

**Nova Scotia Utility and Review Board**

**IN THE MATTER OF:        *Public Utilities Act***

**- and -**

**IN THE MATTER OF:    An Application by the Halifax Regional Water Commission for Approval of a Schedule of Rates and Charges and Approval of Regulations Respecting Rates and Charges for the provision of water, public and private fire protection, and wastewater and stormwater services**

**SUBMISSION IN SUPPORT OF AN APPLICATION BY THE HALIFAX REGIONAL WATER COMMISSION FOR AN ORDER APPROVING A SCHEDULE OF RATES AND CHARGES FOR THE SUPPLY OF WATER, WASTEWATER AND STORMWATER SERVICES AND APPROVAL OF A SCHEDULE OF RULES AND REGULATIONS FOR WATER, WASTEWATER AND STORMWATER SERVICE**

**FEBRUARY 2022**

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**NOTICE OF APPLICATION**

**NOVA SCOTIA UTILITY AND REVIEW BOARD**

IN THE MATTER OF:                    THE PUBLIC UTILITIES ACT

-and-

IN THE MATTER OF:                    AN APPLICATION BY THE HALIFAX REGIONAL WATER  
COMMISSION FOR CERTAIN REVISIONS TO ITS RATES,  
CHARGES AND REGULATIONS

**TO:     THE NOVA SCOTIA UTILITY AND REVIEW BOARD**

The Applicant hereby applies to the Board for an order:

- (a)     For the approval of a schedule of rates for water, wastewater, and stormwater services, and for public and private fire protection for customers of the Halifax Regional Water Commission, to become effective for services rendered on and after September 1, 2022, a copy of which is attached as Appendix 9A;
- (b)     For the approval of amendments to the Halifax Water Regulations for water, wastewater, and stormwater services for customers of the Halifax Regional Water Commission to become effective on or after September 1, 2022, a copy of which is attached hereto as Appendix 9A; and
- (c)     For the approval of the Cost of Service Rate Design Manual to become effective on or after September 1, 2022, a copy of which is attached hereto as Appendix 4A.

The Applicant hereby submits the following particulars in support of this Application:

- 1.     The Halifax Regional Water Commission (Halifax Water) is a body corporate, incorporated under the *Halifax Regional Water Commission Act*, S.N.S. 2007, c.55, as amended, (*HRWC Act*) and has its head office and chief place of business at 450 Cowie Hill Road, Halifax, Nova Scotia.
- 2.     Halifax Water is a public utility regulated under the *Public Utilities Act*, R.S.N.S. 1989, c.380, as amended, and has responsibility for the supply of municipal water and fire protection services, municipal wastewater services and municipal stormwater services throughout the Halifax Regional Municipality (HALIFAX).
- 3.     The rates charged by Halifax Water for the services provided by it were last adjusted for water services effective April 1, 2016, for public and private fire protection effective April 1, 2021, for wastewater services on April 1, 2021, and for stormwater services on July 1, 2017.
- 4.     Halifax Water makes this application, pursuant to the provisions of the *Public Utilities Act*, and the *HRWC Act*, for approval of a schedule of rates, charges and regulations for the supply of water,



public and private fire protection, wastewater and stormwater as set forth more fully in this application.

In support of this application, Halifax Water files the attached materials.

5. Halifax Water is represented in this proceeding by:

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6. Contact information for Halifax Water in respect of this application is as follows:

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Filed at Halifax, Nova Scotia this 25<sup>th</sup> day of February 2022.

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Louis de Montbrun, CPA, CA  
Director Corporate Services/CFO  
Halifax Water

## OVERVIEW

Halifax Water is a regulated utility pursuant to the *Public Utilities Act* and has provided potable water and fire protection services to the residents of the former City of Halifax since 1945. Following municipal amalgamation in 1996, these services have been provided to thousands of customers within the Halifax Regional Municipality (HALIFAX).

On August 1, 2007, municipal wastewater and stormwater facilities were transferred to Halifax Water and as a result, these services became regulated under the *Public Utilities Act*. The current rate structure was last changed for water services effective April 1, 2016, for public and private fire protection effective April 1, 2021, for wastewater services effective April 1, 2021 and for stormwater services effective July 1, 2017. The Halifax Water Regulations have been periodically updated with the current Regulations approved on May 10, 2021.

Halifax Water is applying for increases in water, public and private fire protection, wastewater and stormwater rates to take effect September 1, 2022 and April 1, 2023. The requested rate increases will allow Halifax Water to maintain the current level of service to customers, recognize additions to utility plant in service, and continue investment in water, wastewater and stormwater infrastructure. Halifax Water's budgets and revenue requirements are developed on a "break-even" basis.

The range of rate increases requested varies depending upon the size of the meter connection and the volume of water consumed. The rate increases requested for 5/8" meters, which are primarily residential customers total 3.1% for water, and wastewater on September 1, 2022, and 3.0% for water and wastewater on April 1, 2023. Requested increases for all other meter sizes will range from 3.5% to 4.8% in 2022/23 and from 1.7% to 5.4% in 2023/24.

The increase in the stormwater impervious area per square meter charge is from \$0.135 to \$0.145 on September 1, 2022, an increase of \$0.012 and a further increase to \$0.173 per square meter of April 1, 2023, an increase of \$0.027. The annual increase in the tier rates range from \$2.00 to \$15.00 per year, or \$0.16 to \$1.25 per month, on September 1, 2022 and a further annual increase of \$3.00 to \$19.00 per year, or \$0.25 to \$1.58 per month, on April 1, 2023.

The public fire protection charge increases to \$7,907,144 per year on September 1, 2022 and \$8,056,564 on April 1, 2023.

The increases in the private fire protection charge range from \$1.00 per year to \$118.00 per year on September 1, 2022 and from \$3.00 per year to \$117.00 per year on April 1, 2023.

## BACKGROUND

Halifax Water is a regulated utility that operates on a cost recovery basis. There is no profit component built into the rates, as there would be for an investor-owned utility. Halifax Water's revenue requirements are sufficient to cover operating expenses including depreciation and there is an imputed rate of return calculated within the cost of service studies equivalent to payment obligations for debt service and the payment to HALIFAX of a dividend/grant in lieu of taxes.

In January 2020, the Halifax Water Board approved the submission of an application to the Board with proposed increases in average annual residential bills for water and wastewater of 5.8% in each of 2020/21 and 2021/22 and increases ranging from 7.7% to 9.4% and 7.7% to 9.1%, respectively, for institutional, commercial, industrial (ICI) customers. No adjustment was requested for stormwater rates at that time as the utility was in the process of updating impervious area data based on satellite imagery and was aware that discussions were underway between HALIFAX and the province of Nova Scotia that may have changed the stormwater service boundary.

The 2020 proposed increases would have resulted in the consumption rate for a 1,000 litres of water, a cubic meter, increasing from \$0.976 in 2019/20 to \$1.085 in 2020/21 and \$1.201 in 2021/22, and the wastewater discharge rate increasing from \$1.753 in 2019/20 to \$1.920 in 2020/21 and \$2.097 in 2021/22.

In addition, there were proposed increases in the public fire protection charges of 14.2% in 2020/21 and 1.4% in 2021/22 and proposed increases in the private fire protection charges of 23.5% in 2020/21 and 18.9% in 2021/22.

In March 2020, when the COVID-19 pandemic began, Halifax Water was approximately mid-way through the pre-hearing process for the 2020 rate application. Given the sensitivities and uncertainties created by the COVID-19 pandemic, Halifax Water changed its approach significantly and revised its application.

The revised approach required Halifax Water to modify revenue requirements, operate using accumulated surpluses and existing special reserves, and in turn requested no increases in water rates, and no increase in the wastewater base charge. The revised approach also included an increase in the wastewater discharge rate from \$1.753 to \$2.073 effective April 1, 2021, and an increase in public fire protection from \$7,074,373 per year to \$7,336,110 for the year ended March 31, 2021 and \$7,627,564 for subsequent years. There was no increase in private fire protection rates for the smaller fire lines sizes and an increase in rates for larger fire lines of 18.7% on October 1, 2020 and a further 18.5% on April 1, 2021.

In addition to revising its rate application, Halifax Water ceased collection activities for overdue accounts including disconnections for non-payment, and waived interest charges on these accounts from April to September 2020.

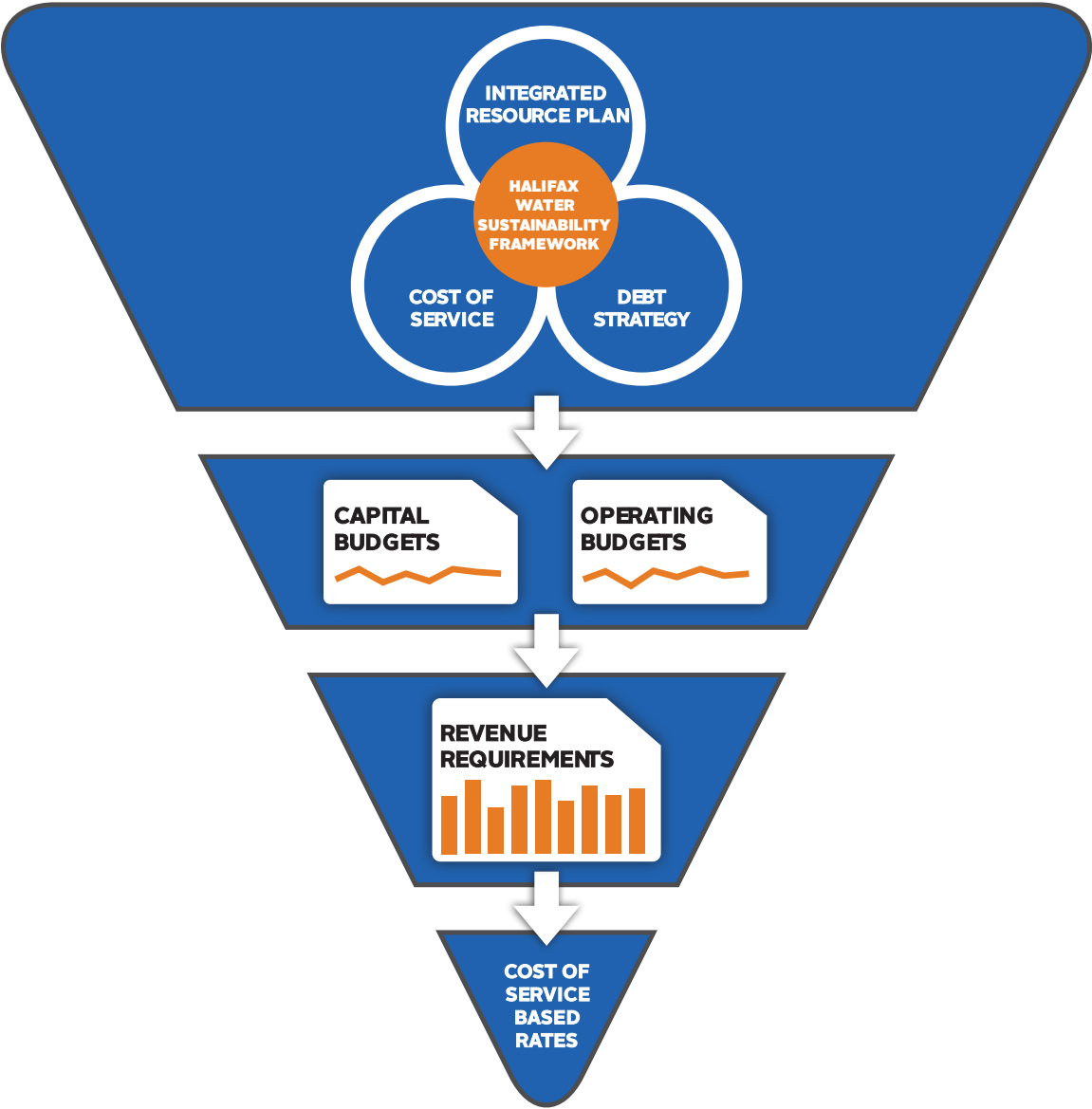
As a result, Halifax Water budgeted deficits in all services for the 2020/21 and 2021/22 fiscal years. The audited 2020/21 results were a surplus of \$0.5 million for water services, a deficit of (\$8.0) million for wastewater services and a deficit of (\$2.4) million for stormwater services. The forecasted results for 2021/22 are deficits in water services of (\$2.4) million and (\$3.6) million in stormwater services and a forecasted surplus of \$1.5 million in wastewater services. At the time when it adopted this revised approach to its 2020 rate application, Halifax Water advised the public and the Board that the revisions would result in higher percentage increases in rates in future years. This was recognized by the Board at paragraph 91 of its decision (2020 NSUARB 113).

## **SUSTAINABILITY FRAMEWORK**

Through various hearings and orders of the Board, Halifax Water has received guidance and approvals on its long-range planning strategy. Halifax Water has developed, and periodically updated and enhanced three key strategy documents: the Cost-of-Service Manual (COS Manual), the Integrated Resource Plan (IRP), and the Debt Strategy. These documents are often referred to as the sustainability framework for

the utility and serve as a touchstone for the development of rates and operating and capital budgets as indicated in Figure 1.

**Figure 1 – Sustainability Framework**



The COS Manual has been adjusted to reflect the most current information, which is discussed below. The IRP was updated in 2019. Assumptions and data used in the Debt Strategy were last updated in 2018, and the underlying information is still relevant.

*Cost of Service*

The COS Manual was initially developed through engagement and consultation with interested parties, including prior rate application interveners and the Board, and is based on cost allocation processes outlined in industry standard manuals of practice referenced below.

The COS Manual was initially approved by the Board in 2013 (2013 NSUARB 127). The Board recognized the COS Manual as a living document that should be updated with any available and relevant information and data. The current approved version of the COS Manual was filed in 2020 as part of M09589.

During the 2020 rate application, Halifax Water indicated that it planned to file an application for changes to the COS Manual in 2022/23. At the time, it was expected that the additional volume and granularity of consumption data from the AMI meters would provide the information required for a more detailed analysis of water demand by different customer classes. This more detailed analysis would enable Halifax Water to consider whether revisions to the cost of service or rate design were required to more accurately reflect the different water demands and usage characteristics of different customer classes.

Although AMI meters have provided a significant amount of new water demand information, the consumption patterns of customer classes have been significantly affected by the COVID-19 pandemic. Prior to the COVID-19 pandemic, consumption patterns were stable and predictable. As a result, Halifax Water does not believe it is appropriate to change the current rate structure until there is a return to more stable usage patterns. The table below illustrates the variability in the consumption patterns.

**Figure 2: Consumption by Customer Class**

Consumption by Customer Class (m3)				
	Annual Consumption 2018/19	Annual % Change in Consumption 2019/20	Annual % Change in Consumption 2020/21	Fiscal Year to Date % Change in Consumption 2021/22
Commercial	6,593,653	4.6%	(17.5%)	4.6%
Industrial	2,152,430	(7.3%)	(7.4%)	8.3%
Institutional	4,206,462	0.8%	(18.6%)	10.5%
Multi-residential	7,012,116	(3.3%)	8.0%	5.4%
Residential	12,615,922	1.6%	7.8%	(6.8%)
Total	32,580,583	0.5%	(1.8%)	0.7%

Therefore, the requested updates to the COS Manual are more routine in nature, reflecting changes in cost allocation based on actual operating costs and updates to data such as number of customer connections and amount of impervious area. The cost of service methodology used to establish water, wastewater and stormwater rates has not changed.

This application is prepared in accordance with the updated COS Manual and based on the NSUARB approved methodology. This methodology uses well-established principles developed by the American Water Works Association (AWWA) and the Water Environment Federation (WEF), which are applied to the context of the local and operational characteristics prevalent for Halifax Water. Cost allocations are tailored to reflect system characteristics, and to adapt to changing circumstances. This application applies the concept of gradualism to the recommended rate design.

## Integrated Resource Plan

Since 2016/17, Halifax Water has invested \$367.0 million in infrastructure. Over \$119.3 million has been contributed through the development process or funded by Regional Development Charges (RDC), Capital Cost Contributions (CCC) or other external funding. The remaining \$247.7 million has been funded by rates. The depreciation expense included within the current rates do not reflect the current utility plant in service.

**Figure 3: Increase in Utility Plant in Service April 1, 2016 to March 31, 2021**

	Infrastructure Investment					Total
	2016-17	2017-18	2018-19	2019-20	2020-21	
<b>Water</b>						
Regular Additions	3,630,428	24,589,196	14,828,127	35,990,957	24,685,973	103,724,681
Donated Additions	16,111,370	11,447,973	11,609,270	13,388,017	1,399,724	53,956,355
<b>Total Water</b>	<b>19,741,798</b>	<b>36,037,169</b>	<b>26,437,397</b>	<b>49,378,974</b>	<b>26,085,698</b>	<b>157,681,036</b>
<b>Wastewater</b>						
Regular Additions	14,929,355	27,723,960	28,058,315	22,899,657	13,694,027	107,305,314
Donated Additions	2,986,803	16,087,168	16,009,600	4,525,803	2,097,620	41,706,994
<b>Total Wastewater</b>	<b>17,916,158</b>	<b>43,811,128</b>	<b>44,067,915</b>	<b>27,425,460</b>	<b>15,791,647</b>	<b>149,012,309</b>
<b>Stormwater</b>						
Regular Additions	4,929,232	7,623,037	4,735,342	14,903,872	4,474,492	36,665,975
Donated Additions	6,094,763	11,077,624	2,507,989	2,614,098	1,298,758	23,593,232
<b>Total Stormwater</b>	<b>11,023,995</b>	<b>18,700,661</b>	<b>7,243,331</b>	<b>17,517,970</b>	<b>5,773,250</b>	<b>60,259,207</b>
<b>Total Regular Additions</b>	<b>23,489,015</b>	<b>59,936,193</b>	<b>47,621,784</b>	<b>73,794,486</b>	<b>42,854,492</b>	<b>247,695,971</b>
<b>Total Donated Additions</b>	<b>25,192,936</b>	<b>38,612,765</b>	<b>30,126,859</b>	<b>20,527,918</b>	<b>4,796,103</b>	<b>119,256,581</b>
<b>Total</b>	<b>48,681,951</b>	<b>98,548,958</b>	<b>77,748,643</b>	<b>94,322,404</b>	<b>47,650,595</b>	<b>366,952,551</b>

As expected, the increased investment in infrastructure has resulted in increased costs to operate and maintain the assets and finance the capital investment.

The capital investment planned in the 2022/23 fiscal year is \$106,485,000. The details of the 2022/23 and the future capital investments are outlined in the 2022/23 capital budget, which will be filed with the Board either contemporaneous with this application or very shortly thereafter. The capital investment planned in the 2023/24 fiscal year is \$190,047,000.

