing shift Saturday-Wednesday, so that regular planned weekend overtime is eliminated. The annual net difference in budgeted full time staff salaries is roughly estimated at \$5,000. The Township may consider covering the resulting shortfall in Roads staff from a levy increase. The Township can continue after hours on-call coverage through the supporting pool of licensed Heavy Equipment Operators. There may be some opportunity to further combine with winter Night Patrol duties since the nature of the after hours coverage is availability.

**It is recommended that the Township consider an alternate model for staffing, to address continuity, coverage, succession planning and culture challenges. The Township should reduce reliance on part-time, part-season and shared staff. Dedicated full time staff would support keeping up with maintenance and build up the knowledge and experience to identify opportunities for continuous improvement.**

**The Township should also ensure salaries are attractive enough to retain and develop staff, which may be addressed through the current salary and organizational review. It is imperative the Township focus on securing at competent staff with redundancy and coverage, and continue to invest in regular training.**

**SCADA monitoring or automation opportunities may allow for some opportunities with remote and after hours coverage for plant monitoring. Critical control points are currently identified as source water agricultural runoff, chemical feed pump failure, high-lift pump failure, watermain break, loss of distribution residual, and for Creighton UV light failure, and generator failure. Although SCADA monitoring may be cost prohibitive for these elements, automated alarms and notification related to failure of some of these**

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



elements may be considered, if only to cover Sundays or Statutory holidays. This is not only for cost reasons, but can result in improved rest time for staff.

It is also recommended that regular communication meetings with water staff be established and documented, which will help improve awareness of challenges, decisions, initiatives and may help improve staff morale and the sense of team.

## 5.2. Culture

Several key factors appear to be affecting the culture at the Township. The Water Department has been underfunded both through water rates that have not kept pace with costs and through a limited benefit from provincial grants. Therefore, there may be a sense that water challenges and water duties are not recognized or prioritized at the same level as other municipal services, especially since the “directly benefitting water properties are only about 10% of all Township properties”. Services that benefit all municipal citizens may be perceived as ‘more important’.

The part-time nature of the staffing model for the Water Department further strengthens the perception that Water is less important. The Water Operators spend 75% of their work time on roads duties, and spending only one week out of every four on Water Department duties results in inefficiencies and communication continuity challenges. It is also typical practice in Hamilton Township for water duties to be prioritized after winter operations duties, except in the case of water emergencies. Although water duties are often shared with Roads in smaller municipalities for efficiencies, it is more common practice that water duties take precedence.

Also, because of limited available resources, Water Operators are stretched to complete all of the legislated duties and continue to find cost efficiencies. The strain on some staff was observed, especially in terms of work/life balance and extensive regular work week hours. There is a perception that there is little incentive to work in the Water Department since compensation may not commensurate with the responsibilities and commitment that is required.

The other factor that has negatively impacted the culture is the turnover in leadership. It is evident that the current Manager has begun to establish a sense of team and trust with the group, however the Water Department staff have worked for nine different Water Managers in the past 20 years. This level of turnover undermines trust, disrupts opportunities for

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



continuous improvement and a high frequency of change also impacts the culture of commitment.

**It is recommended that the Township work towards maintaining stable leadership for the Water Department and move towards a dedicated staffing model with limited reliance on part-time or shared staff. In addition, Water Department funding and operations should be prioritized.**

### 5.3. Network Additions and Growth

The Township's Official Plan states that development may proceed based on "infilling and rounding out" of existing development.

The Official Plan states that there is reserve water system capacity in the Baltimore water system to accommodate new residential development and associated commercial activity. Staff noted the remaining capacity in the system to be approximately 20%. The Official Plan permits Baltimore to continue to develop on a limited basis, with "only small-scale development in Baltimore" to take place in accordance with the severance policies of this plan. Development by plan of subdivision is only be permitted following the preparation of a Secondary Plan for the area , including a long term servicing strategy.

The Official Plan states "In Camborne, the municipal water system may be expanded to accommodate infill and rounding out of existing development... A servicing options report shall be prepared by the proponent in support of all new subdivision development in Camborne to determine the most appropriate method of servicing the area."