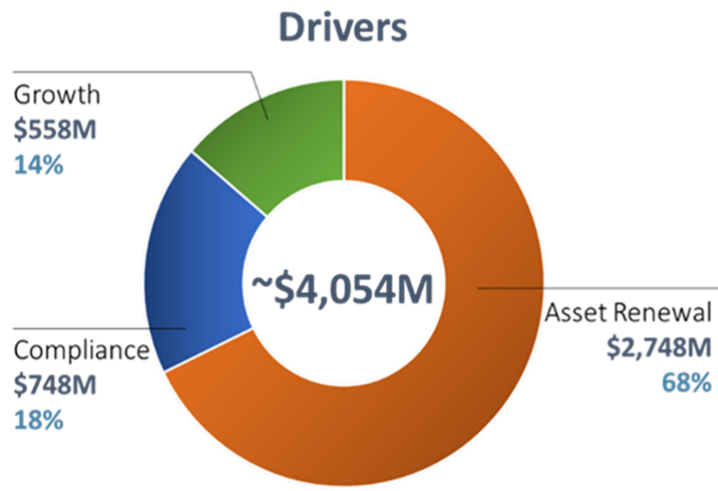
An updated Integrated Resource Plan (IRP) was completed in 2019 and filed with the Board as part of M09494. The IRP update builds on the previous plans to address three primary drivers: growth (Infrastructure Master Plan), asset renewal (Asset Management Plan), and regulatory compliance (Compliance Plan). This IRP created a six-step program integrated approach and produced a comprehensive 30-year capital investment program.

The IRP update features a review of demand- and supply-side management activities Halifax Water has been or could be involved in. Further, it uses a systematic approach to reviewing integration opportunities for the outputs of the predecessor plans (Compliance Plan, Asset Management Plans and Infrastructure Master Plan).

The resulting IRP update revises the projected amount of long-term investment to an estimated \$4.0 billion over 30 years. These projections will be reviewed every five years as part of Halifax Water’s long-term planning cycle.

Asset renewal expenditures represent approximately 68% of the 2019 IRP; growth represents 14%; and regulatory compliance expenditures represent approximately 18%. The total 30-year project cost is shown in Figure 4 below.

**Figure 4 – Integrated Resource Plan 30-Year By Driver**



**Debt Strategy and Affordability**

In 2012, Halifax Water prepared “Study of An Efficient Funding Mechanism for Halifax Water” (Debt Strategy). The data and assumptions were updated in 2018, as part of a Rate Affordability Study.

The Debt Strategy was developed through evaluation of funding alternatives using three general principles:

- Rate stability and affordability
- Halifax Water’s long-term financial sustainability
- Intergenerational equity

The Debt Strategy concluded that appropriate financial performance ratios for Halifax Water include:

- Target debt service ratio of 35%
- Target debt/equity ratio of 40% to 60%

These two targets provide benchmarks for Halifax Water’s capital financing strategy when considering future use of debt.

Additionally, the Debt Strategy addresses the issue of affordability and references industry studies which suggest an appropriate affordability measure is 2% of median household income for each of water, wastewater and stormwater service, *i.e.* 4% for all three services. Halifax Water is currently using the benchmark of 2% of median household income for combined services (rather than 4%) for the purpose of financial planning.

Halifax Water commissioned a more in-depth review of affordability (Rate Affordability Study) in 2017, which concluded there is no broad affordability issue in Halifax. However, the study did identify that there are subsets of communities and populations within the service area with concerns regarding affordability. In 2018, in response to this Rate Affordability Study, Halifax Water implemented some enhancements to the customer assistance program, Help to Others (H2O), which is funded from non-rate revenues. Halifax Water's customer assistance program (H2O Fund) administered by the Salvation Army assisted 98 customers in 2020/21 and in most years the program funding is not fully utilized. In addition, a new rate-funded program to provide assistance to customers was approved by the Board in 2020: the lead service line replacement program where Halifax Water will fund the replacement of the private portion of the service connection as part of projects integrated with HALIFAX. The lead service line replacement rebate and the private lateral replacement assistance program continue to be available to customers interested in replacing lead service lines in advance of an integrated project. The Halifax Water Board confirmed the target of replacing all lead service lines by 2039.

Median household income in the Halifax Census Metropolitan Area is \$73,400 based on Statistics Canada, Canadian Income Survey 2012-2019. The median household income, if increased by CPI, would be expected to be \$74,564 in 2021. The average family currently pays \$841.31 for water, wastewater and stormwater Service. The average bill equates to 1.13% of median household income, indicating that in terms of rate affordability, Halifax Water benchmarks favourably with the rate affordability threshold. Halifax Water rates also benchmark favourably with other comparable Canadian utilities. As of the most recent benchmarking in 2020/21, the average residential bill for combined water, wastewater and stormwater service for the 14 benchmark cities was \$1,025.87. With the proposed rate increases in 2022/23 and 2023/24, Halifax Water's total residential bills will be below the 2020/21 average.

The benchmarking of estimated annual residential cost is shown in Figure 5 below.

**Figure 5 – Benchmarking of Estimated Annual Residential Costs (5/8" Meter)**





Halifax Water's rates for other meter sizes also benchmark well with other cities. The comparison based on current rates shows Halifax Water for all meter sizes other than 10" was less than the average of the benchmark cities.

The global pandemic and Halifax Water's introduction of temporary customer assistance measures from March – September 2020 did have an impact on Halifax Water's outstanding accounts, but collection activities and the number of disconnections for non-payment are now at levels consistent with pre-pandemic activity. On average 1.2% of Halifax Water's water customers have outstanding balances that escalate to disconnection for non-payment on an annual basis.

The utilization of debt in the two test years of this application is consistent with the Debt Strategy. Capital financing strategies for future infrastructure requirements are updated as required to reflect changes in key assumptions such as:

- Interest rates,
- Availability of federal/provincial infrastructure funding,
- Availability of RDC funding for specific projects, and
- Financial constraints posed by rates and affordability issues.

The Nova Scotia Municipal Finance Corporation (MFC) requires that HALIFAX guarantee most of Halifax Water's debt. In September 2014, HRM Council approved a blanket guarantee for Halifax Water debt subject to the utility maintaining a debt service ratio of 35% or less. As of December 31, 2021, the debt service ratio for all services is 18.95%.

## **RATE SMOOTHING**

The Halifax Water Board approved a rate smoothing strategy on October 30, 2014 to help smooth the projected rate increases required to achieve the objectives of the IRP and meet the requirements of asset renewal, environmental compliance, and growth. This strategy has been applied to the proposed rates in this application by proposing a level of capital spend more consistent with Halifax Water's ability to deliver capital projects in 2022/23. Capital spending will increase to the recommended IRP levels in future years. In addition, there will be a gradual implementation of cost of service rates based on the COS Manual, which is discussed in more detail below.

## **FIVE-YEAR BUSINESS PLAN**

The current five-year business plan for Halifax Water and the annual business plan for 2022/23 are attached to this application (Appendices 6A and 6B). The five-year business plan is based on fiscal years that begin on April 1 and end on March 31. The two test years for this application are within the five-year business plan (2022/23 and 2023/24). In rate making, a test year is a 12-month period used to calculate the revenue required to cover the eligible costs of providing the service.

Several identified challenges, mainly of a capital nature, are drivers for Halifax Water's request to increase rates:

- **Additions to Utility Plant in Service** – There is a need to accommodate new debt servicing and depreciation.

- **Capital demands** – The current water, wastewater and stormwater rates are insufficient to meet the capital needs for sustainable infrastructure as identified in the IRP. The IRP acknowledges that water, wastewater, and stormwater assets are currently underfunded, and wastewater and stormwater have been historically underfunded. Growth in Halifax Water’s customer base, more stringent environmental regulations and the need to renew current assets are driving capital expenditures. Institutional capacity will have to increase over the test years in order to deliver the required capital projects.
- **Environmental regulations** – Increased operating expenses will be incurred by Halifax Water as it conforms to the Wastewater Systems Effluent Regulations enacted under the federal *Fisheries Act* in June 2012 and related to the Canadian Council of Ministers of the Environment Municipal Wastewater Effluent Strategy.
- **Increasing energy and chemical costs** – electricity and chemical costs are projected to continue to increase at a rate higher than average inflation over the last five years.
- **Increasing compensation costs** – the number of employees, and some wage, salary and compensation costs have increased since rates were last adjusted.
- **Inflationary adjustments for other goods and services** – the cost of many goods and services required by Halifax Water are subject to inflationary increases. CPI for Halifax is shown in in Figure 20.

Each of these drivers is discussed in more detail below.

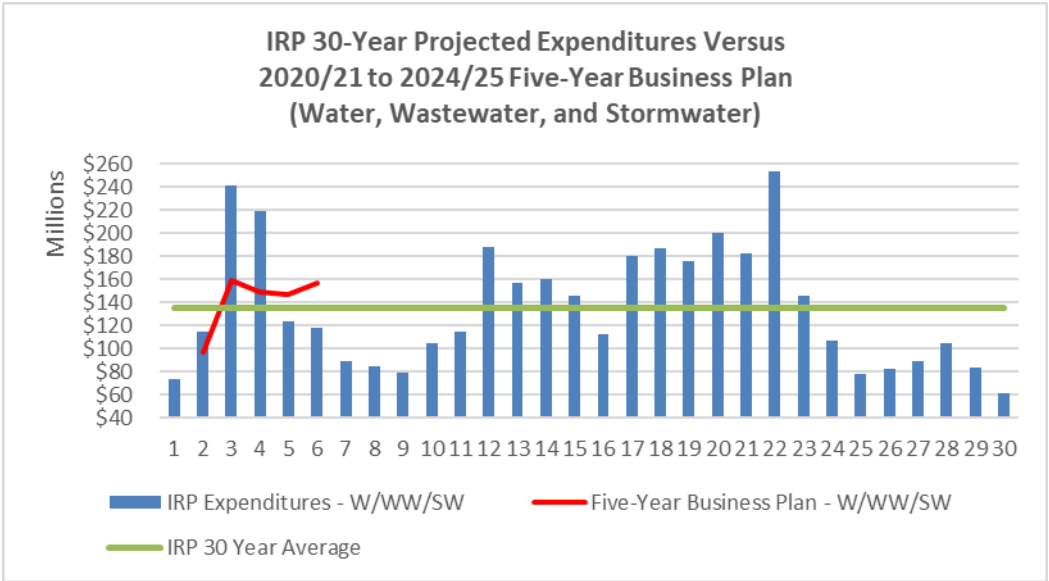
## CAPITAL BUDGET

Halifax Water’s proposed five-year capital budget within its five-year business plan incorporates and prioritizes IRP projects. However, the proposed amount of capital spending is less than the level of spending recommended within the IRP as indicated in Figure 6. Halifax Water proposes to phase in the IRP level of capital spending with investments ranging from \$96.5 million in 2020/21 to \$156.9 million in 2024/25. As Halifax Water has progressed through the first years covered by the five-year business plan, capital budgets have been adjusted to reflect Halifax Water’s ability to deliver projects. Delivery of capital projects has been negatively impacted by organizational capacity and the staff available to deliver these projects, challenges to secure land required for projects, delays in HALIFAX-integrated projects and market issues resulting from the COVID-19 pandemic. Over the next two to three years, Halifax Water will be building organizational capacity and implementing revised business processes to enable it to reach the recommended IRP level of spending.

Figure 6 shows IRP expenditures of \$815.7 M over the next five years and the red line denotes the capital budgets in the five-year business plan.

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**Figure 6 – Five-Year Capital Compared to the IRP**



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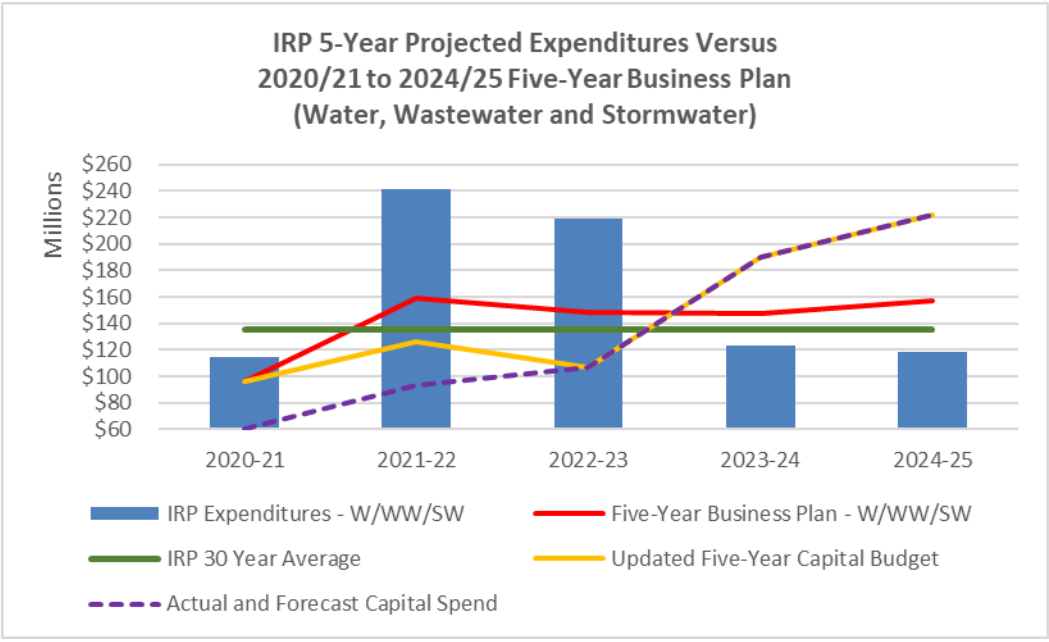
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The full five-year capital budget for the urban core system is shown in Appendix D of the five-year business plan (Appendix 6B). The year-one, 2020/21 budget has a total project value of \$96.5 million (\$48.9 million for water, \$38.4 million for wastewater, and \$9.1 million for stormwater). The original five-year total budgeted value is \$708.4 million (\$293.8 million for water, \$352.2 million for wastewater, and \$62.4 for stormwater). The revised capital spend based on actual, forecasted, and revised budgets for the five years 2020/21 to 2024/25 is \$672.6 million (\$284.4 million for water, \$325.4 million for wastewater, and \$62.7 million for stormwater). Year-to-year capital funding details are provided in Figure 7.

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**Figure 7 – Five-Year Capital Water, Wastewater and Stormwater compared to the IRP**



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The recommended total capital spend over the next five years for water and wastewater under the IRP would be \$815.7 million. The total capital spend for water, wastewater and stormwater in the five-year business plan is \$708.4 million. By comparison, the updated five-year capital spend based on the actual, forecasted, and revised budgets is \$672.6 million. The increasing capital funding in the test years to meet the IRP recommended level of capital spending is a significant driver for this application.

The capital funding in the five-year business plan is provided in Figure 8 and makes some assumptions about the availability of external funding. No capital from operating funding is included, depreciation on contributed assets for water and wastewater is not included, 25% of the depreciation on contributed assets for stormwater is included and equity financing is either depreciation or RDC funds.

**Figure 8 – Five-Year Capital Funding**

	Capital Funding Projection					
	2020-21	2021-22	2022-23	2023-24	2024-25	Total
<b>Water</b>						
External Funding	4,770,000	12,326,050	12,347,950	6,862,000	3,105,200	39,411,200
Depreciation	11,479,000	12,434,000	13,516,000	13,819,000	13,919,000	65,167,000
Debt Funding	23,183,300	46,567,700	39,347,050	28,472,250	33,189,800	170,760,100
Regional Development Charge	150,000	2,828,250	3,264,000	167,250	2,680,500	9,090,000
CCC	9,347,200					9,347,200
<b>Total Water</b>	<b>48,929,500</b>	<b>74,156,000</b>	<b>68,475,000</b>	<b>49,320,500</b>	<b>52,894,500</b>	<b>293,775,500</b>
<b>Wastewater</b>						
External Funding	934,630	820,460	8,278,060	1,003,860	935,360	11,972,370
Depreciation	15,974,000	17,101,000	18,213,000	18,157,000	19,516,000	88,961,000
Debt Funding	17,740,970	32,249,990	19,318,140	35,891,590	27,892,990	133,093,680
Regional Development Charge	3,798,400	22,575,550	14,481,800	32,391,050	44,729,150	117,975,950
CCC		247,500				247,500
<b>Total Wastewater</b>	<b>38,448,000</b>	<b>72,994,500</b>	<b>60,291,000</b>	<b>87,443,500</b>	<b>93,073,500</b>	<b>352,250,500</b>
<b>Stormwater</b>						
External Funding	18,280	255,850				274,130
Depreciation	1,582,000	1,776,000	1,997,000	2,003,000	2,177,000	9,535,000
Debt Funding	7,536,220	9,816,650	18,096,000	8,438,000	8,729,000	52,615,870
Regional Development Charge						-
CCC						-
<b>Total Stormwater</b>	<b>9,136,500</b>	<b>11,848,500</b>	<b>20,093,000</b>	<b>10,441,000</b>	<b>10,906,000</b>	<b>62,425,000</b>
<b>Total</b>	<b>96,514,000</b>	<b>158,999,000</b>	<b>148,859,000</b>	<b>147,205,000</b>	<b>156,874,000</b>	<b>708,451,000</b>

Figure 9 reflects the actual capital spend for 2020/21, forecasted capital spend for 2021/22 and the budgeted capital spend for the next three years including the test years 2022/23 and 2023/24.

**Figure 9 – Actual, Forecast and Budgeted Capital Spend 2020/21 to 2023/24**

	Capital Expenditure Program					Total
	Actual 2020-21	Forecast 2021-22	Budget 2022-23	Budget 2023-24	Budget 2024-25	
<b>Water</b>	32,374,000	39,081,000	52,393,500	69,892,500	90,682,500	284,423,500
<b>Wastewater</b>	23,248,000	44,382,000	45,554,000	92,584,500	119,667,000	325,435,500
<b>Stormwater</b>	4,870,000	10,164,000	8,537,500	27,570,000	11,591,500	62,733,000
<b>Total Expenditures</b>	60,492,000	93,627,000	106,485,000	190,047,000	221,941,000	672,592,000

Additions to utility plant in service for the two test years reflect projects that will be completed and in service during the test years, while the capital budget reflects planned activity during the test years. Capital projects can span multiple fiscal years and are often multi-year in nature. A project may commence but not be completed or in service during the test period. Additions to utility plant in service are developed based on: 1) capital projects from previously approved capital budgets that are expected to be completed, plus, 2) planned future capital budgets, and less, 3) capital projects that will not be completed during the test year periods, which will become additions to utility plant in service in future years after the test years. Additions to utility plant in service for water, wastewater and stormwater are detailed within the Water, Wastewater and Stormwater Rate Studies (Appendices 1, 2 and 3 respectively).

Halifax Water has identified the following key issues affecting the ability to deliver the budgeted capital spend:

- Organizational capacity and staff availability – the 2022/23 operating budget reflect an increase of 21 full-time equivalent positions primarily related to improving the level of capital spend.
- Land issues – the capital budget has been adjusted to reflect the need to allow additional time to secure land and/or easements prior to the allocation of funds to deliver the capital project.
- Integrated projects – several large projects that are integrated with HALIFAX have been delayed. Halifax Water continues to work with HALIFAX staff to ensure funds are budgeted in the appropriate fiscal year.
- Securing necessary regulatory approvals from NSECC and/or NSUARB sometimes take longer than anticipated and project timelines need to allow for this.
- Operating Results – operating results in the five-year business plan were based on the specified level of spend and revenues approved by the Board at the time the plan was approved.