The "Kennedy" watermain was constructed during the upgrade to Kennedy Road in 2018, in an effort to coordinate work in the right of way. The project was completed without a requirement for property owners to connect, or for recovering costs through development charges. Instead, the watermain is isolated from the rest of the system, dormant and has no active connections. One property owner will be actively serviced through a new connection in early 2022, and the operational challenges of preparing the dormant watermain and then maintaining the active watermain on behalf of one benefitting user will increase significantly.

# **Township of Hamilton**

## **Comprehensive Water Department Review**

### **Final Report**



The Northumberland County Official Plan<sup>5</sup> states “...municipal water services are the preferred form of servicing for settlement areas. Intensification and redevelopment within settlement areas on existing municipal sewage services and municipal water services should be promoted, wherever feasible.”

In municipal water treatment, a common industry practice is to trigger a capacity/growth study at 80% capacity, and design/construction at 90% capacity. The treatment plants may surpass the 80% capacity study trigger in the short term.

**Reconsideration of the above growth principles discussed above is recommended. This includes:**

- **When municipal services are provided and available, such as to properties fronting Kennedy watermain, it would be prudent of the Township to prescribe connection requirements to those owners based on aquifer vulnerability – the fewer private well users may benefit the aquifer sustainability. This principle is strengthened by the statements in the Northumberland County Official Plan.**
- **Mandate fronting properties to the Kennedy watermain to connect to the municipal water and decommission or confirm separation of well systems. Connections allow for revenues from water usage in that area, and more importantly, regular water turnover in that main will reduce public health risk.**
- **Formally assess capacity and develop a master plan for water related growth.**
- **Maximize external funding (for example, Development Charges) for growth related infrastructure to enable the Township to reduce/eliminate the cost burden of growth on existing citizens.**
- **It is recommended that a capacity assessment be carried out at a minimum, which should be followed by a Master Plan study as the budget may afford it.**
- **Consider pursuing compensation from the MTO for the impact of the costs of adding the Creighton Heights users due to the 401 construction disconnection. Re-establishing connection to the Town of Cobourg distribution system (perhaps via a tunnelled sleeve under the 401) may be considered in the alternate service model assignment.**

---

<sup>5</sup> Northumberland County Official Plan, section B8.1 Servicing Growth, Nov 23, 2016

#### **5.4. Maintaining Compliance and Applying the QMS**

Management Review is one of the key elements in quality management. Its focus is the review of information at a senior executive level, to confirm that adequate resources are present to ensure customer satisfaction, improve the QMS, and maintain water commitments made in the Policy. Although the Township management reviews are detailed discussions of detailed challenges, successes and milestones each year, there is no documented discussion of the significant fiscal and resource constraints on the department as a whole, or the overall subsequent risks. With the current fiscal health of the system, it would be expected the overall financial strain, coming pressures and strategy forward would be discussed between the QMS Representative and Top Management, and then communicated to the Owner.

- The Management Review of August 2020 reported the need for QMS training for the Operators, to reduce QMS responsibilities on the Manager, and suggested an external party to assist with QMS requirements. The Infrastructure Review identified equipment specific projects, and that the ten-year capital needs assessment. Existing overall operating, resourcing and capital shortfalls, although discussed, were not strongly highlighted in the minutes.
- The Management Review of July 2021 reiterated several of the same items regarding QMS administrative needs and the completion of the infrastructure review. Existing overall operating, resourcing and capital shortfalls, including the impact of the capital needs assessment on the department as a whole, although discussed, were not strongly highlighted in the minutes.

Under the legislated Drinking Water Quality Management Standard, section 3, Top Management shall obtain and provide the resources needed to not only maintain but continually improve the system. Under Standard of Care in the Safe Drinking Water Act (section 19), the Owner and decision makers have a legislated duty to exercise care and ensure protection of the users. Ontario Regulation 453/07 Financial Plans was enacted to ensure municipalities are operating financially sustainable water systems.

It is also a legislated requirement that the results of Management Reviews be communicated to the Owner, and direct, frank discussions of the overall suitability, adequacy and effectiveness of the QMS should also be explicitly communicated to Council. This is achieved through budget documents and the annual water report, and water issues are discussed

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



monthly at Public Works Coordinators meetings, where all Councillors receive the agendas and minutes.