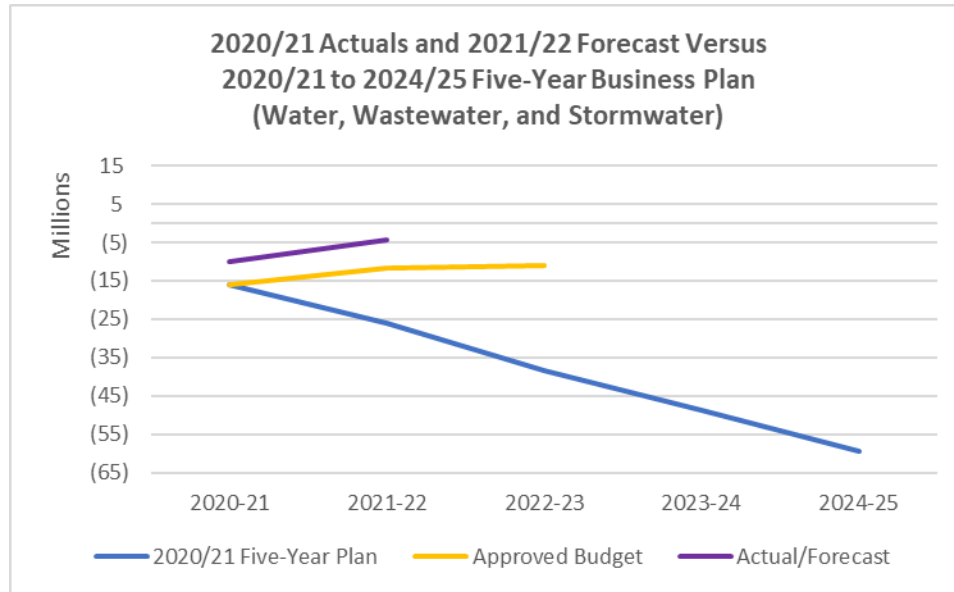
As shown in Figure 7, capital spend has been below the level expected in the five-year business plan in 2020/21 and 2021/22, which has positively impacted the operating budget. In addition, the Board approved an increase in the discharge rate for wastewater effective April 1, 2021, increases to the public and private fire protection rates effective October 1, 2020 and April 1, 2021 and various charges effective April 1, 2021.

#### BUDGETED VERSUS ACTUAL SURPLUS (DEFICIT)

As a result of these factors as well as additional costs savings in 2020/21 and 2021/22, the financial position of the utility is improved from the position described in the five-year business plan.

A comparison between the budgeted deficits in the five-year business plan to the actual and forecasted results for 2020/21 and 2021/22 are shown in Figure 10 and Figure 11.

**Figure 10 - Comparison Five-Year Business Plan to Actual results 2020/21**



**Figure 11 - Comparison Five-Year Business Plan to Budget and Forecasted results 2021/22**

	2021/22 Annual Surplus/(Deficit) by Service		
	2021/22 Five-Year Plan	2021/22 Budget	2021/22 Forecast
Water	(9,180,000)	(5,221,000)	(2,355,000)
Wastewater	(11,980,000)	(1,518,000)	1,499,000
Stormwater	(4,996,000)	(4,912,000)	(3,578,000)
	(26,156,000)	(11,651,000)	(4,434,000)

As a result, the accumulated deficits by service at March 31, 2022 are forecasted to be (\$4.4) million, \$32.8 million less than reflected in the five-year business plan. See Figure 12.

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**Figure 12 – Comparison Accumulated Surplus (Deficit) Five-Year Business Plan to Actual, Forecasted and Budgeted Results 2020/21 to 2023/24**

	<b>Accumulated Surplus (Deficit)</b>		
	<b>2020/21 Five-Year Plan</b>	<b>Actual and Forecast</b>	<b>Difference</b>
<b>2020/21 Fiscal Year</b>			
Balance, beginning of year	\$ 38,454	\$ 38,454	\$ -
Earnings (loss) for the year	(15,949)	(9,885)	(6,064)
Transfer from reserve	-	5,040	(5,040)
Surplus, end of year	22,505	33,609	(11,104)
<b>2021/22 Fiscal Year</b>			
Balance, beginning of year	22,505	33,609	(11,104)
Projected earnings (loss) for the year	(26,156)	(4,434)	(21,722)
Projected surplus (deficit), end of year	(3,651)	29,175	(32,826)
<b>2022/23 Fiscal Year</b>			
Balance, beginning of year	(3,651)	29,175	(32,826)
Projected (loss) for the year	(38,374)	(10,888)	(27,486)
Projected surplus (deficit), end of year	(42,025)	18,287	(60,312)
<b>2023/24 Fiscal Year</b>			
Balance, beginning of year	(42,025)	18,287	(60,312)
Projected (loss) for the year	(48,815)	(16,801)	(32,014)
Projected surplus (deficit), end of year	(90,840)	1,486	(92,326)

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Despite the improvement in the accumulated surplus, the budgeted operating deficits in 2022/23 and 2023/24 (the test years) show that accumulated surpluses will decrease significantly. By March 31, 2024, it is budgeted that water services will have an accumulated surplus of \$9.8 million, wastewater services will have an accumulated surplus of \$1.2 million and stormwater services will have an accumulated deficit of \$(9.6) million. Figure 13 shows the expected Accumulated Surpluses (Deficits).

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**Figure 13 – Accumulated Surplus (Deficit)**

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Accumulated Operating Surplus (Deficit) - NSUARB (in thousands)				
	Total	Water	Wastewater	Stormwater
<b>2020/21 Fiscal Year</b>				
Balance, beginning of year	\$ 38,454	\$ 22,635	\$ 9,880	\$ 5,939
Earnings (loss) for the year	(9,885)	498	(7,955)	(2,428)
Transfer from reserve	5,040	0	5,040	0
Surplus, end of year	33,609	23,133	6,965	3,511
Projected accumulated surplus as a percentage of total expenses	22.80%	40.69%	8.81%	30.39%
<b>2021/22 Fiscal Year</b>				
Balance, beginning of year	33,609	23,133	6,965	3,511
Projected earnings (loss) for the year	(4,434)	(2,355)	1,499	(3,578)
Projected surplus (deficit), end of year	29,175	20,778	8,464	(67)
Projected accumulated surplus as a percentage of total expenses	18.58%	33.79%	10.40%	-0.47%
<b>2022/23 Fiscal Year</b>				
Balance, beginning of year	29,175	20,778	8,464	(67)
Projected (loss) for the year	(10,888)	(4,175)	(2,270)	(4,442)
Projected surplus (deficit), end of year	\$ 18,287	\$ 16,603	\$ 6,193	\$ (4,509)
Projected accumulated surplus as a percentage of total expenses	11.12%	26.21%	7.24%	-29.20%
<b>2023/24 Fiscal Year</b>				
Balance, beginning of year	18,287	16,603	6,193	(4,509)
Projected (loss) for the year	(16,801)	(6,778)	(4,961)	(5,062)
Projected surplus (deficit), end of year	\$ 1,486	\$ 9,825	\$ 1,232	\$ (9,571)
Projected accumulated surplus as a percentage of total expenses	0.87%	14.90%	1.40%	-59.59%

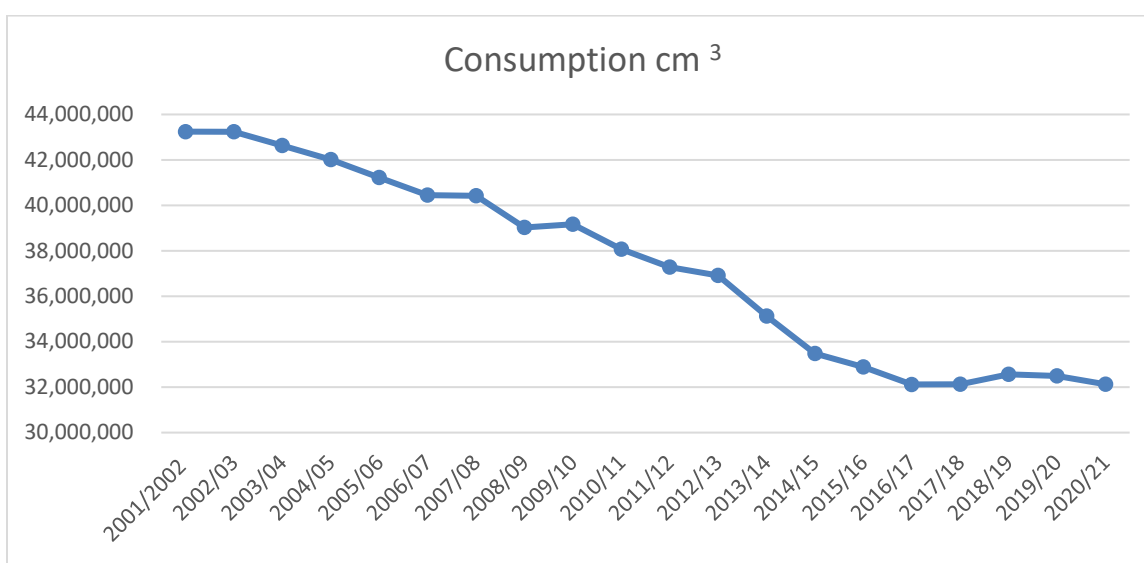
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## REVENUES

Between 2001/02 and 2020/21, Halifax Water had experienced average, yearly, net-metered consumption decreases of 1.54%, as indicated in Figure 14. The total decrease since 2001/02 is a 25.7% reduction, which was managed predominantly through changing rate structures to align fixed and variables costs, diversifying rate structures (stormwater with a different billing determinant), increasing rates, increasing unregulated revenue and controlling costs. Halifax Water promotes water stewardship through leak detection, and investment in providing tools and information to customers through the Customer Portal to encourage monitoring and managing of consumption. Last year, Halifax Water implemented new business processes to provide earlier notification to customers about potential high consumption and leaks.

**Figure 14 – Consumption 2001 to 2021**



Average			-1.54%
Rolling 4 Year Average increase			0.01%
Median			-0.67%
Total Decrease since 2001/02			-25.7%

After the long-term trend of declining water consumption, Halifax Water has experienced increases in consumption of 0.1% and 1.4% in 2017/18 and 2018/19 respectively, due to customer growth and conversion to new, more accurate meters.

In 2019/20, Halifax Water saw a further growth in consumption of 0.5%. In 2020/21, as a result of the global COVID-19 pandemic, Halifax Water experienced significant changes in consumption by customer class. The industrial, commercial, and institutional customer classes saw significant decreases as businesses were closed, some employees moved to working from home and students moved to online learning. With many customers learning and working from home, residential and multi-residential customer classes experienced increases in consumption. However, in 2020/21, these increases were not sufficient to offset the decreases in other customer classes.

Since April 1, 2021, Halifax Water has seen consumption by customer class returning to pre-COVID-19 levels. At the end of December 2021, consumption had increased by 0.7% from 2020/21. Details by customer classes are in Figure 2.

As consumption is returning to more normal patterns, overall consumption is expected to increase as a result of growth. The budget for 2022/23 includes an increase in consumption of 1% based on this return to more normal levels and an increase of 680 new customers. The budget for 2023/24, the second test year, does not have an additional increase in consumption. The decision to not increase consumption estimates further is a conservative approach to reflect unknowns related to the COVID-19 pandemic.

The increase in consumption affects both water and wastewater revenue as the discharge fee billed to most customers is based upon water consumption. Consumption is impacted by timing of development, form of development and new customer growth.

The projected increase in new customer connections is 680 in 2022/23 and an additional 680 customers in 2023/24, allocated to the various meter sizes based on a review of connection history. The breakdown of customer accounts as of March 31, 2021 is included in Figure 15.

**Figure 15 – Customer Connections as of March 31, 2021**

<b>March 31 2021 (Fiscal Year : 2020/2021)</b>		
<b>Customer Numbers by Type</b>		
	<b>Number of Accounts</b>	<b>Percentage of Total</b>
Water, Wastewater and Stormwater	74,886	70.57%
Stormwater only	19,227	18.12%
Water and Wastewater	6,874	6.48%
Water and Stormwater	3,858	3.64%
Wastewater and Stormwater	530	0.50%
Water only	570	0.54%
Wastewater only	174	0.16%
<b>Total of all Types</b>	<b>106,119</b>	<b>100%</b>

Over the period 2019/20 to 2023/24, operating revenues have increased from \$137.8 million in 2019/20 to \$152.8 million in the 2023/24 test year, an increase of 10.9%. The increase is primarily related to increase in fire protection charges and wastewater discharge rates and budgeted increase in consumption in 2022/23. See Figure 16.

**Figure 16 – Total Revenues – 2019/20 to 2023/24**

Total Revenues						
	Actual 2019-20	Actual 2020-21	Forecast 2021-22	Budget 2022-23	Budget 2023-24	Total
<b>Water</b>						
Operating revenues	56,542	56,645	58,556	58,629	58,629	289,001
Financial and other revenues	766	699	578	545	545	3,133
	57,308	57,344	59,134	59,174	59,174	292,134
<b>Wastewater</b>						
Operating revenues	71,837	70,822	82,682	83,149	83,149	391,639
Financial and other revenues	346	231	187	176	176	1,116
	72,183	71,053	82,869	83,325	83,325	392,755
<b>Stormwater</b>						
Operating revenues	9,371	9,102	10,549	10,987	10,987	50,996
Financial and other revenues	99	33	18	12	12	174
	9,470	9,135	10,567	10,999	10,999	51,170
<b>Total</b>						
Operating revenues	137,750	136,569	151,787	152,765	152,765	731,636
Financial and other revenues	1,211	963	783	733	733	4,423
	138,961	137,532	152,570	153,498	153,498	736,059

The majority of Halifax Water's revenues come from rate-regulated activities. Halifax Water does have a small amount of other revenue from miscellaneous fees and financial revenue from interest income.

Financial and other revenues were \$1.2 million in 2019/20 and are budgeted to be \$0.7 million in the 2023/24 test year, a decrease of 39.5%. The decrease is primarily related to the decrease in interest earned on cash balances.

Unregulated revenues were \$1.7 million in 2019/20 and in the 2023/24 test year are budgeted to be \$1.7 million.

**Figure 17 – Unregulated Revenues – 2019/20 to 2023/24**

Total Revenues						
	Actual 2019-20	Actual 2020-21	Forecast 2021-22	Budget 2022-23	Budget 2023-24	Total
<b>Regulated</b>						
Operating revenues	136,648	135,596	150,767	151,685	151,685	726,381
Financial and other revenues	655	303	164	137	137	1,396
	137,303	135,899	150,931	151,822	151,822	727,777
<b>Unregulated</b>						
Operating revenues	1,102	973	1,020	1,080	1,080	5,255
Financial and other revenues	556	660	619	596	596	3,027
	1,658	1,633	1,639	1,676	1,676	8,282
	138,961	137,532	152,570	153,498	153,498	736,059

Unregulated business includes the following:

1. Septage tipping
2. Leachate facility
3. Biosolids processing

- 520           4. Airline effluent  
522           5. Tower leases and other property leases  
522           6. Energy generation

524   The primary source of unregulated revenues is septage tipping. Unregulated revenues are used to fund  
526   specific programs such as the H2O Fund and sponsorships and any additional surplus is used to help  
526   mitigate the extent of future rate increases.

528   A more in-depth review of operating revenues by service shows operating revenues for water services  
530   have increased from \$56.5 million in 2019/20 to \$58.6 million 2023/24, an increase of 3.7%. In 2019/20,  
532   the operating revenue was generated as follows: consumption charges were 55.9%, base charges were  
534   28.8% and the remainder 15.2% for fire protection revenues, bulk water sales, late payment and interest  
534   charges. In the test years, the operating revenue are generated as follows: consumption charges are  
534   54.7%, base charges are 28.5% and the remainder 16.8% for fire protection revenues, bulk water sales,  
534   late payment and interest charges.

536   Operating revenues for wastewater services have increased from \$71.8 million in 2019/20 to \$83.1 million  
538   2023/24, an increase of 15.8%. In 2019/20, the operating revenue was generated as follows: consumption  
540   charges were 74.3%, 23.8% were from base charges and the remaining 1.9% were from septage tipping  
542   fees, biosolids processing and other contract services, late payment and interest charges, and other fees.  
542   In the test years, the operating revenues are generated as follows: consumption charges are 77.0%, 21.2%  
542   were from base charges and the remaining 1.8% were from septage tipping fees, biosolids processing and  
542   other contract services, late payment and interest charges, and other fees.

544   Operating revenues for stormwater services have increased from \$9.4 million in 2019/20 to \$11.0 million  
546   2023/24, an increase of 17.2%. In 2019/20, the operating revenue was generated as follows: 57.2% were  
548   site generated charges and 40.9% were from right-of-way charges to HALIFAX. In the test years, the  
548   operating revenues are generated as follows: 61.8% were site generated charges and 36.4% were from  
548   right-of-way charges to HALIFAX.

550   With approximately 73% of water and wastewater revenues coming from volumetric rates and 27% from  
552   fixed charges (see Figure 18), Halifax Water understands that it is important to balance the revenues from  
554   fixed charges, which provide rate stability, and consumption charges. As shown in Figure 2, the trend of  
556   declining consumption has changed, and Halifax Water has had small increases and is budgeting for  
556   consumption growth in 2022/23. Halifax Water expects that consumption will stabilize and therefore it is  
556   proposing to maintain the fixed charges and to allocate any increases in rates to consumption charges.

558   Halifax Water understands that any increase in rates can be challenging for customers. By applying rate  
560   increases to consumption charges only, customers may be able to reduce their water bills by adjusting  
560   their consumption.

**Figure 18 – Revenues from Base and Consumption Charges – for All Services 2019/20 to 2023/24**

Total Revenues						
	Actual 2019-20	Actual 2020-21	Forecast 2021-22	Budget 2022-23	Budget 2023-24	Total
<b>Water</b>						
Consumption	31,636	31,275	32,009	32,074	32,074	159,068
Base	16,282	16,356	16,643	16,696	16,696	82,673
Other	8,624	9,014	9,904	9,859	9,859	47,260
	56,542	56,645	58,556	58,629	58,629	289,001
<b>Wastewater</b>						
Consumption	54,418	53,264	64,821	65,316	65,315	303,134
WW Rebate	(1,041)	(847)	(1,108)	(1,314)	(1,313)	(5,623)
Base	17,117	17,188	17,537	17,606	17,606	87,054
Other	1,343	1,217	1,432	1,541	1,541	7,074
	71,837	70,822	82,682	83,149	83,149	391,639
<b>Stormwater</b>						
Site generated	5,361	5,127	6,537	6,790	6,790	30,605
Right-of-way	3,835	3,835	3,835	3,996	3,996	19,497
Other	175	140	177	201	201	894
	9,371	9,102	10,549	10,987	10,987	50,996
<b>Total</b>						
Consumption	86,054	84,539	96,830	97,390	97,389	462,202
WW Rebate	(1,041)	(847)	(1,108)	(1,314)	(1,313)	(5,623)
Base	33,399	33,544	34,180	34,302	34,302	169,727
Other	19,338	19,333	21,885	22,387	22,387	105,330
	137,750	136,569	151,787	152,765	152,765	731,636

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566 **EXPENSES**

568 Halifax Water's operating budgets are shown on an accrual basis, which provides better information for  
 570 decision making and aligns with accounting standards. As indicated in Figure 19, the largest components  
 572 of Halifax Water's consolidated operating budgets are operating costs for water, wastewater and  
 stormwater services which include salaries and benefits (excluding accrued pension costs), electricity, and  
 chemicals. Other major expense categories are debt service and depreciation.