**It is recommended that the Township continue higher level discussions for overall fiscal and resource challenges and constraints to the agenda for Management Review, especially the ‘Resources needed to maintain the QMS’, and directly communicate the items to Council. This could also include reporting of discussions and key concerns from the Management Review meeting, and could involve adding more stakeholders as Top Management.**

The Asset Management Policy and Plan are required by law, and will allow the Township to continue to be eligible for funding, a critical revenue stream. Both of these documents provide a foundation for long-term investment planning of water assets. **It is recommended that the current fiscal challenges and levels of service should be clearly documented in the Asset Management Plan when it is updated for this upcoming deadline.**

## 5.5. Operation and Maintenance

No opportunities to reduce the regular tasks to monitor or test the water systems were identified.

Larger cost line items may be reduced, but significant changes to risk may result, and must be considered on a case by case basis.

### General Maintenance

Unlike the common industry cycle frequency of 3 to 5 years, all valves are not regularly inspected/operated. Hydrants are inspected or operated on a general 3 year cycle, which is also less than the common industry practice of 1 to 2 years. No opportunities to reduce staff time allocated to these tasks are identified, and rather an increase in resources in these activities would result in reduced unplanned maintenance, longer asset life and reduced risk.

An average annual of \$50,000 is spent on routine linear and facilities maintenance. To save money, staff continue to strive to repair as much as possible using internal skillsets where possible, including millwright and basic plumbing tasks, where many of these tasks used to be outsourced. No opportunities to reduce these maintenance costs were identified, and rather an increase in budget for these activities could result in reduced risk.

# **Township of Hamilton**

## **Comprehensive Water Department Review**

### **Final Report**



Some other common industry monitoring programs, such as leak detection on linear infrastructure, are not carried out because of constrained resources and budget.

Described below, consideration was also given to potential of reduced Operation and Maintenance costs through:

- The renewal or replacement of aging infrastructure,
- Investments in automation, and
- Targeted reductions in high-cost operation and maintenance activities, especially those with low 'value' to the corporation.

These are further discussed below.

### **Automation**

Automation opportunities in the water treatment plants are limited due to the age and complexity of the facilities. However, opportunities should still be considered on a case by case basis, where the return on investment is feasible, the risk is low and the savings on staff time is measurable. Automation in metering is discussed in the 'Meters' section.

### **Utilities**

Because there is no existing storage capacity within the water systems, the treatment plants must operate continuously, reducing the opportunities to reduce hydro consumption. Variable Frequency Drive pumps may be considered for hydro savings, but also introduce significant capital investment that may not provide comparable savings in hydro costs. No significant opportunities related to communications and telephone costs are identified at this time.

### **Provision of Locate Services**

The Township staff provide locates for municipal water infrastructure through Ontario One Call. It is within the Township's authority to provide this service directly or through an external contractor. Directly providing locates to the community has inherent benefits to the Township in terms of customer service, system monitoring, and training. However, since staffing resources are limited, the benefits of providing locates internally may be less than the benefits of the same staff performing other enhanced preventive maintenance. Locates can often be successfully contracted without significant risk to the corporation. Many municipalities have

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



converted to third party contractors to provide this service, while others keep it as a service that is provided with internal staff. While cost savings may not be significant, especially if current request volume is low, as growth continues and construction activity requires more locate services, outsourcing locates may become more viable.

**It is recommended that the Township explore comparative costing and viability for outsourcing locates services, including a consideration of alternative maintenance that may be performed using the internal staff time.**

## Water Meters

Meters are essential assets that enable the Township to bill for the water services. Both distribution systems include installed water meters that are beyond recommended service life.

- Meters wear with age and use, and tend to fail in favour of the customer, that is, meters tend to under-read flows with age.
- Quarterly meter reads also require 96 hours of Township staff time per cycle to collect the meter read data (or 10 weeks per year).

The Township has implemented an ongoing meter replacement program with Radio Frequency (RF) meters. These meters enable automation of part of the Township's metering process through drive-by reading. Drive-by reads require approximately 20 hours per cycle in staff time, rather than 96 hours, and eliminate the corporate and safety risks related to accessing private property. With the allocated capital budget, approximately 20 meters per year are replaced by an external contractor. Replacement is prioritized based on condition then age, while applying an installation strategy for optimized used of installer time and drive by reads.