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**Figure 19 – 2019/20 to 2023/24 Expenses**

	Total Expenses					Total
	Actual 2019-20	Actual 2020-21	Forecast 2021-22	Budget 2022-23	Budget 2023-24	
<b>Water</b>						
Operating expenses	30,561	32,997	35,958	36,791	37,892	174,199
Depreciation	9,818	10,879	11,634	12,171	13,292	57,794
Debt interest	1,828	2,028	2,103	2,306	2,459	10,724
Debt principal	4,722	5,331	5,862	6,063	6,195	28,173
Dividend	5,078	5,498	5,713	5,918	5,978	28,185
Miscellaneous	96	117	219	100	136	668
	52,103	56,850	61,489	63,349	65,952	299,743
<b>Wastewater</b>						
Operating expenses	45,807	45,817	46,826	51,335	52,850	242,635
Depreciation	14,038	15,019	15,909	16,093	17,835	78,894
Debt interest	4,706	4,405	3,999	3,639	3,015	19,764
Debt principal	12,522	13,242	13,711	13,635	13,686	66,796
Dividend	-	386	777	736	743	2,642
Miscellaneous	145	143	148	157	157	750
	77,218	79,012	81,370	85,595	88,286	411,481
<b>Stormwater</b>						
Operating expenses	7,880	7,467	8,913	9,810	10,091	44,161
Depreciation	1,222	1,512	2,368	2,588	2,572	10,262
Debt interest	610	685	720	723	842	3,580
Debt principal	1,475	1,806	1,986	2,148	2,383	9,798
Dividend	-	67	136	149	150	502
Miscellaneous	13	18	22	22	23	98
	11,200	11,555	14,145	15,441	16,061	68,402
<b>Total</b>						
Operating expenses	84,248	86,281	91,697	97,936	100,833	460,995
Depreciation	25,078	27,410	29,911	30,852	33,699	146,950
Debt interest	7,144	7,118	6,822	6,668	6,316	34,068
Debt principal	18,719	20,379	21,559	21,846	22,264	104,767
Dividend	5,078	5,951	6,626	6,803	6,871	31,329
Miscellaneous	254	278	389	279	316	1,516
	140,521	147,417	157,004	164,385	170,299	779,626

As noted in Figure 19, Halifax Water's total operating expenses, excluding depreciation, are forecast to increase from \$84.2 million in 2019/20 to \$100.8 million in 2023/24, an increase of 16.4%.

Other expenses, such as depreciation, the dividend/grant in lieu of taxes paid to HALIFAX and principal and interest payments are forecast to increase from \$56.3 million in 2019/20 to \$69.5 million in 2023/24, a total increase of 23.4%.

The increase in the Consumer Price Index (CPI) is one of the key drivers in operating costs. Depreciation, the dividend/grant in lieu of taxes, and principal and interest payments increase at levels different from CPI, as they are driven by the level of capital activity and new additions to utility plant in service.

Figure 20 shows that the historic average for CPI in Halifax from 2015 to 2021 is 2.0% per year. The compounded impact of inflation is 10.76%. For 2021, the CPI has increased by 3.88% and the trend is expected to be similar in 2022.

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**Figure 20 – Consumer Price Index 2015 to 2021**

Halifax, Nova Scotia								
Year	2015	2016	2017	2018	2019	2020	2021	Average
	2002=100							
All-items	128.20	129.80	131.20	134.00	136.00	136.70	142.00	118.81
Difference		1.60	1.40	2.80	2.00	0.70	5.30	2.31
Change		1.25%	1.08%	2.13%	1.49%	0.51%	3.88%	2.00%
Compounded Inflation	\$ 1.0000	\$ 1.0125	\$ 1.0234	\$ 1.0452	\$ 1.0608	\$ 1.0662	\$ 1.1076	

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**Salaries and Benefits**

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Reasonable provisions for salary increases are provided for in the five-year business plan. These increases are based on five-year collective agreements signed with CUPE Locals 227 and 1431 in 2019 and on market information for non-union compensation. Halifax Water has budgeted for the impact of step increases within salary bands or reclassification of positions and increases in benefits. Halifax Water is also adding additional salaried staff to increase institutional capacity to enable it to deliver the capital spending required under the IRP and to reflect the growth in services caused by increasing customers, additional infrastructure requiring maintenance, and increased service requests. This approach is reflected in the 2022/23 and 2023/24 operating budgets for the test years.

**Chemicals**

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Chemical are a significant expense for Halifax Water. Halifax Water negotiates yearly contracts for key chemicals. Historically, chemical prices increase above CPI. In 2022/23 and 2023/24, chemical prices are budgeted to increase by 5% per year.

**Energy**

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The budgets for the test years were established based on assumptions of increases in the cost of electricity, oil and natural gas rate in each year covered by the application. The impacts of these increases are expected to be partially offset by Halifax Water's Energy Management Program initiated in 2011/12 (see section 7 of the five-year business plan).

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The projected increases are:

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- Electricity – 3.0% in year 2022/23 and 3.0% in 2023/24;
- Furnace Oil – 15.0% in 2022/23 and 2.0% in 2023/24; and,
- Natural Gas – 15.0% in 2022/23 and 2.0% in 2023/24.

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**Debt Financing**

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Over the course of 2022/23 and 2023/24, debt payments for water, wastewater and stormwater services are budgeted to increase from \$28.5 million in 2022/23 to \$28.6 million in 2023/24. Principal and interest payments are affected by the total amount of new debt required, interest rates and the amortization period for new debt.

636 New debt is driven by the timing of the completion of projects. As the capital budget has increased, the  
638 expected amount of debt to finance new assets is expected to increase. However, actual capital spend  
has not kept pace with the capital budget and the impact is a lower debt requirement than was expected.

640 In the future, as capital spend increases, the amount of new debt will increase. Prior to issuing new debt,  
642 Halifax Water reviews its cash balances to determine the timing of new debt. Higher cash balances in the  
short-term due to RDCs collected allows Halifax Water to defer the issuance of new debt and results in  
savings in debt service costs. Cash balances have been approximately \$57.8 million over the last four  
years as a result of RDCs collected for projects to be completed in the future.

644 Halifax Water accounts for the RDC funds separately and pays interest to the RDC fund for any cash utilized  
646 to cashflow capital or operating requirements. This approach to treasury management is most cost  
effective for the utility and the RDC fund is not affected. The delayed issuance of debt saves Halifax Water  
648 interest charges of approximately 1.0% to 1.5% per year. Debt will be required to be issued in future years  
as capital spend increases. Halifax Water has budgeted to issue \$15.7 million in new debt in 2022/24 and  
650 \$55.2 million in 2023/24.

652 Interest rates – the all-in interest cost for debt is 2.3% based on the current debt. Halifax Water has  
654 budgeted the all-in interest rate on new debt issued at 2.5% in 2022/23 and 2.5% in 2023/24.

656 Amortization period – When issuing new debt, Halifax Water has traditionally requested an amortization  
658 period of 20 years from the MFC. A shorter amortization period means debt is paid off sooner and total  
interest charges are lower. A longer amortization period will spread the principal and interest costs over  
a longer period and will reduce the annual principal and interest costs. A longer amortization period also  
more closely corresponds to the useful life of the assets being financed and allocates costs more  
660 appropriately to the customers receiving the benefit from the assets.

662 In preparing the operating budget for 2022/23, Halifax Water contacted the MFC to determine if they  
were able to offer amortization periods of longer than 20 years. MFC has indicated this is possible for  
664 new debt issued. As a result, the 2022/23 and 2023/24 budgets include an amortization period for new  
debt issued for 30 years. The reduction in debt servicing costs on an accrual basis is \$0.2 million in 2022/23  
666 and \$0.6 million in 2023/24.

668 As capital spend increases and as assets that were contributed are required to be replaced, issuing debt  
over a longer amortization period will be an effective strategy to smooth the financing costs of these  
670 assets. Halifax Water will continue to work with the MFC to finance debt over longer periods that more  
appropriately match the life of the assets being financed. Currently, the MFC has indicated that debt can  
672 be amortized over the same term as the useful lives of the assets as mandated in the NSUARB Water  
Utility Accounting and Reporting Handbook (Handbook).

674 Debt Service Ratio - Halifax Water's current capital financing strategy is designed to maintain a debt  
676 service ratio of 35% or less, and to use a mixture of infrastructure funding, development related charges  
(reserves), depreciation, and debt. As capital spend increases, an increase to the debt service ratio may  
678 be a means of reducing the impact on rates.

680 The two test years include projected issuance of new debt totaling \$70.9M, based on an interest rate of  
2.5% in 2022/23, and 2023/24. Halifax Water's weighted average cost of debt is 2.863% at December  
682 2021. The interest rates utilized are less than the MFC recommended upper limit of 5.5%.



### Depreciation

As Halifax Water's assets and future capital budgets increase, so does depreciation expense. Depreciation is an integral funding source to support rehabilitation of the existing infrastructure and new infrastructure and upgrades to meet future capital requirements necessitated by both service demands and changing environmental regulations.

The current rates for water, wastewater and stormwater services include \$26.5 million in depreciation allocated as follows: water \$9.3 million, wastewater \$15.9 million and stormwater \$1.3 million. Over the two test years, the depreciation expense for water, wastewater and stormwater is budgeted to increase to \$33.8 million in 2022/23 and \$36.8 million in 2023/24. Projected depreciation reflects the anticipated completed utility plant in service during the test period and is consistent with depreciation methods and rates prescribed by the Handbook or as otherwise approved by the Board.

Depreciation on contributed assets – Currently, Halifax Water includes depreciation on 25% of stormwater contributed assets. There is no depreciation on contributed assets for water and wastewater services built into the current rates. Halifax Water has determined that to include 100% of depreciation on contributed assets in its rates would increase the annual depreciation costs by approximately \$3.9 million for water, by \$10.5 million for wastewater and by \$1.7 million for stormwater (see Figure 21).

**Figure 21 – Increase in Annual Depreciation Costs to Include Full Depreciation on Contributed Assets 2022/23**

2022/23	Depreciation on Contributed Assets			
	Water	Wastewater	Stormwater	Total
	-	-	558,000	558,000
100%	3,924,000	10,531,000	2,233,000	16,688,000
Increase	3,924,000	10,531,000	1,675,000	16,130,000

Based on the information in Figure 21, a strategy is required to smooth the introduction of depreciation of contributed assets. Including additional depreciation on contributed assets in the test years would further increase deficits. Therefore, Halifax Water is proposing to increase the depreciation on contributed assets starting in 2024/25.

**Figure 22 – Increase in Annual Depreciation Costs – Increase in Contributed Assets 2024/25**

2024/25 Increase	Depreciation on Contributed Assets			
	Water	Wastewater	Stormwater	Total
1% increase	44,000	121,000	22,000	187,000
2% increase	88,000	242,000	44,000	374,000
5% increase	220,000	605,000	110,000	935,000
10% increase	440,000	1,210,000	220,000	1,870,000
25% increase	1,100,000	3,025,000	550,000	4,675,000

As depicted in Figure 22, increasing the percentage of depreciation on contributed assets by 1% increases costs by approximately \$187,000 a year (water \$44,000, wastewater \$121,000 and stormwater \$22,000).

Halifax Water recommends that the percentage of depreciation on contributed assets be increased by 1% per year from 2024/25 to 2028/29 (see Figure 23) and will request this in the next rate application.

**Figure 23 – Impact on Depreciation Costs of Increasing  
Depreciation on Contributed Assets 1% per year from 2024/25 to 2028/29**

	2024-25	2025-26	2026-27	2027-28	2028-29
<b>% of Depreciation on Contributed Assets</b>	<b>1%</b>	<b>2%</b>	<b>3%</b>	<b>4%</b>	<b>5%</b>
Water	(44,000)	(99,000)	(158,000)	(215,000)	(274,000)
Wastewater	(121,000)	(266,000)	(420,000)	(554,000)	(697,000)
<b>% of Depreciation on Contributed Assets</b>	<b>26%</b>	<b>27%</b>	<b>28%</b>	<b>29%</b>	<b>30%</b>
Stormwater	(22,000)	(45,000)	(65,000)	(85,000)	(106,000)
<b>Total</b>	<b>(187,000)</b>	<b>(410,000)</b>	<b>(643,000)</b>	<b>(854,000)</b>	<b>(1,077,000)</b>

Halifax Water recommends that the percentage of depreciation on contributed assets be increased by 2% per year from 2029/30 to 2033/34 (see Figure 24).

**Figure 24 – Impact on Depreciation Costs of Increasing  
Depreciation on Contributed Assets 2% per year from 2029/30 to 2033/34**

	2029-30	2030-31	2031-32	2032-33	2033-34
<b>% of Depreciation on Contributed Assets</b>	<b>7%</b>	<b>9%</b>	<b>11%</b>	<b>13%</b>	<b>15%</b>
Water	(394,000)	(528,000)	(657,000)	(793,000)	(918,000)
Wastewater	(1,024,000)	(1,272,000)	(1,398,000)	(1,692,000)	(1,983,000)
<b>% of Depreciation on Contributed Assets</b>	<b>32%</b>	<b>34%</b>	<b>36%</b>	<b>38%</b>	<b>40%</b>
Stormwater	(144,000)	(183,000)	(218,000)	(257,000)	(295,000)
<b>Total</b>	<b>(1,562,000)</b>	<b>(1,983,000)</b>	<b>(2,273,000)</b>	<b>(2,742,000)</b>	<b>(3,196,000)</b>

At the end of this period, water and wastewater costs would include 15% of depreciation on contributed assets and stormwater costs would include 40% of depreciation on contributed assets.

#### *Dividend/Grant in Lieu of Taxes*

Halifax Water does not pay municipal property taxes and instead pays a dividend/grant in lieu of taxes to HALIFAX. The dividend/grant in lieu of taxes is based on 1.56% of water utility plant in service and 0.25% of wastewater and stormwater utility plant in service. The current agreement with HALIFAX expires March 31, 2023, and includes a provision that caps the future growth in the water, wastewater and stormwater dividend at 1% per year. This ensures that as the utility increases the level of capital funding to meet the IRP level of recommended spend, growth in the dividend/grant in lieu of taxes is constrained to a reasonable level that provides recognition of increases in costs of municipal services provided to Halifax Water.

HALIFAX has indicated their intent to analyze the costs of providing municipal services to Halifax Water and this information will be considered when developing the renewal of the grant in lieu of taxes. Any changes to the dividend/grant in lieu of taxes would require approval in future by HALIFAX Council, the Halifax Water Board, and the NSUARB. Halifax Water has budgeted for 2023/24 based on the existing approved methodology. Figure 19 above shows that the dividend/grant in lieu of taxes for all services is projected to grow from \$5.1 million in 2019/20 to \$6.9 million in 2023/24.

756            Pension

758        There are accrued expenses for future employee benefits (pension) as calculated under CPA Canada  
760        Handbook, Part II Section 3461 which are excluded from the revenue requirements in this application.

762        The NSUARB Handbook was developed based on the old Canadian Generally Accepted Accounting  
764        Principles (GAAP). In 2004, Section 3461 Employee Future Benefits came into effect.

766        Halifax Water's Employee's Pension Plan was redesigned in 2016. As a result, the Plan's related expenses  
768        included within the revenue requirements have decreased. The redesign of the Plan has resulted in  
770        pension contribution rates for 2021/22 of 10.34% for employees and 10.34% for Halifax Water. At the  
772        end of 2020, the audited financial statements showed a surplus of \$13.2 million and a funded ratio of  
774        109.3%. Since 2019/20, Halifax Water has not been required to make special payments to the pension  
776        plan, a savings of over \$0.8M per year.

778            **OPERATING SURPLUS (DEFICIT)**

780        On a consolidated basis, the projected revenue requirements are shown in Figure 25. Operating expenses  
(including depreciation) are projected to increase from \$109.3 million in 2019/20 to \$128.8 million in  
2022/23 and to \$134.5 million in 2023/24, or 23.0% over the five years. Over the same period, operating  
revenues are projected to increase from \$137.8 million in 2019/20 to \$152.8 million in 2022/23 and  
2023/24, or 10.9% over the five years. Non-operating revenues are expected to decrease by \$0.5 million  
over the period, primarily as a result of lower interest earned on cash balances and reductions in  
unregulated revenues. However, non-operating expenses are expected to increase by \$4.6 million or  
14.6% due to increased debt-servicing costs and grants in lieu of taxes.

**Figure 25 – Pro Forma Income Summary (All Services)**

<b>Pro Forma Income Summary</b>				
	<b>Actual 2020-21</b>	<b>Forecast 2021-22</b>	<b>Budget 2022-23</b>	<b>Projected Budget 2023-24</b>
Operating revenues	\$ 136,569	\$ 151,787	\$ 152,765	\$ 152,765
Operating expenses	113,691	121,608	128,788	134,532
Operating surplus	22,878	30,179	23,977	18,233
Financial and other revenues	963	783	733	733
Financial and other expenses				
Long term debt interest	7,118	6,822	6,668	6,316
Long term debt principal	20,379	21,559	21,846	22,264
Amortization of debt discount	209	229	229	229
Dividend/grant in lieu of taxes	5,951	6,626	6,803	6,871
Miscellaneous	69	160	51	87
	33,726	35,396	35,598	35,767
Net deficit	\$ (9,885)	\$ (4,434)	\$ (10,888)	\$ (16,801)

Percentage increase in revenue to cover deficit

7.1%

Incremental percentage increase in operating revenue

3.9%

Note:

Amounts reported above include regulated and unregulated activities. Revenue increases are for illustrative purposes only and do not represent actual revenue requirements of future rate applications for regulated activities.

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Without further rate increases, the 2022/23 and 2023/34 operating budgets are projected to yield operating deficits of \$(10.9) million and \$(16.8) million respectively.

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#### **WATER DEMAND ANALYSIS**

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Halifax Water has completed installation of approximately 83,000 Advanced Meter Infrastructure (AMI) meters. There are approximately 900 customers that have not converted to AMI meters and are being charged the meter read fee of \$50 per reading.

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An updated Water Demand Analysis was conducted using AMI data, by Raftelis Financial Consultants, Inc. (Raftelis), which is attached as Appendix 5. The Water Demand Analysis in 2019, recommended further analysis should be conducted. Halifax Water indicated in its 2020 rate application that it would be beneficial to undertake this analysis once all meter installations are completed and there is a full year of metering data available for all customers. However, since the 2020 rate application, Halifax Water has seen significant changes in consumption patterns by customer class, as shown in Figure 2, as a result of the COVID-19 pandemic.

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The 2022 Water Demand Analysis indicates at page 16, recommendation 3:

Halifax Water's customer classes exhibit enough differentiation in peaking characteristics, both daily and hourly, to support class-based volumetric water rates. It should be noted though, that given Halifax Water's AMI is relatively young, and data anomalies are still being resolved, it may be prudent for Halifax Water to delay the implementation of class-based rates until its next rate application. This would give Halifax Water and its consultants time to ensure all data, assumptions, and corresponding analyses are vetted as fully as possible prior to the implementation of a completely new rate structure. This coupled with the recommended delay due to COVID-19 abnormalities led Raftelis to believe that Halifax Water should not make a structural rate change at this time, but revisit this once reliable and accurate data are available.

Halifax Water agrees with this recommendation and submits this application based on the existing COS Manual and rate structure (single unit volumetric rate with base charges increasing based on meter size). Halifax Water will complete the additional analysis recommended by Raftelis, and update the COS Manual and file a Cost of Service/rate design application in 2024. Consideration will be given to the possibility of moving to a block rate structure at the next general rate application which would be filed in late 2024 or early 2025.

## **RATE REQUIREMENTS**

The operating budget reveals that rate increases will be required to avoid an operating deficit if Halifax Water is to maintain its current levels of service, complete projects already in progress and approved, and meet stricter environmental regulations.

In determining the proposed base and volumetric rates for this application, revenue stability, rate affordability, and gradualism were considered. When considering how quickly to phase-in the cost of service-based rates, there are three rate design components to consider: fire protection, base charges and volumetric charges.

### **Fire Protection**

In the 2015 rate hearing, the Board accepted a model recommended by Mr. Scott Rubin, the consultant for the Consumer Advocate. The fire protection rates proposed in this application are based on that model.

The cost of service studies produced a result that would see private fire protection revenue increase from \$0.6 million in 2021/22 to \$1.5 million, an increase of 135.2% and to \$1.6 million in 2023/24, an increase of \$0.1 million or 10.5% (see Figure 26).

The cost of service studies produced a result that would see public fire protection revenue increase from \$7.6 million in 2021/22 to \$7.9 million, an increase of \$0.3 million or 3.7% and to \$8.1 million in 2023/24, an increase of \$0.2 million or 1.9% (see Figure 26).

The cost of service studies produced a result that would see total fire protection revenue increase from \$8.2 million in 2021/22 by \$1.1 million or 13.6% and 2023/24 by \$0.3 million or 3.2%.

**Figure 26 – Public and Private Fire Protection**

Summary of Proposed Fire Protection			
	<u>2021/22</u>	<u>2022/23</u>	<u>2023/24</u>
Proposed Public Fire Protection	\$7,627,564	\$7,907,144	\$8,056,564
Proposed Private Fire Protection	\$625,484	\$1,470,915	\$1,624,917
<b>Totals per the Rate Studies</b>	<b>\$8,253,048</b>	<b>\$9,378,059</b>	<b>\$9,681,481</b>

Figure 27 and Figure 28 provide information regarding fire protection rates and revenue per rate model.

**Figure 27 – Private Fire Protection Rates per Rate Model**

Calculation of Maximum Rates Permitted based on the model of Mr. Scott Rubin									
	Diameter mm	Units	Current Rates	Rates based on Cost of Service	Actual % Increase	Maximum Increase Allowed (%)	Maximum Increase Allowed (\$)	Proposed Change per year	Total \$ Change
Reference size	25	0	\$50.00	\$50.00	0.0%	0.0%	\$0.00	\$50.00	\$0.00
Fire Lines	50	16	\$68.00	\$68.74	1.1%	33.6%	\$90.84	\$68.74	\$0.74
Fire Lines	75	0	\$170.00	\$154.66	(9.0%)	33.6%	\$227.11	\$170.00	\$0.00
Fire Lines	100	82	\$269.00	\$274.95	2.2%	33.6%	\$359.37	\$274.95	\$5.95
Fire Lines	150	1161	\$544.00	\$618.63	13.7%	33.6%	\$726.75	\$618.63	\$74.63
Fire Lines	200	775	\$697.00	\$1,099.78	57.8%	33.6%	\$931.15	\$931.15	\$234.15
Fire Lines	250	156	\$697.00	\$1,718.41	146.5%	33.6%	\$931.15	\$931.15	\$234.15
Fire Lines	300	16	\$697.00	\$2,474.51	255.0%	33.6%	\$931.15	\$931.15	\$234.15

**Figure 28 – Public and Private Fire Protection Revenue per Rate Model**

Summary of Proposed Rates and Revenue for Fire Protection									
	Diameter mm	Units	Current Rates	2022/23 Private Fire Rates	2023/24 Private Fire Rates	2022/23 Rates (rounded)	2023/24 Rates (rounded)	2022/23 Fire Protection Revenue	2023/24 Fire Protection Revenue
Reference size	25	0	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$0	\$0
Fire Lines	50	16	\$68.00	\$68.37	\$68.74	\$69.00	\$69.00	\$1,104	\$1,104
Fire Lines	75	0	\$170.00	\$170.00	\$170.00	\$170.00	\$170.00	\$0	\$0
Fire Lines	100	82	\$269.00	\$271.97	\$274.95	\$272.00	\$275.00	\$22,304	\$22,550
Fire Lines	150	1161	\$544.00	\$581.31	\$618.63	\$582.00	\$619.00	\$675,702	\$718,659
Fire Lines	200	775	\$697.00	\$814.07	\$931.15	\$815.00	\$932.00	\$631,625	\$722,300
Fire Lines	250	156	\$697.00	\$814.07	\$931.15	\$815.00	\$932.00	\$127,140	\$145,392
Fire Lines	300	16	\$697.00	\$814.07	\$931.15	\$815.00	\$932.00	\$13,040	\$14,912
Revenue recoverable from Private Fire Protection								\$1,470,915	\$1,624,917
Total Fire Protection Revenue per the Rate Application								\$9,378,059	\$9,681,481
<b>Balance due from Public Fire Protection</b>								<b>\$7,907,144</b>	<b>\$8,056,564</b>

866                    *Base Charges and Volumetric Charges*

868        Halifax Water prepared three scenarios for the calculation of the water and wastewater rates proposed  
in this application:

- 870            • Scenario 1 – Rate studies: this scenario is based on the rates calculated using the COS Manual,  
without any adjustments.
- 872            • Scenario 2 – Volumetric adjustment only, WITHOUT residential smoothing: this scenario  
maintains the current base charge and adjusts only the volumetric charge.
- 874            • Scenario 3 – Volumetric adjustment only, WITH utilization of accumulated water surpluses: this  
scenario uses the rates calculated in scenario 2 and utilization of a portion of the accumulated  
876        water surpluses to smooth the required increase in rates over the two test years.

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## Scenario 1 – Rate Studies

This scenario uses the rates as calculated by the Rate Studies. In this scenario, there would be adjustments to base charges and volumetric charges.

The water rate increases range from an increase of 0.7% to an increase of 22.4% for 2022/23 and 2.5% to 6.0% for 2023/24.

The wastewater rate changes range from a decrease of 7.6% to an increase of 9.2% for 2022/23 and a decrease of 1.1% to an increase of 2.6% for 2023/24.

The combined water and wastewater rate changes range from a decrease of 4.6% to an increase of 8.2% for 2022/23 and increases of 0.3% to 3.9% for 2023/24.

**Figure 29 – Scenario 1 Bill Comparison**

Scenario #1: Cost of service per rate studies, with base rates rounded to nearest dollar												
Halifax Regional Water Commission Consolidated Rate Studies - Water and Wastewater Services Bill Comparisons 2022/23												
Meter Size	Monthly Base Charge			Monthly Commodity Charge			Monthly Combined Bill			Quarterly Combined Bill		
	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change
5/8" - 15mm	\$27.00	\$27.00	0.0%	\$40.86	\$45.54	11.5%	\$67.86	\$72.54	6.9%	\$203.58	\$217.62	6.9%
3/4" - 20mm	\$38.00	\$34.00	(10.5%)	\$131.13	\$146.30	11.6%	\$169.13	\$180.30	6.6%	\$507.40	\$540.90	6.6%
1" - 25mm	\$62.00	\$47.00	(24.2%)	\$253.85	\$283.27	11.6%	\$315.85	\$330.27	4.6%	\$947.55	\$990.82	4.6%
1.5" - 40mm	\$119.00	\$82.00	(31.1%)	\$531.76	\$594.06	11.7%	\$650.76	\$676.06	3.9%	\$1,952.29	\$2,028.17	3.9%
2" - 50mm	\$188.00	\$125.00	(33.5%)	\$1,318.21	\$1,474.57	11.9%	\$1,506.21	\$1,599.57	6.2%	\$4,518.63	\$4,798.72	6.2%
3" - 80mm	\$376.00	\$236.00	(37.2%)	\$2,988.48	\$3,344.80	11.9%	\$3,364.48	\$3,580.80	6.4%	\$10,093.44	\$10,742.41	6.4%
4" - 100mm	\$585.00	\$362.00	(38.1%)	\$5,091.53	\$5,691.29	11.8%	\$5,676.53	\$6,053.29	6.6%	\$17,029.60	\$18,159.88	6.6%
6" - 150mm	\$1,168.00	\$711.00	(39.1%)	\$15,291.67	\$17,090.16	11.8%	\$16,459.67	\$17,801.16	8.2%	\$49,379.02	\$53,403.49	8.2%
8" - 200mm	\$2,100.00	\$1,269.00	(39.6%)	\$17,967.51	\$19,953.47	11.1%	\$20,067.51	\$21,222.47	5.8%	\$60,202.53	\$63,667.40	5.8%
10" - 250mm	\$3,498.00	\$2,107.00	(39.8%)	\$7,685.29	\$8,561.23	11.4%	\$11,183.29	\$10,668.23	(4.6%)	\$33,549.88	\$32,004.68	(4.6%)
Halifax Regional Water Commission Consolidated Rate Studies - Water and Wastewater Services Bill Comparisons 2023/24												
Meter Size	Monthly Base Charge			Monthly Commodity Charge			Monthly Combined Bill			Quarterly Combined Bill		
	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change
5/8" - 15mm	\$27.00	\$27.00	0.0%	\$45.54	\$47.00	3.2%	\$72.54	\$74.00	2.0%	\$217.62	\$222.01	2.0%
3/4" - 20mm	\$34.00	\$34.00	0.0%	\$146.30	\$149.90	2.5%	\$180.30	\$183.90	2.0%	\$540.90	\$551.69	2.0%
1" - 25mm	\$47.00	\$49.00	4.3%	\$283.27	\$291.37	2.9%	\$330.27	\$340.37	3.1%	\$990.82	\$1,021.12	3.1%
1.5" - 40mm	\$82.00	\$84.00	2.4%	\$594.06	\$602.51	1.4%	\$676.06	\$686.51	1.5%	\$2,028.17	\$2,059.54	1.5%
2" - 50mm	\$125.00	\$126.00	0.8%	\$1,474.57	\$1,503.13	1.9%	\$1,599.57	\$1,629.13	1.8%	\$4,798.72	\$4,887.40	1.8%
3" - 80mm	\$236.00	\$239.00	1.3%	\$3,344.80	\$3,403.72	1.8%	\$3,580.80	\$3,642.72	1.7%	\$10,742.41	\$10,928.17	1.7%
4" - 100mm	\$362.00	\$365.00	0.8%	\$5,691.29	\$5,706.20	0.3%	\$6,053.29	\$6,071.20	0.3%	\$18,159.88	\$18,213.59	0.3%
6" - 150mm	\$711.00	\$718.00	1.0%	\$17,090.16	\$17,776.86	4.0%	\$17,801.16	\$18,494.86	3.9%	\$53,403.49	\$55,484.58	3.9%
8" - 200mm	\$1,269.00	\$1,283.00	1.1%	\$19,953.47	\$20,734.79	3.9%	\$21,222.47	\$22,017.79	3.7%	\$63,667.40	\$66,053.37	3.7%
10" - 250mm	\$2,107.00	\$2,128.00	1.0%	\$8,561.23	\$8,900.74	4.0%	\$10,668.23	\$11,028.74	3.4%	\$32,004.68	\$33,086.21	3.4%

The impact on the average residential bill as calculated in the rate studies is an increase of 6.9% in 2022/23 and 2.0% in 2023/24, as per Figure 30.



902

**Figure 30 – Scenario 1 Impact on Average Residential Bill**

Scenario #1: Cost of service per rate studies, with base charges rounded up to the nearest dollar							
	Current Rates	Proposed Rates		Change 2022/23		Change 2023/24	
		2022/23	2023/24	\$	%	\$	%
<b>Water</b>							
Base charges	\$156.00	\$120.00	\$120.00	(\$36.00)	(23.1%)	\$0.00	0.0%
Consumption	\$157.23	\$203.26	\$214.32	\$46.03	29.3%	\$11.06	5.4%
	\$313.23	\$323.26	\$334.32	\$10.03	3.2%	\$11.06	3.4%
<b>Wastewater</b>							
Base charges	\$168.00	\$204.00	\$204.00	\$36.00	21.4%	\$0.00	0.0%
Consumption	\$333.08	\$343.22	\$349.71	\$10.15	3.0%	\$6.48	1.9%
	\$501.08	\$547.22	\$553.71	\$46.15	9.2%	\$6.48	1.2%
<b>Annual total</b>	\$814.31	\$870.48	\$888.02	\$56.17	6.9%	\$17.54	2.0%

904

906 Consumption is based on 161 m<sup>3</sup> in 2022/23 and 160 m<sup>3</sup> in 2023/24.

908

## Scenario 2 – Volumetric adjustment only WITHOUT residential smoothing

This scenario maintains the base rate at the current level and applies all required rate adjustments to the volumetric rate.

The water rate increases range from 6.8% to 12.4% for 2022/23 and 4.4% to 7.6% for 2023/24.

The wastewater rate increases range from 3.7% to 5.2% for 2022/23 and a decrease of 0.5% to an increase of 3.1% for 2023/24.

The combined water and wastewater rate increases range from 4.9% to 7.7% for 2022/23 and 1.1% to 4.7% for 2023/24.

**Figure 31 – Scenario 2 Bill Comparison**

Scenario #2 - No change in current base charges/change in consumption rate only												
Halifax Regional Water Commission Consolidated Rate Studies - Water and Wastewater Services Bill Comparisons 2022/23												
Meter Size	Monthly Base Charge			Monthly Commodity Charge			Monthly Combined Bill			Quarterly Combined Bill		
	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change
5/8" - 15mm	\$27.00	\$27.00	0.0%	\$40.86	\$44.19	8.2%	\$67.86	\$71.19	4.9%	\$203.58	\$213.58	4.9%
3/4" - 20mm	\$38.00	\$38.00	0.0%	\$131.13	\$141.88	8.2%	\$169.13	\$179.88	6.4%	\$507.40	\$539.63	6.4%
1" - 25mm	\$62.00	\$62.00	0.0%	\$253.85	\$274.67	8.2%	\$315.85	\$336.67	6.6%	\$947.55	\$1,010.00	6.6%
1.5" - 40mm	\$119.00	\$119.00	0.0%	\$531.76	\$575.57	8.2%	\$650.76	\$694.57	6.7%	\$1,952.29	\$2,083.71	6.7%
2" - 50mm	\$188.00	\$188.00	0.0%	\$1,318.21	\$1,427.40	8.3%	\$1,506.21	\$1,615.40	7.2%	\$4,518.63	\$4,846.20	7.2%
3" - 80mm	\$376.00	\$376.00	0.0%	\$2,988.48	\$3,236.59	8.3%	\$3,364.48	\$3,612.59	7.4%	\$10,093.44	\$10,837.76	7.4%
4" - 100mm	\$585.00	\$585.00	0.0%	\$5,091.53	\$5,511.99	8.3%	\$5,676.53	\$6,096.99	7.4%	\$17,029.60	\$18,290.96	7.4%
6" - 150mm	\$1,168.00	\$1,168.00	0.0%	\$15,291.67	\$16,553.58	8.3%	\$16,459.67	\$17,721.58	7.7%	\$49,379.02	\$53,164.75	7.7%
8" - 200mm	\$2,100.00	\$2,100.00	0.0%	\$17,967.51	\$19,411.10	8.0%	\$20,067.51	\$21,511.10	7.2%	\$60,202.53	\$64,533.30	7.2%
10" - 250mm	\$3,498.00	\$3,498.00	0.0%	\$7,685.29	\$8,310.91	8.1%	\$11,183.29	\$11,808.91	5.6%	\$33,549.88	\$35,426.72	5.6%
Halifax Regional Water Commission Consolidated Rate Studies - Water and Wastewater Services Bill Comparisons 2023/24												
Meter Size	Monthly Base Charge			Monthly Commodity Charge			Monthly Combined Bill			Quarterly Combined Bill		
	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change
5/8" - 15mm	\$27.00	\$27.00	0.0%	\$44.19	\$46.04	4.2%	\$71.19	\$73.04	2.6%	\$213.58	\$219.11	2.6%
3/4" - 20mm	\$38.00	\$38.00	0.0%	\$141.88	\$146.72	3.4%	\$179.88	\$184.72	2.7%	\$539.63	\$554.16	2.7%
1" - 25mm	\$62.00	\$62.00	0.0%	\$274.67	\$285.19	3.8%	\$336.67	\$347.19	3.1%	\$1,010.00	\$1,041.58	3.1%
1.5" - 40mm	\$119.00	\$119.00	0.0%	\$575.57	\$589.26	2.4%	\$694.57	\$708.26	2.0%	\$2,083.71	\$2,124.78	2.0%
2" - 50mm	\$188.00	\$188.00	0.0%	\$1,427.40	\$1,469.13	2.9%	\$1,615.40	\$1,657.13	2.6%	\$4,846.20	\$4,971.38	2.6%
3" - 80mm	\$376.00	\$376.00	0.0%	\$3,236.59	\$3,324.91	2.7%	\$3,612.59	\$3,700.91	2.4%	\$10,837.76	\$11,102.73	2.4%
4" - 100mm	\$585.00	\$585.00	0.0%	\$5,511.99	\$5,578.40	1.2%	\$6,096.99	\$6,163.40	1.1%	\$18,290.96	\$18,490.20	1.1%
6" - 150mm	\$1,168.00	\$1,168.00	0.0%	\$16,553.58	\$17,381.92	5.0%	\$17,721.58	\$18,549.92	4.7%	\$53,164.75	\$55,649.76	4.7%
8" - 200mm	\$2,100.00	\$2,100.00	0.0%	\$19,411.10	\$20,355.13	4.9%	\$21,511.10	\$22,455.13	4.4%	\$64,533.30	\$67,365.38	4.4%
10" - 250mm	\$3,498.00	\$3,498.00	0.0%	\$8,310.91	\$8,720.78	4.9%	\$11,808.91	\$12,218.78	3.5%	\$35,426.72	\$36,656.35	3.5%

The Alliance for Water Efficiency recommends that no more than 40% of a utility's revenues should come from base charges. Maintaining the existing base charges and adjusting volumetric rates provides more opportunity and incentive for customers to manage their consumption and bills, and provides customers with a means of offsetting the proposed rate increases through reducing their water use.

The impact on the average residential bill as calculated in the rate studies is an increase of 4.9% in 2022/23 and 2.6% in 2023/24, as per Figure 32.