- Currently there are 555 meters in total, 420 require replacement.
- Replacing 20 meters per year will require 21 more years to complete the replacement program.
- With an estimated service life of 15-25 years, the oldest meters will likely require replacement before the original RF meter installation program is complete.
- With an additional 420 water meters to be upgraded, an estimated \$282,000 is required to complete the conversion to RF meters, based on current pricing. Long term implementation of this program will significantly increase this estimate because of cost of meters, installation services and inflation.

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



- When converted to all RF meters, the Township is likely to experience increased revenues, as current water losses are recovered. Not only do the new meters record usage more accurately, but lost revenue through bypassed or stopped meters will be corrected during the meter installation. Also, staff time usually consumed in quarterly staff reads (estimated at approximately 1 Operator @ 10 weeks/year) can be reallocated to more pressing maintenance items, which can result in long-term lifecycle costs savings. Township efficiencies related to prompt access to data, customer service, usage trending and monitoring capabilities, and corporate risk will also be experienced.

In addition, challenges related to coordination of final reads, meter installations and meter removals is also straining resources of Township staff.

**It is recommended that the Township explore options to advance the replacement program. If eligible, it is recommended that the Township consider application of Modernization or other eligible Funding for the meter replacement program, since it is an automation opportunity with significant impact on the Township.**

## 5.6. Infrastructure Planning

A recent Capital Needs Assessment was completed for the treatment and distribution systems<sup>6</sup>. The Township's Asset Management Plan (2016) describes levels of service to include predictable, continuous services, accessible to the entire community with sufficient capacity, at the lowest possible cost, with minimized risks. The annual water deficit in the Asset Management Plan is identified at \$98,000, and recommends increased revenues and applying an inflation index to budgets. The tax assets were identified to have a \$6.0M deficit. The updated Asset Management Plan is expected to update the projections for investment needs, to comply with new 2022 legislative deadlines.

**It is recommended that the study scope expand to include all distribution systems. The capital requirements being identified through LUSI must be folded into the Township's plans.**

---

<sup>6</sup> Capital Needs Assessment, GM BluePlan, 2020

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



To reduce lifecycle costs, budget for enhanced preventive maintenance and monitoring should be increased. Activities such as hydrant and valve programs and curbstop maintenance programs directly correlate with lifecycle costs for each asset, and should be implemented as soon as these might be afforded.

It is recommended that the Township explore options within the LUSI agreement to improve communication of asset condition monitoring or assessment activities and resulting data.

## 5.7. Revenues

It is recommended the Township explore other revenue opportunities, further described below.

### Rates

A feasible opportunity to increase revenue from external users is through increasing water rates as advised in the Watson & Associates, Water Rate study, February 12, 2021. Rate increases will assist the Township in recovering the operating expenditures over the forecast period. This level of contribution provides funding towards the operating budget and ensures that the Township will have secured revenue should fluctuations in volumes occur from year to year. Increases will also assist in partially funding the capital program, and reducing the need for debentures. **It is recommended that the Township implement the recommended rate increases.**

**Township of Hamilton**  
**Comprehensive Water Department Review**  
**Final Report**



**External Funding**

The table below lists funding received by the Township in 2020.

Type	2020	Allocated to Water
Federal Gas Tax	\$ 331,939.07	\$0
Ontario Community Infrastructure Fund (OCIF)	\$ 308,268.00	\$0
Ontario Municipal Partnership Fund (OMPF)	\$ 744,100.00	\$0
Ontario Efficiency Fund	\$617,084.00 (2019)	\$15,000 (2021)
Modernization Grant Review Stream	Up to \$150,000	Up to \$150,000

- Gas Tax and OCIF in 2020 was spent 100% on roads projects.
- The OMPF funding is unconditional and “can be used to support the local priorities and specific needs of each community” , however it did not appear that OMPF funding was applied to water projects.
- In March 2019, the Township received \$617,084 in provincial Efficiency Funding. In 2020, the Efficiency Fund was spent on a Fire Master Plan, stormwater drainage study, portable traffic lights, CCTV security system, generator remote monitoring, parks & rec master plan, and Information Technology enhancement. No funding was allocated to water at this time. The funds were instead deployed for a series of improvements expected to increase the overall operation of the municipality. Spending was allocated with a focus on projects that were expected to “have the greatest impact to all residents in the municipality”, which did not include water. When savings were experienced in 2020 projects, one year later, Council approved allocating \$15,000 of the savings towards water meter replacement. This is 2.4% of the total Efficiency Funding received.

**It is recommended that the Township allocate more external funding to eligible water system projects, especially regular funding from OCIF, OMPF and Gas Tax where possible.** Without planned and sustained increases in revenue sources for the Water Department operations, the Township will, by default, continue to subsidize water operations by default through loans and increasing debt.

## **Non-Revenue and Unaccounted Water**

There is also a small opportunity to increase non-revenue water uses by the Township. Internal services, such as Fire, Parks and Recreation, may be using water which is unaccounted in billing. Water is often used for fire services training and flushing irrigation lines, and this usage is now captured through accounting processes. Capital construction and watermain commissioning also requires water which may not be currently metered. Although not significant, accounting for estimated water use for through metered hydrant connections allows for improved cost recovery, and also reduces the non-revenue and unaccounted water for the Township. Estimates for losses from watermain breaks or known leaks can also be included, should the Township wish to further isolate potential water loss estimates through unapproved connections (e.g. meter bypasses), leaks, or meter error, which can all lead to substantial water losses.

**It is recommended that the Township continue metering and/or estimating water used for Township purposes not currently captured, such as capital construction and emergency response, and estimating losses.**

## **Construction Water**

Water required for development construction is significant, and can account for significant revenue losses. Although significant improvements have already been made to ensure new water meters are installed at the earliest possible opportunity for new home construction, it was not clear how the usage of construction water before dwellings are completed is regulated. Water is often used in large amounts in development projects in pouring concrete foundations and site maintenance, well in advance of structure construction.

**It is recommended that the Township consider enhancing fees or hydrant metering for construction water that is used before new construction household meters are installed.**

### **5.8. Technology**

The “foreAction” software is the digitized system is used for customer complaints. Maintenance forms are created electronically using Microsoft Office and completed on paper. Maintenance communications and records are currently not digitized.

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



Neptune software is used for meter data, and Great Plains is the billing platform. These two systems don't currently integrate within the Township. Data is currently manually entered into Great Plains, introducing significant risk of error. The Neptune capabilities are broad, and allow for auto download of read data, integration into Great Plains and data access for the Manager such as customer-centric usage. Although payment options are electronic, billing is paper-based.

Operator logs and communications are paper-based, including the communication between Operators on the weekly changeover of duties. A digitized system would help with continuity, real time communication, and record keeping.

**Digitizing records and communications is recommended when affordable,** and low-cost solutions can include Microsoft Outlook as a maintenance platform, which has been successfully established at smaller municipalities. This would require operators have phone or tablet access. Staff not as familiar or comfortable with new technology can be coached, especially through a buddy-type system.

## **6. Conclusions**

Given the challenging current financial state of the Water Department, the focus of exploration for this assignment was in cost savings and alternate revenues, and other opportunities for efficiencies and improvement were also reported.

Overall, the Township Water Department is in an operational deficit position, and in addition, the water rates do not generate enough revenue to cover expenditures. The challenging raw water quality, aging infrastructure, shared/rotating staffing model, and impending growth are factors that further pressurize the current and future service levels.

To address the fiscal position, and to work towards the future state desired outcome, the Township should:

- Increase revenues through rates, RF metering, reduction of non-revenue water and application of external funding,
- Optimize staff coverage through an improved staffing model,
- Increase regular, open communication within the Department and to the Owner,
- Optimize infrastructure lifecycle strategies, especially in preventive maintenance, and
- Digitize data and communications.

These measures are likely to reduce risk, improve conformance and continuous improvement, enhance long-term infrastructure lifecycles, and improve culture and staff retention. Recommendations are summarized below.