934

**Figure 32 – Scenario 2 Impact on Average Residential Bill**

Scenario #2 - No change in current base charges/change in consumption rate only							
	Current Rates	Proposed Rates		Change 2022/23		Change 2023/24	
		2022/23	2023/24				
				\$	%	\$	%
Water							
Base charges	\$156.00	\$156.00	\$156.00	\$0.00	0.0%	\$0.00	0.0%
Consumption	\$157.23	\$178.67	\$192.15	\$21.44	13.6%	\$13.48	7.5%
	\$313.23	\$334.67	\$348.15	\$21.44	6.8%	\$13.48	4.0%
Wastewater							
Base charges	\$168.00	\$168.00	\$168.00	\$0.00	0.0%	\$0.00	0.0%
Consumption	\$333.08	\$351.64	\$360.27	\$18.56	5.6%	\$8.64	2.5%
	\$501.08	\$519.64	\$528.27	\$18.56	3.7%	\$8.64	1.7%
Annual total	\$814.31	\$854.31	\$876.43	\$40.00	4.9%	\$22.12	2.6%

936

938 Consumption is based on 161 m<sup>3</sup> in 2022/23 160 m<sup>3</sup> and in 2023/24.

940

### Scenario 3 - Volumetric adjustment only WITH utilization of accumulated water surpluses

This scenario uses the rates calculated in scenario 2 and utilizes a portion of the accumulated water surpluses to reduce the required increase in rates over the two test years. The scenario would utilize accumulated water surplus of \$3.0M in 2022/23 and a further \$2.4M in 2023/24. There would be sufficient accumulated water surplus remaining to help mitigate risk of unexpected events or operating deficits that are greater than currently projected.

The water rate increases range from 2.1% to 3.8% for 2022/23 and 5.2% to 9.9% for 2023/24.

The wastewater rate increases range from 3.7% to 5.2% for 2022/23 and a decrease of 0.5% to an increase of 3.1% for 2023/24.

The combined water and wastewater rate increases range from 3.1% to 4.8% for 2022/23 and 1.7% to 5.4% for 2023/24.

**Figure 33 – Scenario 3 Bill Comparison**

Scenario #3 - No change in current base charges/change in consumption rate WITH utilization of accumulated water surplus to reduce the rate increase												
Halifax Regional Water Commission Consolidated Rate Studies - Water and Wastewater Services Bill Comparisons 2022/23												
Meter Size	Monthly Base Charge			Monthly Commodity Charge			Monthly Combined Bill			Quarterly Combined Bill		
	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change	Current	2022/23 Proposed Rates	% Change
5/8" - 15mm	\$27.00	\$27.00	0.0%	\$40.86	\$42.96	5.1%	\$67.86	\$69.96	3.1%	\$203.58	\$209.87	3.1%
3/4" - 20mm	\$38.00	\$38.00	0.0%	\$131.13	\$137.86	5.1%	\$169.13	\$175.86	4.0%	\$507.40	\$527.57	4.0%
1" - 25mm	\$62.00	\$62.00	0.0%	\$253.85	\$266.86	5.1%	\$315.85	\$328.86	4.1%	\$947.55	\$986.59	4.1%
1.5" - 40mm	\$119.00	\$119.00	0.0%	\$531.76	\$558.99	5.1%	\$650.76	\$677.99	4.2%	\$1,952.29	\$2,033.97	4.2%
2" - 50mm	\$188.00	\$188.00	0.0%	\$1,318.21	\$1,385.60	5.1%	\$1,506.21	\$1,573.60	4.5%	\$4,518.63	\$4,720.80	4.5%
3" - 80mm	\$376.00	\$376.00	0.0%	\$2,988.48	\$3,141.16	5.1%	\$3,364.48	\$3,517.16	4.5%	\$10,093.44	\$10,551.49	4.5%
4" - 100mm	\$585.00	\$585.00	0.0%	\$5,091.53	\$5,352.05	5.1%	\$5,676.53	\$5,937.05	4.6%	\$17,029.60	\$17,811.14	4.6%
6" - 150mm	\$1,168.00	\$1,168.00	0.0%	\$15,291.67	\$16,074.23	5.1%	\$16,459.67	\$17,242.23	4.8%	\$49,379.02	\$51,726.69	4.8%
8" - 200mm	\$2,100.00	\$2,100.00	0.0%	\$17,967.51	\$18,893.64	5.2%	\$20,067.51	\$20,993.64	4.6%	\$60,202.53	\$62,980.91	4.6%
10" - 250mm	\$3,498.00	\$3,498.00	0.0%	\$7,685.29	\$8,080.05	5.1%	\$11,183.29	\$11,578.05	3.5%	\$33,549.88	\$34,734.14	3.5%
Halifax Regional Water Commission Consolidated Rate Studies - Water and Wastewater Services Bill Comparisons 2023/24												
Meter Size	Monthly Base Charge			Monthly Commodity Charge			Monthly Combined Bill			Quarterly Combined Bill		
	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change	2022/23 Proposed Rates	2023/24 Proposed Rates	% Change
5/8" - 15mm	\$27.00	\$27.00	0.0%	\$42.96	\$45.05	4.9%	\$69.96	\$72.05	3.0%	\$209.87	\$216.16	3.0%
3/4" - 20mm	\$38.00	\$38.00	0.0%	\$137.86	\$143.55	4.1%	\$175.86	\$181.55	3.2%	\$527.57	\$544.65	3.2%
1" - 25mm	\$62.00	\$62.00	0.0%	\$266.86	\$279.03	4.6%	\$328.86	\$341.03	3.7%	\$986.59	\$1,023.09	3.7%
1.5" - 40mm	\$119.00	\$119.00	0.0%	\$558.99	\$576.32	3.1%	\$677.99	\$695.32	2.6%	\$2,033.97	\$2,085.95	2.6%
2" - 50mm	\$188.00	\$188.00	0.0%	\$1,385.60	\$1,436.45	3.7%	\$1,573.60	\$1,624.45	3.2%	\$4,720.80	\$4,873.34	3.2%
3" - 80mm	\$376.00	\$376.00	0.0%	\$3,141.16	\$3,250.17	3.5%	\$3,517.16	\$3,626.17	3.1%	\$10,551.49	\$10,878.51	3.1%
4" - 100mm	\$585.00	\$585.00	0.0%	\$5,352.05	\$5,454.88	1.9%	\$5,937.05	\$6,039.88	1.7%	\$17,811.14	\$18,119.65	1.7%
6" - 150mm	\$1,168.00	\$1,168.00	0.0%	\$16,074.23	\$16,998.44	5.7%	\$17,242.23	\$18,166.44	5.4%	\$51,726.69	\$54,499.31	5.4%
8" - 200mm	\$2,100.00	\$2,100.00	0.0%	\$18,893.64	\$19,941.16	5.5%	\$20,993.64	\$22,041.16	5.0%	\$62,980.91	\$66,123.47	5.0%
10" - 250mm	\$3,498.00	\$3,498.00	0.0%	\$8,080.05	\$8,536.10	5.6%	\$11,578.05	\$12,034.10	3.9%	\$34,734.14	\$36,102.29	3.9%

The impact on the average residential bill as calculated in the rate studies is an increase of 3.1% in 2022/23 and 3.0% in 2023/24, as per Figure 34.

**Figure 34 – Scenario 3 Impact on Average Residential Bill**

Scenario #3 - No change in current base charges/change in consumption rate WITH utilization of accumulated water surplus to reduce the rate increase							
	Proposed Rates		Change 2022/23		Change 2023/24		
	Current Rates	2022/23	2023/24	\$	%	\$	%
<b>Water</b>							
Base charges	\$156.00	\$156.00	\$156.00	\$0.00	0.0%	\$0.00	0.0%
Consumption	\$157.23	\$163.84	\$180.37	\$6.61	4.2%	\$16.53	10.1%
	\$313.23	\$319.84	\$336.37	\$6.61	2.1%	\$16.53	5.2%
<b>Wastewater</b>							
Base charges	\$168.00	\$168.00	\$168.00	\$0.00	0.0%	\$0.00	0.0%
Consumption	\$333.08	\$351.64	\$360.27	\$18.56	5.6%	\$8.64	2.5%
	\$501.08	\$519.64	\$528.27	\$18.56	3.7%	\$8.64	1.7%
<b>Annual total</b>	\$814.31	\$839.48	\$864.65	\$25.17	3.1%	\$25.17	3.0%

Consumption is based on 161 m<sup>3</sup> in 2022/23 and 160 m<sup>3</sup> in 2023/24.

In summary, the rates calculated under the three scenarios are presented in Figure 35.

**Figure 35 – Quarterly Bill Comparison for Scenarios 1, 2 and 3**

Halifax Regional Water Commission Consolidated Rate Studies - Water and Wastewater Services Quarterly Bill Comparisons 2022/23								
Meter Size	Current	Rate Studies	% Change	Volumetric without Adjustments	% Change	Volumetric with Adjustments	% Change	
	5/8" - 15mm	\$203.58	\$217.62	6.9%	\$213.58	4.9%	\$209.87	3.1%
	3/4" - 20mm	\$507.40	\$540.90	6.6%	\$539.63	6.4%	\$527.57	4.0%
	1" - 25mm	\$947.55	\$990.82	4.6%	\$1,010.00	6.6%	\$986.59	4.1%
	1.5" - 40mm	\$1,952.29	\$2,028.17	3.9%	\$2,083.71	6.7%	\$2,033.97	4.2%
	2" - 50mm	\$4,518.63	\$4,798.72	6.2%	\$4,846.20	7.2%	\$4,720.80	4.5%
	3" - 80mm	\$10,093.44	\$10,742.41	6.4%	\$10,837.76	7.4%	\$10,551.49	4.5%
	4" - 100mm	\$17,029.60	\$18,159.88	6.6%	\$18,290.96	7.4%	\$17,811.14	4.6%
	6" - 150mm	\$49,379.02	\$53,403.49	8.2%	\$53,164.75	7.7%	\$51,726.69	4.8%
	8" - 200mm	\$60,202.53	\$63,667.40	5.8%	\$64,533.30	7.2%	\$62,980.91	4.6%
	10" - 250mm	\$33,549.88	\$32,004.68	(4.6%)	\$35,426.72	5.6%	\$34,734.14	3.5%
Halifax Regional Water Commission Consolidated Rate Studies - Water and Wastewater Services Quarterly Bill Comparisons 2023/24								
Meter Size	Rate Studies	% Change from Prior Year	Volumetric without Adjustments	% Change from Prior Year	Volumetric with Adjustments	% Change from Prior Year		
	5/8" - 15mm	\$222.01	2.0%	\$219.11	2.6%	\$216.16	3.0%	
	3/4" - 20mm	\$551.69	2.0%	\$554.16	2.7%	\$544.65	3.2%	
	1" - 25mm	\$1,021.12	3.1%	\$1,041.58	3.1%	\$1,023.09	3.7%	
	1.5" - 40mm	\$2,059.54	1.5%	\$2,124.78	2.0%	\$2,085.95	2.6%	
	2" - 50mm	\$4,887.40	1.8%	\$4,971.38	2.6%	\$4,873.34	3.2%	
	3" - 80mm	\$10,928.17	1.7%	\$11,102.73	2.4%	\$10,878.51	3.1%	
	4" - 100mm	\$18,213.59	0.3%	\$18,490.20	1.1%	\$18,119.65	1.7%	
	6" - 150mm	\$55,484.58	3.9%	\$55,649.76	4.7%	\$54,499.31	5.4%	
	8" - 200mm	\$66,053.37	3.7%	\$67,365.38	4.4%	\$66,123.47	5.0%	
	10" - 250mm	\$33,086.21	3.4%	\$36,656.35	3.5%	\$36,102.29	3.9%	

Halifax Water proposes to smooth the impact of the total increase to customers across the two test years.

Figure 36 shows the increased cost to a residential customer under scenario 3 with an average annual household consumption of 161 m<sup>3</sup> calculated based on current data.

**Figure 36 – Proposed Rates for Water and Wastewater Service for Residential Customers**

Percentage split between annual base and consumption charges						
	Current		2022/23		2023/24	
Base charges	\$324.00	39.8%	\$324.00	38.6%	\$324.00	37.5%
Consumption	\$490.31	60.2%	\$515.48	61.4%	\$540.65	62.5%
	<u>\$814.31</u>		<u>\$839.48</u>		<u>\$864.65</u>	

**Summary of residential rates and monthly base charges**

	Current	2022/23	2023/24
<b>Base</b>			
Water	\$13.00	\$13.00	\$13.00
Wastewater	\$14.00	\$14.00	\$14.00
<b>Consumption rates</b>			
Water	\$0.976	\$1.017	\$1.128
Wastewater	\$2.073	\$2.189	\$2.259

Figures 37 and 38 illustrate the revenue requirements for water and wastewater services respectively, the sources of revenue and comparison between Cost of Service and the recommended alternative.

**Figure 37 – Comparison of Recommended Alternative for Water Rates to the Cost of Service Revenue Requirements**

WATER											
		2022/23					2023/24				
		Scenario 1	Scenario 2	Scenario 3			Scenario 1	Scenario 2	Scenario 3		
		Cost of Service Revenue	Current Base Rate	Recommended Alternative	Scenario 1 to Scenario 3 Difference		Cost of Service Revenue	Current Base Rate	Recommended Alternative	Scenario 1 to Scenario 3 Difference	
		\$	\$	\$	\$	%	\$	\$	\$	\$	%
Calculated Revenues											
5/8" - 15mm		\$26,122,434	\$27,493,286	\$26,274,755	\$152,321	0.6%	\$27,663,430	\$28,804,321	\$27,829,497	\$166,067	0.6%
3/4" - 20mm		\$853,442	\$838,765	\$788,005	(\$65,437)	(7.8%)	\$905,323	\$892,815	\$852,208	(\$53,115)	(5.9%)
1" - 25mm		\$2,407,880	\$2,363,425	\$2,213,486	(\$194,394)	(8.2%)	\$2,552,171	\$2,520,477	\$2,400,526	(\$151,646)	(6.0%)
1.5" - 40mm		\$3,783,796	\$3,702,918	\$3,461,891	(\$321,905)	(8.7%)	\$4,015,057	\$3,963,992	\$3,771,170	(\$243,888)	(6.2%)
2" - 50mm		\$6,427,026	\$6,066,199	\$5,635,335	(\$791,691)	(13.1%)	\$6,819,664	\$6,517,902	\$6,173,212	(\$646,452)	(9.9%)
3" - 80mm		\$5,523,001	\$5,185,311	\$4,810,303	(\$712,698)	(13.7%)	\$5,859,505	\$5,574,983	\$5,274,976	(\$584,530)	(10.5%)
4" - 100mm		\$2,347,060	\$2,194,970	\$2,034,709	(\$312,352)	(14.2%)	\$2,492,368	\$2,364,898	\$2,236,690	(\$255,679)	(10.8%)
6" - 150mm		\$3,048,635	\$2,797,690	\$2,584,858	(\$463,777)	(16.6%)	\$3,232,423	\$3,010,740	\$2,840,474	(\$391,948)	(13.0%)
8" - 200mm		\$2,287,124	\$2,153,743	\$1,998,505	(\$288,619)	(13.4%)	\$2,422,665	\$2,309,140	\$2,184,950	(\$237,716)	(10.3%)
10" - 250mm		\$97,184	\$104,540	\$98,999	\$1,816	1.7%	\$102,390	\$110,086	\$105,654	\$3,264	3.0%
		\$52,897,583	\$52,900,847	\$49,900,847	(\$2,996,736)	(5.7%)	\$56,064,998	\$56,069,356	\$53,669,356	(\$2,395,642)	(4.3%)
Fire Protection		\$9,378,059	9,378,059	\$9,378,059	\$0	0.0%	\$9,681,481	9,681,481	\$9,681,481	\$0	0.0%
Total		\$62,275,642	\$62,278,906	\$59,278,906	(\$2,996,736)	(4.8%)	\$65,746,479	\$65,750,837	\$63,350,837	(\$2,395,642)	(3.6%)
Revenue Requirement per Rate Application		\$62,278,906	\$62,278,906	\$62,278,906			\$65,750,837	\$65,750,837	\$65,750,837		
Rounding difference		(\$3,264)		(\$3,000,000)			(\$4,358)		(\$2,400,000)		
Adjustment To Accumulated Surplus		(\$3,264)	\$0	(\$3,000,000)			(\$4,358)	\$0	(\$2,400,000)		

**Figure 38 – Comparison of Recommended Wastewater Rates to the Cost of Service Revenue Requirements**

WASTEWATER										
	2022/23					2023/24				
	Scenario 1	Scenario 2	Scenario 3			Scenario 1	Scenario 2	Scenario 3		
	Cost of Service Revenue	Current Base Rate	Recommended Alternative	Scenario 1 to Scenario 3 Difference		Cost of Service Revenue	Current Base Rate	Recommended Alternative	Scenario 1 to Scenario 3 Difference	
	\$	\$	\$	\$	%	\$	\$	\$	\$	%
<b>Calculated Revenues</b>										
5/8" - 15mm	\$42,585,205	\$40,461,139	\$40,461,139	(\$2,124,066)	(5.2%)	\$43,815,674	\$41,445,386	\$41,445,386	(\$2,370,288)	(5.7%)
3/4" - 20mm	\$1,395,280	\$1,410,464	\$1,410,464	\$15,184	1.1%	\$1,434,831	\$1,451,851	\$1,451,851	\$17,020	1.2%
1" - 25mm	\$3,886,627	\$4,042,270	\$4,042,270	\$155,643	3.9%	\$3,989,082	\$4,159,084	\$4,159,084	\$170,002	4.1%
1.5" - 40mm	\$6,124,211	\$6,472,917	\$6,472,917	\$348,706	5.4%	\$6,293,153	\$6,676,215	\$6,676,215	\$383,062	5.7%
2" - 50mm	\$9,935,663	\$10,460,954	\$10,460,954	\$525,291	5.0%	\$10,198,609	\$10,784,929	\$10,784,929	\$586,320	5.4%
3" - 80mm	\$8,409,892	\$8,865,101	\$8,865,101	\$455,209	5.1%	\$8,633,496	\$9,144,345	\$9,144,345	\$510,849	5.6%
4" - 100mm	\$3,685,948	\$3,880,519	\$3,880,519	\$194,571	5.0%	\$3,786,970	\$4,007,944	\$4,007,944	\$220,974	5.5%
6" - 150mm	\$4,461,285	\$4,659,555	\$4,659,555	\$198,270	4.3%	\$4,575,697	\$4,801,741	\$4,801,741	\$226,044	4.7%
8" - 200mm	\$3,916,463	\$4,127,603	\$4,127,603	\$211,139	5.1%	\$4,015,171	\$4,250,302	\$4,250,302	\$235,131	5.5%
10" - 250mm	\$158,849	\$178,874	\$178,874	\$20,025	11.2%	\$162,308	\$183,164	\$183,164	\$20,857	11.4%
<b>Total</b>	<b>\$84,559,422</b>	<b>\$84,559,395</b>	<b>\$84,559,395</b>	<b>(\$28)</b>	<b>(0.0%)</b>	<b>\$86,904,991</b>	<b>\$86,904,961</b>	<b>\$86,904,961</b>	<b>(\$30)</b>	<b>(0.0%)</b>
<b>Revenue Requirement per Rate</b>	<b>\$84,559,396</b>	<b>\$84,559,396</b>	<b>\$84,559,396</b>			<b>\$86,904,962</b>	<b>\$86,904,962</b>	<b>\$86,904,962</b>		
Rounding difference	\$27		(\$1)			\$29		(\$1)		
Adjustment To Accumulated Surplus	\$27	(\$1)	(\$1)			\$29	(\$1)	(\$1)		

Figure 39 illustrates the combined revenue requirements for water and wastewater, the sources of revenue and comparison between Cost of Service and the recommended alternative.