### **Recommended to be Initiated Immediately (based on risk or ease of implementation):**

1. Implement recommended rate increases.
2. The Township currently subsidizes its water operations. Allocate more external funding to eligible water system projects, especially regular funding from OCIF, OMPF and Gas Tax. Open, careful communication to the public is critical, and the application of funding must maintain adherence to all funding eligibility requirements.
3. The current fiscal challenges and levels of service should be clearly documented through the Asset Management Plan when it is updated for upcoming legislative deadlines.
4. Maximize external funding (for example, Development Charges) for growth related infrastructure to enable the Township to reduce/eliminate the cost burden of growth on existing citizens.

# **Township of Hamilton**

## **Comprehensive Water Department Review**

### **Final Report**



5. Continue higher level discussions for challenges and constraints to the agenda for Management Review, including fiscal discussions, directly communicate the deficiencies, decisions and action items to Council, and consider communication also to the ad hoc Water Committee while that committee is active.
6. Explore options to advance the meter replacement program. If eligible, it is recommended that the Township consider application of Modernization or other eligible Funding for the meter replacement program, since it is an automation opportunity with significant impact on the Township.
7. Expand condition assessments study scope to include all Township-owned infrastructure, so upcoming asset investment needs, including those from LUSI, can be better planned for. Explore options within the LUSI agreement to improve communication of asset condition monitoring or assessment activities and resulting data.
8. Continue to maintain stable leadership for the Water Department and move towards a dedicated staffing model with limited reliance on part-time or shared staff. In addition, Water Department funding and operations should be shown to be a high priority at all levels of the organization.
9. Consider pursuing compensation from the MTO for the impact of the costs of adding the Creighton Heights users due to the 401 construction disconnection.

#### **High Priority, Recommended Within Next 2 Years**

1. Consider an alternative staffing model as described in the report, with dedicated Water Operator staff. Conduct a comprehensive review of available historical salary and overtime pay with full disclosure of actual costs, in preparation for any organizational changes. The Township should also ensure salaries are attractive enough to retain and develop staff, which may be addressed through the current salary and organizational review. It is imperative the Township focus on securing at competent staff with redundancy and coverage, and continue to invest in regular training.
2. Carry out a capacity assessment for the systems, which should be followed by a Master Plan study as the budget may afford it.
3. SCADA monitoring or automation opportunities may allow for some opportunities with remote and after hours coverage for plant monitoring. Critical control points are currently identified as source water agricultural runoff, chemical feed pump failure, high-lift pump failure, watermain break, loss of distribution residual, and for Creighton UV light failure,

# Township of Hamilton

## Comprehensive Water Department Review

### Final Report



and generator failure. Although SCADA monitoring may be cost prohibitive for these elements, automated alarms and notification related to failure of some of these elements may be considered, if only to cover Sundays or Statutory holidays. This is not only for cost reasons, but can result in improved rest time for staff.

4. Re-institute regular communication meetings with water staff and document discussions, which will help improve awareness of challenges, decisions, initiatives and may help improve staff morale and the sense of team.
5. Mandate fronting properties to the Kennedy watermain to connect to the municipal water and decommission or confirm separation of well systems. Also employ this principle in the future within urbanized areas. Connections allow for revenues from water usage in that area, and more importantly, regular water turnover in that main will reduce public health risk. This principle is strengthened by the statements in the Northumberland County Official Plan.
6. Budgets for enhanced preventive maintenance and monitoring activities such as hydrant, valve, and curbstop maintenance programs should be implemented as soon as these might be feasible. The Asset Management activities may help forecast lifecycle savings and build the business case for this strategy.
7. To reduce lifecycle costs, budget for enhanced preventive maintenance and monitoring should be increased. Activities such as hydrant and valve programs and curbstop maintenance programs directly correlate with lifecycle costs for each asset, and should be implemented as soon as these might be afforded.

#### **Moderate Priority, Recommended Next 2-5 Years**

1. Digitize log, maintenance records and communications when affordable. Consider metering and/or estimating all water used for Township purposes, and further exploring and characterizing losses.
2. Consider enhancing fees or hydrant metering for construction water that is used before new construction household meters are installed.
3. Explore comparative costing and viability for outsourcing locates services, including a consideration of alternative maintenance that may be performed using the internal staff time.