**Figure 39 – Comparison of Recommended Combined Water and Wastewater Rates to the Cost of Service Revenue Requirements**

COMBINED WATER AND WASTEWATER										
	2022/23					2023/24				
	Scenario 1	Scenario 2	Scenario 3			Scenario 1	Scenario 2	Scenario 3		
	Cost of Service Revenue	Current Base Rate	Recommended Alternative	Scenario 1 to Scenario 3 Difference		Cost of Service Revenue	Current Base Rate	Recommended Alternative	Scenario 1 to Scenario 3 Difference	
	\$	\$	\$	\$	%	\$	\$	\$	\$	%
<b>Calculated Revenues</b>										
5/8" - 15mm	\$68,707,639	\$67,954,425	\$66,735,894	(\$1,971,745)	(2.9%)	\$71,479,104	\$70,249,708	\$69,274,883	(\$2,204,221)	(3.1%)
3/4" - 20mm	\$2,248,723	\$2,249,229	\$2,198,470	(\$50,253)	(2.2%)	\$2,340,154	\$2,344,667	\$2,304,060	(\$36,095)	(1.5%)
1" - 25mm	\$6,294,507	\$6,405,695	\$6,255,756	(\$38,751)	(0.6%)	\$6,541,253	\$6,679,560	\$6,559,610	\$18,356	0.3%
1.5" - 40mm	\$9,908,007	\$10,175,835	\$9,934,808	\$26,801	0.3%	\$10,308,211	\$10,640,207	\$10,447,385	\$139,175	1.3%
2" - 50mm	\$16,362,689	\$16,527,152	\$16,096,289	(\$266,400)	(1.6%)	\$17,018,273	\$17,302,831	\$16,958,140	(\$60,133)	(0.3%)
3" - 80mm	\$13,932,893	\$14,050,412	\$13,675,404	(\$257,489)	(1.8%)	\$14,493,002	\$14,719,328	\$14,419,321	(\$73,681)	(0.5%)
4" - 100mm	\$6,033,008	\$6,075,489	\$5,915,228	(\$117,781)	(1.9%)	\$6,279,338	\$6,372,842	\$6,244,633	(\$34,705)	(0.5%)
6" - 150mm	\$7,509,919	\$7,457,245	\$7,244,412	(\$265,507)	(3.6%)	\$7,808,120	\$7,812,481	\$7,642,215	(\$165,904)	(2.1%)
8" - 200mm	\$6,203,587	\$6,281,346	\$6,126,108	(\$77,480)	(1.2%)	\$6,437,836	\$6,559,442	\$6,435,251	(\$2,585)	(0.0%)
10" - 250mm	\$256,033	\$283,414	\$277,873	\$21,840	7.7%	\$264,698	\$293,251	\$288,818	\$24,120	8.2%
	\$137,457,006	\$137,460,242	\$134,460,242	(\$2,996,764)	(2.2%)	\$142,969,989	\$142,974,317	\$140,574,317	(\$2,395,672)	(1.7%)
<b>Fire Protection</b>	<b>\$9,378,059</b>	<b>\$9,378,059</b>	<b>\$9,378,059</b>	<b>\$0</b>	<b>0.0%</b>	<b>\$9,681,481</b>	<b>\$9,681,481</b>	<b>\$9,681,481</b>	<b>\$0</b>	<b>0.0%</b>
<b>Total</b>	<b>\$146,835,065</b>	<b>\$146,838,301</b>	<b>\$143,838,301</b>	<b>(\$2,996,764)</b>	<b>(2.0%)</b>	<b>\$152,651,470</b>	<b>\$152,655,798</b>	<b>\$150,255,798</b>	<b>(\$2,395,672)</b>	<b>(1.6%)</b>
<b>Revenue Requirement per</b>	<b>\$146,838,302</b>	<b>\$146,838,302</b>	<b>\$146,838,302</b>			<b>\$152,655,799</b>	<b>\$152,655,799</b>	<b>\$152,655,799</b>		
Rounding difference	(\$3,237)		(\$3,000,001)			(\$4,329)		(\$2,400,001)		
Adjustment To Accumulated Surplus	(\$3,237)	(\$1)	(\$3,000,001)			(\$4,329)	(\$1)	(\$2,400,001)		

## STORMWATER RATES

Stormwater services has been operating at a deficit since 2017/18. In the 2022/23 test year, the deficit for stormwater services is budgeted to be \$(4.4) million. The revenues generated by stormwater services would need to increase by 40.4% to offset the budgeted deficit in 2022/23. In 2023/24, the operating deficit is budgeted to be \$(5.1) million. Revenues in 2023/24 generated from stormwater services would need to increase by 46.4% from current levels to offset the budgeted deficit. As a result of the operating deficits, the accumulated deficit at the end of the 2023/24 test year is budgeted to be \$(9.6) million.



Operating stormwater services at the current rates is not sustainable and the necessary increases in revenues are significant.

Halifax Water has updated the stormwater rate studies using the methodology approved by the Board and utilized the most current impervious area data. This impervious area data includes more accurate information concerning property ownership than was available in 2016 and includes additional information on the ownership of streets throughout the municipality. Appendix 3, worksheet SW4 shows the results of the additional information, including the allocation of the right-of-way charge to HALIFAX, the provincial government and the Halifax Dartmouth Bridge Commission. This allocation of impervious area (see Figure 40) has been included in the calculation of the stormwater rates.

**Figure 40 – Impervious Area Allocation Based on Improved Ownership Data**

Billable impervious area breakdown as follows:

Halifax (HRM)	23,564,330	
Province of Nova Scotia	5,243,630	
Halifax Dartmouth Bridge Commission	73,230	28,881,190

One of the key drivers of stormwater charge allocation to residential and non-residential customers is the establishment of the Equivalent Residential Unit (ERU). The current charges utilize an ERU of 200 m<sup>2</sup>, initially introduced in M07147 and established in M07731. The ERU was set at 200 m<sup>2</sup> using a calculation that considered the number of parcels and qualifying impervious area at that time. Changes to the number of parcels and qualifying impervious area will affect the ERU.

In developing the rate studies (Appendix 3), the ERU was calculated as 279 m<sup>2</sup>, a significant increase from the ERU of 200 m<sup>2</sup> used in the calculation of current stormwater charges. This increase in ERU results in reallocation of revenue requirements from non-residential customers to residential customers.

**Figure 41 – Calculation of ERU as 279 m<sup>2</sup>**

Residential Customers:					
	Tier	Tier Parameters * (in units)		Number of Parcels	Qualifying Impervious Area (square meters)
		from	to		
<b>Average Residential Size</b> ( Impervious Area/ # of Parcels)  <div>279 square meters</div>	1	less than	5 units	3,276	25,410
	2	5 units	20 units	34,701	5,395,110
	3	21 units	40 units	41,848	11,559,475
	4	41 units	80 units	8,569	4,494,815
	5	81 units	or more	1,690	2,793,700
Total qualifying impervious area				90,084	24,268,510
Less: Tier 1 parcels				(3,276)	(25,410)
Total billable impervious area				86,808	24,243,100

\* Each unit equals 10 square meters

As a result, Halifax Water reviewed the calculation of ERU more closely and determined that it is significantly affected by the impervious area of properties in tiers 4 and 5. Halifax Water adjusted the calculation of ERU to more closely reflect the impervious area of tiers 2 and 3, which represent over 88% of residential stormwater customers. The ERU calculated based on tiers 2 and 3 is 221 m<sup>2</sup>.

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**Figure 42 – Calculation of ERU as 221 m<sup>2</sup>**

Residential Customers:					
	Tier	Tier Parameters * (in units)		Number of Parcels	Qualifying Impervious Area (square meters)
		from	to		
<u>Average Residential Size</u> ( Impervious Area/ # of Parcels)  221 square meters	1	less than	5 units	-	-
	2	5 units	20 units	34,701	5,395,110
	3	21 units	40 units	41,848	11,559,475
	4	41 units	80 units	-	-
	5	81 units	or more	-	-
Total qualifying impervious area				76,549	16,954,585
Less: Tier 1 parcels				-	-
Total billable impervious area				76,549	16,954,585

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\* Each unit equals 10 square meters

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To demonstrate the impact ERU has on stormwater charges, Halifax Water prepared three scenarios for the calculation of stormwater charges proposed in this application. Each scenario considers the right-of-way impervious area allocation identified in Figure 40. For ease of distinguishing these scenarios from those noted above related to water and wastewater rates, these are numbered scenario 4, 5 and 6:

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- Scenario 4 – ERU of 200 m<sup>2</sup>
- Scenario 5 – ERU of 279 m<sup>2</sup>
- Scenario 6 – ERU of 221 m<sup>2</sup>

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1072                      Scenario 4 – Stormwater charge structure using the current ERU of 200 m<sup>2</sup>

1074        Based on this scenario, in 2022/23, the annual charges for residential customers would increase in each  
1076        tier ranging from \$4.00 for tier 2 to \$27.00 for tier 5. In 2023/24, the annual charges for residential  
1078        customers would increase further in each tier ranging from \$2.00 for tier 2 to \$12.00 for tier 5. The total  
revenue to be received from residential customers would be approximately \$2.9 million in 2022/23 and  
\$3.3 million in 2023/24.

1080        In 2022/23, the charges per m<sup>2</sup> for non-residential customers would increase from \$0.135 to \$0.180, an  
increase of \$0.045 per m<sup>2</sup>. In 2023/24, charges for non-residential customers would increase to \$0.200  
1082        per m<sup>2</sup>. The total revenue to be received from non-residential customers would be approximately \$5.9  
million in 2022/23 and \$6.6 million in 2023/24.

1084        The right-of-way charge to HALIFAX would increase to \$4.9 million in 2022/23 and to \$5.3 million in  
1086        2023/24. The right-of-way charge for the provincial government would be \$1.1 million in 2022/23 and  
would increase to \$1.2 million in 2023/24. For the Halifax Dartmouth Bridge Commission, the right-of-  
1088        way charge would be \$15,200 in 2022/23 and \$16,500 in 2023/24.

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Scenario 5 – Stormwater charge structure using an ERU of 279 m<sup>2</sup> (see Figure 41)

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Utilizing an ERU of 279 m<sup>2</sup>, in 2022/23, the annual charges for residential customers would increase in each tier ranging from \$9.00 for tier 2 to \$54.00 for tier 5. In 2023/24, the annual charges for residential customers would further increase in each tier ranging from \$2.00 for tier 2 to \$15.00 for tier 5. The total revenue to be received from residential customers would be approximately \$3.7 million in 2022/23 and \$4.1 million in 2023/24.

In 2022/23, the charges per m<sup>2</sup> for non-residential customers would increase from \$0.135 to \$0.161, an increase of \$0.026 per m<sup>2</sup>. In 2023/24, the charges for non-residential customers would increase to \$0.179 per m<sup>2</sup>. The total revenue to be received from non-residential customers would be approximately \$5.3 million in 2022/23 and \$5.9 million in 2023/24.

The right-of-way charge will remain unchanged from scenario 4. The right-of-way charge to HALIFAX would increase to \$4.9 million in 2022/23 and to \$5.3 million in 2023/24. The right-of-way charge for the provincial government would be \$1.1 million in 2022/23 and would increase to \$1.2 million in 2023/24. For the Halifax Dartmouth Bridge Commission, the right-of-way charge would be \$15,200 in 2022/23 and \$16,500 in 2023/24.

Scenario 6 – Stormwater charge structure using an ERU of 221 m<sup>2</sup> (see Figure 42)

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With an ERU of 221 m<sup>2</sup>, in 2022/23 the annual charges for residential customers would increase in each tier ranging from \$5.00 for tier 2 to \$36.00 for tier 5. In 2023/24, the annual charges for residential customers would further increase in each tier ranging from \$3.00 for tier 2 to \$12.00 for tier 5. The total revenue to be received from residential customers would be approximately \$3.2 million in 2022/23 and \$3.5 million in 2023/24.

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In 2022/23, the charges per m<sup>2</sup> for non-residential customers would increase from \$0.135 to \$0.176, an increase of \$0.041. In 2023/24 the charges for non-residential customers would increase to \$0.195 per m<sup>2</sup>. The total revenue to be received from non-residential customers would be approximately \$5.8 million in 2022/23 and \$6.4 million in 2023/24.

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The right-of-way charge will remain unchanged from scenario 4. The right-of-way charge to HALIFAX would increase to \$4.9 million in 2022/23 and to \$5.3 million in 2023/24. The right-of-way charge for the provincial government would be \$1.1 million in 2022/23 and would increase to \$1.2 million in 2023/24. For the Halifax Dartmouth Bridge Commission, the right-of-way charge would be \$15,200 in 2022/23 and \$16,500 in 2023/24.

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Figure 43 provides a comparative summary of the revenue requirements for 2022/23 and 2023/24 for each of scenario 4, 5, and 6.

**Figure 43 – Revenue Requirement Comparison of Scenarios 4, 5 and 6**

				Revenue Requirements - 2022/23					
					Scenario 4	Scenario 5	Scenario 6	Increase	Percentage Increase
				Current	200 sq. m.	279 sq. m.	221 sq. m.	Current to Scenario 6	Current to Scenario 6
Street Right-of Way (ROW)									
Halifax (HRM)				\$ 3,835,012	\$ 4,898,100	\$ 4,898,100	\$ 4,898,100	\$ 1,063,088	27.72%
Province of Nova Scotia				\$ -	\$ 1,089,900	\$ 1,089,900	\$ 1,089,900	\$ 1,089,900	
Halifax Dartmouth Bridge Commission				\$ -	\$ 15,200	\$ 15,200	\$ 15,200	\$ 15,200	
Total Street Right-of-Way				\$ 3,835,012	\$ 6,003,200	\$ 6,003,200	\$ 6,003,200	\$ 2,168,188	56.54%
Site Related Flow (SRF)									
Non-residential				\$ 4,440,332	\$ 5,920,443	\$ 5,295,507	\$ 5,788,878	\$ 1,348,545	30.37%
Residential									
Tier 1				\$ -	\$ -	\$ -	\$ -	\$ -	
Tier 2				\$ 485,814	\$ 624,618	\$ 798,123	\$ 659,319	\$ 173,505	35.71%
Tier 3				\$ 1,129,896	\$ 1,506,528	\$ 1,883,160	\$ 1,632,072	\$ 502,176	44.44%
Tier 4				\$ 462,726	\$ 616,968	\$ 771,210	\$ 668,382	\$ 205,656	44.44%
Tier 5				\$ 136,890	\$ 182,520	\$ 228,150	\$ 197,730	\$ 60,840	44.44%
Culvert only Customers				\$ 6,972	\$ 8,964	\$ 11,454	\$ 9,462	\$ 2,490	35.71%
Total Residential				\$ 2,222,298	\$ 2,939,598	\$ 3,692,097	\$ 3,166,965	\$ 944,667	42.51%
Preliminary Revenue Total				\$ 10,497,642	\$ 14,863,241	\$ 14,990,804	\$ 14,959,043	\$ 4,461,400	42.50%
Less: Revenue Requirement				\$ (14,963,566)	\$ (14,963,566)	\$ (14,963,566)	\$ (14,963,566)		
Excess (deficiency) compared to Revenue Requirement				\$ (4,465,924)	\$ (100,325)	\$ 27,238	\$ (4,524)	\$ 4,461,400	
				Revenue Requirements - 2023/24					
				2022/23	Scenario 4	Scenario 5	Scenario 6	Increase	Percentage Increase
				Proposed Rate ERU 221 sq. m	200 sq. m.	279 sq. m.	221 sq. m.	Proposed to Scenario 6	Proposed to Scenario 6
Street Right-of Way (ROW)									
Halifax (HRM)				\$ 4,898,100	\$ 5,316,000	\$ 5,316,000	\$ 5,316,000	\$ 417,900	8.53%
Province of Nova Scotia				\$ 1,089,900	\$ 1,182,900	\$ 1,182,900	\$ 1,182,900	\$ 93,000	8.53%
Halifax Dartmouth Bridge Commission				\$ 15,200	\$ 16,500	\$ 16,500	\$ 16,500	\$ 1,300	8.55%
Total Street Right-of-Way				\$ 6,003,200	\$ 6,515,400	\$ 6,515,400	\$ 6,515,400	\$ 512,200	8.53%
Site Related Flow (SRF)									
Non-residential				\$ 5,788,878	\$ 6,578,270	\$ 5,887,552	\$ 6,413,813	\$ 624,936	10.80%
Residential									
Tier 1				\$ -	\$ -	\$ -	\$ -	\$ -	
Tier 2				\$ 659,319	\$ 694,020	\$ 867,525	\$ 763,422	\$ 104,103	15.79%
Tier 3				\$ 1,632,072	\$ 1,673,920	\$ 2,092,400	\$ 1,799,464	\$ 167,392	10.26%
Tier 4				\$ 668,382	\$ 685,520	\$ 856,900	\$ 736,934	\$ 68,552	10.26%
Tier 5				\$ 197,730	\$ 202,800	\$ 253,500	\$ 218,010	\$ 20,280	10.26%
Culvert only Customers				\$ 9,462	\$ 9,960	\$ 12,450	\$ 10,956	\$ 1,494	15.79%
Total Residential				\$ 3,166,965	\$ 3,266,220	\$ 4,082,775	\$ 3,528,786	\$ 361,821	11.42%
Preliminary Revenue Total				\$ 14,959,043	\$ 16,359,890	\$ 16,485,727	\$ 16,457,999	\$ 1,498,957	10.02%
Less: Revenue Requirement				\$ (16,415,400)	\$ (16,415,400)	\$ (16,415,400)	\$ (16,415,400)		
Excess (deficiency) compared to Revenue Requirement				\$ (1,456,357)	\$ (55,510)	\$ 70,327	\$ 42,599	\$ 1,498,957	

Figure 44 compares the impact on individual charges for stormwater service for residential and non-residential customers.

**Figure 44 – Comparison of Impact of Scenarios 4, 5, and 6 on Charges**

			Revenue Requirements - 2022/23						
Tier Parameters			Current	Scenario 4	Scenario 5	Scenario 6	Increase	Monthly Increase	Percentage Increase
(in units)				200 sq. m.	279 sq. m.	221 sq. m.	Current to Scenario 6	Current to Scenario 6	Current to Scenario 6
Tier	Each unit equals 10 square meters								
1	less than	5 units	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
2	6 units	20 units	\$ 14	\$ 18	\$ 23	\$ 19	\$ 5	\$ 0.42	35.71%
3	21 units	40 units	\$ 27	\$ 36	\$ 45	\$ 39	\$ 12	\$ 1.00	44.44%
4	41 units	80 units	\$ 54	\$ 72	\$ 90	\$ 78	\$ 24	\$ 2.00	44.44%
5	81 units	or more	\$ 81	\$ 108	\$ 135	\$ 117	\$ 36	\$ 3.00	44.44%
Non-residential			\$ 0.135	\$ 0.180	\$ 0.161	\$ 0.176	\$ 0.041		30.37%
Average Non-residential Impervious Area			4,031	4,031	4,031	4,031	4,031		
Average Non-residential Bill			\$ 544.19	\$ 725.58	\$ 648.99	\$ 709.46	\$ 165.27	\$ 13.77	30.37%
			Revenue Requirements - 2023/24 - comparison to 2022/23 rates						
Tier Parameters			2022/23	Scenario 4	Scenario 5	Scenario 6	Increase	Monthly Increase	Percentage Increase
(in units)			Proposed Rate	200 sq. m.	279 sq. m.	221 sq. m.	Current to Scenario 3	Current to Scenario 3	Current to Scenario 3
Tier	Each unit equals 10 square meters								
1	less than	5 units	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
2	6 units	20 units	\$ 19	\$ 20	\$ 25	\$ 22	\$ 3	\$ 0.25	15.79%
3	21 units	40 units	\$ 39	\$ 40	\$ 50	\$ 43	\$ 4	\$ 0.33	10.26%
4	41 units	80 units	\$ 78	\$ 80	\$ 100	\$ 86	\$ 8	\$ 0.67	10.26%
5	81 units	or more	\$ 117	\$ 120	\$ 150	\$ 129	\$ 12	\$ 1.00	10.26%
Non-residential			\$ 0.176	\$ 0.200	\$ 0.179	\$ 0.195	\$ 0.019		10.80%
Average Non-residential Impervious Area			4,031	4,031	4,031	4,031	4,031		
Average Non-residential Bill			\$ 709.46	\$ 806.20	\$ 721.55	\$ 786.05	\$ 76.59	\$ 6.38	10.80%

All scenarios reflect percentage increases that are significant and in excess of increases that would be considered gradual. However, translating those percentages increases to monthly dollar values provides important context: increases for residential customers range from \$0.42 to \$3.00 per month in 2022/23 and from \$0.25 to \$1.00 per month in 2023/34. Increases for non-residential customers, based on the average impervious area for non-residential properties, are \$165.27 per year or \$13.77 per month in 2022/23 and \$76.59 per year or \$6.38 per month in 2023/24.

Current operating deficits require significant increases in charges for stormwater service to fund the operation of this service.

Halifax Water is proposing to utilize scenario 6, increasing the ERU to 221 m<sup>2</sup>, but limiting increases to a maximum of 20% in 2022/23 and 2023/24. By limiting the percentage increases to 20%, stormwater services would continue to operate at a deficit in 2022/23 and 2023/24 (see Figure 45).

For residential customers, charges would increase over the two test years by \$5.00 per year or \$0.42 per month for customers in tier 2 and \$34 per year or \$2.83 per month for customers in tier 5 (see Figure 45).

**Figure 45 – Revenue requirements based on ERU of 221 m<sup>2</sup>  
and maximum annual increases of 20%**

				Revenue Requirements - 2022/23 to 2023/24 - Maximum 20% increase				
					2022/23	2023/24	Increase	Percentage Increase
				Current	Max 20%	Max 20%	Current to 2023/24	Current to 2023/24
Street Right-of Way (ROW)								
Halifax (HRM)				\$ 3,835,012	\$ 4,602,014	\$ 5,316,000	\$ 1,480,988	38.62%
Province of Nova Scotia					\$ 1,089,900	\$ 1,182,900	\$ 1,182,900	
Halifax Dartmouth Bridge Commission					\$ 15,200	\$ 16,500	\$ 16,500	
Total Street Right-of-Way				\$ 3,835,012	\$ 5,707,114	\$ 6,515,400	\$ 2,680,388	69.89%
Site Related Flow (SRF)								
Non-residential				\$ 4,440,332	\$ 4,769,246	\$ 5,690,204	\$ 1,249,871	28.15%
Residential								
Tier 1				\$ -	\$ -	\$ -		
Tier 2				\$ 485,814	\$ 555,216	\$ 659,319	\$ 173,505	35.71%
Tier 3				\$ 1,129,896	\$ 1,339,136	\$ 1,590,224	\$ 460,328	40.74%
Tier 4				\$ 462,726	\$ 548,416	\$ 651,244	\$ 188,518	40.74%
Tier 5				\$ 136,890	\$ 162,240	\$ 194,350	\$ 57,460	41.98%
Culvert only Customers				\$ 6,972	\$ 7,968	\$ 9,462	\$ 2,490	35.71%
Total Residential				\$ 2,222,298	\$ 2,612,976	\$ 3,104,599	\$ 882,301	39.70%
Preliminary Revenue Total				\$ 10,497,642	\$ 13,089,336	\$ 15,310,203	\$ 4,812,560	45.84%
Less: Revenue Requirement				\$(14,963,566)	\$(14,963,566)	\$(16,415,400)		
Excess (deficiency) compared to Revenue Requirement				\$ (4,465,924)	\$ (1,874,230)	\$ (1,105,197)		
				Revenue Requirements - 2022/23 to 2023/24 - Maximum 20% increase				
Tier Parameters				Current	2022/23	2023/24	Increase	Monthly Increase
(in units)					Max 20%	Max 20%	Current to 2023/24	Current to 2023/24
Tier	Each unit equals 10 square meters							
1	less than	5 units		\$ -	\$ -	\$ -	\$ -	\$ -
2	6 units	20 units		\$ 14	\$ 16	\$ 19	\$ 5	\$ 0.42
3	21 units	40 units		\$ 27	\$ 32	\$ 38	\$ 11	\$ 0.92
4	41 units	80 units		\$ 54	\$ 64	\$ 76	\$ 22	\$ 1.83
5	81 units	or more		\$ 81	\$ 96	\$ 115	\$ 34	\$ 2.83
Non-residential				\$ 0.135	\$ 0.145	\$ 0.173	\$ 0.038	
Average Non-residential Impervious Area				4,031	4,031	4,031	4,031	
Average Non-residential Bill				\$ 544.19	\$ 584.50	\$ 697.36	\$ 153.18	\$ 12.77

As noted in Figure 45, implementing scenario 6 and limiting increases to a maximum of 20% results in a revenue deficiency for 2022/23 of \$(1.9) million and for 2023/24, \$(1.1) million. Therefore, future increases beyond the test years will be required to eliminate this deficit and ensure service levels are maintained in the future.

### Impervious Area Changes

As shown, in Appendix 3, worksheet SW4, the overall impervious area associated with site related flow and road right of ways reduced. The main reasons for this reduction are the use of better quality imagery, updated software tools, and use of lidar data to better delineate the stormwater catchment boundary. Halifax Water also conducted an iterative manual quality check was conducted to identify and remove anomalous impervious area such as those attributed to shadows, shorelines and image registration. Customer appeals resulted in some impervious area being reduced or removed. The impervious area within the HALIFAX-owned right of way reduced primarily because of better road ownership data.



### Stormwater Service Expansion

Halifax Water has applied to expand its stormwater boundary (matter number M10295), which is currently before the Board. During the course of that proceeding Halifax Water has stated that the numbers of customers receiving service and the current state of the infrastructure in the proposed expansion areas is not currently known. In its application, Halifax Water proposed that the customers in the expanded service area at the would be billed on the same basis as existing customers. Any updated charges would apply to customers in the proposed expansion areas when they become applicable to all stormwater customers. As more data in relation to the proposed expansion areas becomes available, Halifax Water will be able to more accurately quantify the revenue it expects to receive from new customers and the associated costs to service those customers. Halifax Water does not anticipate that the addition of customers in the proposed expansion areas will materially affect the basis on which revised stormwater rates are being requested in this application.

#### **PROPOSED RESIDENTIAL RATES FOR WATER, WASTEWATER AND STORMWATER SERVICES**

Based on this application's proposed water, wastewater and stormwater rates, in 2022/23 the total residential bill would increase by 3.6% from \$841.31 to \$871.48, an increase of \$30.17 per year or \$2.51 per month; in 2023/24, it would increase by 3.6% from \$871.48 to \$902.65, an increase of \$31.17 per year or \$2.60 per month.

**Figure 46 – Impact of Proposed Rates on Total Residential Bill**

Scenario #3 - No change in current base charges/change in consumption rate WITH utilization of accumulated water surplus to reduce the rate increase and stormwater recommended rate							
	Proposed Rates			Change 2022/23		Change 2023/24	
	Current Rates	2022/23	2023/24	\$	%	\$	%
<b>Water</b>							
Base charges	\$156.00	\$156.00	\$156.00	\$0.00	0.0%	\$0.00	0.0%
Consumption	\$157.23	\$163.84	\$180.37	\$6.61	4.2%	\$16.53	10.1%
	\$313.23	\$319.84	\$336.37	\$6.61	2.1%	\$16.53	5.2%
<b>Wastewater</b>							
Base charges	\$168.00	\$168.00	\$168.00	\$0.00	0.0%	\$0.00	0.0%
Consumption	\$333.08	\$351.64	\$360.27	\$18.56	5.6%	\$8.64	2.5%
	\$501.08	\$519.64	\$528.27	\$18.56	3.7%	\$8.64	1.7%
<b>Annual Water and Wastewater Total</b>	\$814.31	\$839.48	\$864.65	\$25.17	3.1%	\$25.17	3.0%
<b>Stormwater (Tier 3)</b>	\$27.00	\$32.00	\$38.00	\$5.00	18.5%	\$6.00	18.8%
<b>Total Average Residential Bill</b>	\$841.31	\$871.48	\$902.65	\$30.17	3.6%	\$31.17	3.6%

#### **RATE OF RETURN**

Section 45 of the NSUARB Water Utility Accounting and Reporting Handbook - "Amount utility entitled to earn annually" states that every public utility shall be entitled to earn annually such return as the Board deems just and reasonable on the rate base as fixed and determined by the Board for each type or kind

of service furnished. These earnings are in addition to such expense as the Board may allow as reasonable and prudent. Halifax Water's current and proposed rates do not include any rate of return in addition to operating expenses (including depreciation) other than the amount required to fund debt servicing and dividend/grant in lieu of taxes.

#### **INTEREST ON OVERDUE ACCOUNTS**

The vast majority of customers pay their Halifax Water bills by the due date and do not incur any interest charges. When a customer is experiencing difficulty paying their bill, Halifax Water will work with the customer to develop payment plans to help and will delay charging interest while there is a payment plan in place.

Section 10(1) of the Halifax Water Regulations requires Halifax Water to charge interest on overdue accounts at a rate of 19.56% per year or 1.5% per month. Interest on overdue accounts is an important deterrent for customers to delay paying bills. However, Halifax Water is of the view that an interest of 19.56% is too high and is overly punitive to customers who are having difficulty paying their bills.

Halifax Water will be requesting a change to the Regulations to reduce the interest on overdue accounts to 14.0% per annum or 1.1% per month.

#### **CUSTOMER ACCESS TO INFORMATION AND MONTHLY BILLING**

Halifax Water has invested over \$1.5 million in the Customer Connect portal that allows the customer to directly access information about their account including bills and payment history, information about their consumption and other charges applied to their account. The Customer Connect portal also enables the customer to opt for paperless billing. The system notifies the Customer that a bill is available, and the Customer logs into their account to access the detailed bill.

Customers are able to see their water consumption based on hourly consumption readings captured by AMI meters which provides insight into activities that can lead to higher consumption. The customer can use this information to help manage and, if possible, reduce consumption. The Customer Connect portal also enables customers to be notified about high consumption and possible leaks automatically through either text message and/or email. 22 customers per day are notified of such issues through the portal.

Currently, over 27% of Halifax Water customers are registered for the Customer Connect portal. When developing the business case for the portal, the 'best-case' number of registrations was 20% after two years; Halifax Water has surpassed this 'best-case' in only ten months.

Halifax Water pays a portal subscription fee per customer. The test years include subscription fees of \$312,000 in 2022/23 and \$330,000 in 2023/24. Despite the subscription fee, the Customer Connect portal is a very cost-effective tool to provide information to customers, and to reduce other costs, including mailing costs. Currently, 62% of customers registered for the Customer Connect portal have opted for paperless billing.

Halifax Water recognizes that, despite best efforts, not all customers will register for the Customer Connect portal. As a result, Halifax Water has also enhanced other systems to provide information to non-portal customers. For example, Halifax Water has established a high consumption alert process

where AMI meter data is used to identify consumption that appears unusual. Halifax Water will proactively alert the customer by phone, email or letter. Using this process, Halifax Water is notifying an additional 7 customers per day. Alerting a customer through this process is more costly and less contemporaneous than doing so through the Customer Connect portal.

Not all consumption changes would be significant enough to be identified as high consumption, and other consumption issues would only be identified when the customer is billed. Currently, ICI customers are billed monthly, residential customers are billed quarterly and stormwater only customers are billed annually. As a result, some residential customers may not be aware of an issue for an extended period of time. Halifax Water has identified issuing bills to residential customers more frequently as a means of mitigating this potential issue. Halifax Water considers billing these customers monthly, consistent with non-residential customers, to be an appropriate frequency. However, to bill customers monthly will require changes in processes, changes in computer systems and increased costs for paper and postage.

The cost to issue monthly bills to all residential non-stormwater-only customers has been estimated at over \$760,000 annually for printing, postage and envelopes and a further \$250,000 to support customers receiving more frequent bills.

The test year budgets do not include these costs. If these costs are added to the test years, the increase in the average residential bill would be approximately \$4.99 or 0.6% in 2023/24 with no further increase in 2023/24. Halifax Water is proposing that monthly billing for residential customers be deferred until 2024/25.

#### **OBJECTIVES AND CRITERIA FOR DEVELOPING REVENUE REQUIREMENTS**

As indicated above, a number of factors require Halifax Water to file this application. Halifax Water is projecting an operating deficit for 2021/22 and increasing deficits in 2022/23 and 2023/24. Expenses, particularly those to support an increased level of capital spending (depreciation and debt servicing), are increasing.

In summary, this application addresses the following objectives:

- 1) Provide sufficient operating revenue for the two test years to cover the operating and non-operating costs for water, wastewater and stormwater.
- 2) Provide sufficient operating revenue to accommodate depreciation for additions to utility plant in service.
- 3) Provide sufficient operating revenue to accommodate debt servicing requirements.
- 4) Provide sufficient operating revenue for 2022/23 and 2023/24 to enable Halifax Water to continue to address the infrastructure deficit and regulatory compliance issues facing the utility.
- 5) Adjust rates to recognize increased utility plant in service, increased number of customers and connections, and changes in factors such as impervious area, as well as a 1% increase in water consumption in 2022/23.

6) Approve updates to the COS Manual and the Halifax Water Regulations.

The application is submitted under the adjusted COS Manual with updates to allocations as noted in Appendix 4A and the associated Table of Explanatory Notes in Appendix 4B.

#### **SUMMARY OF COMPLIANCE WITH ORDERS FROM 2020 RATE APPLICATION M09589**

The Board's 2020 decision directed Halifax Water to carry out two specific activities:

Compare projected costs to at least three years of actual costs in future rate applications to provide for greater transparency and facilitate comparing trends in actual costs to test year projects: Halifax Water's current application reflects this direction.

Address cost allocation to unregulated activities: Halifax Water had intended to bring forward a separate cost of service and rate design proceeding, and the Board directed that Halifax Water examine appropriate allocation of costs to unregulated activities as part of that application. Halifax Water has updated the COS Manual, including additional information regarding allocation of costs to unregulated activities and it is included within this application. Cost allocation to unregulated activities was also raised as an issue in the 2015 rate application. Following the 2015 rate application, Halifax Water implemented a new time tracking tool to ensure the time and costs associated with employees working on unregulated activities are charged to the unregulated activity or project. In the 2014/15 fiscal year, Halifax Water started allocating an additional 1% mark-up to salaries and benefits charged to unregulated activities to recoup miscellaneous expenses such as office supplies, photocopying, telephone, building occupancy costs, etc. The 1% was based on the fact that unregulated revenues represented approximately 1% of total revenues; and overhead expenses incurred aside from salaries and benefits are minimal. Unregulated revenues as a percentage of total revenues are currently 1.07% as of 2020/21. Unregulated activities have been decreasing as a percentage of total expenses. Therefore, Halifax Water is of the view that no adjustment is required at this time. The surplus from unregulated activities is included within the accumulated operating surplus from regulated utility services.

#### **PROPOSED REGULATIONS**

The proposed Regulations included in Appendix 9A reflect proposed rate and fee adjustments, as well as other amendments. A table of explanatory notes to the proposed Regulations is attached as Appendix 9B.

#### **ORDER SOUGHT**

Halifax Water requests an order approving the Halifax Water Regulations to become effective for services rendered on and after September 1, 2022, a copy of which is attached as Appendix 9A.

**Halifax Regional Water Commission**  
**(“Halifax Water”)**  
**Water Rate Study**  
**2022/23**

Prepared By:

Halifax Water Staff

## Notes on Worksheet

### Worksheet W-1 System Data

Worksheet W-1 provides Water Services related data including:

- Water plant production for the three previous fiscal years, and 3-year average water plant production.
- Average day and maximum day production with related percentages and ratios for the plants.
- Budgeted service connections, system equivalents, and billed consumption for test year 2022/23.
- Average water consumption history by customer class for the five fiscal years spanning 2015/16 to 2019/20 inclusive, including a reallocation of estimated commercial consumption from the residential 15 mm (5/8) meter size. The fiscal year 2020/21 has been excluded due to the probable effects COVID-19 had on consumption patterns.

Assumptions - 2022/23 (Test Year #1):

1. After a long-term trend of declining water consumption, Halifax Water has been experiencing modest increases recently. Consumption in 2022/23 is budgeted to grow at a rate of 1% based on the assumption related to customer growth noted below, and having consumption patterns among customer classes return to pre-COVID-19 levels.
2. Customer connections are projected to increase by 680 connections in 2022/23, based on customer growth in recent years.

Worksheet W-1

Halifax Water Water Rate Study												
Water Plant Production and User Characteristics Data												
Water Production												
				2018/19	2019/20	2020/21	Average					
Average Day Production (in cubic meters)				2018/19	2019/20	2020/21	Average	Average Day as a Percent of Maximum Day				
Lake Major				33,917	32,121	33,198	33,079	68%				
Lake Pockwock				74,615	73,385	78,736	75,579	84%				
Bennery Lake				895	780	535	737	51%				
System				109,427	106,286	112,469	109,394	78%				
Maximum-Day Production (in cubic meters)				2018/19	2019/20	2020/21	Average	Max-Day / Average Day Ratio				
Lake Major				50,020	45,780	44,910	46,903	1.47				
Lake Pockwock				88,829	89,052	97,040	91,640	1.19				
Bennery Lake				1,771	1,607	1,302	1,560	1.98				
System				140,620	136,439	143,252	140,104	1.29				
Usage Characteristics												
Service Connections, Equivalents and Billed Usage												
Date		February 24, 2022		2022/23					Estimated Consumption			
Test Years				Meter Size		Number of Services	Capacity Ratio	System Equivalents	(Cubic Meters)			
1		2022/23		Unmetered 5/8"		0	1	0	0			
2		2023/24		Unmetered 3/4"		0	1.5	0	0			
Current Year		2021/22		Unmetered 1"		0	2.5	0	0			
Historical Year		2020/21		15 MM - 5/8"		82,150	1	82,150	13,233,999			
Customer Classes				20 MM - 3/4"		1,053	1.5	1,579	551,275			
Residential		Non-Residential		25 MM - 1"		1,602	2.5	4,004	1,628,425			
Single Family Residential		Commercial		40 MM - 1.5"		1,212	5	6,058	2,617,709			
Multi-Family		Industrial		50 MM - 2"		859	8	6,872	4,679,444			
		Institutional		80 MM - 3"		328	16	5,240	4,072,824			
		Unmetered		100 MM - 4"		84	25	2,088	1,740,532			
				150 MM - 6"		37	50	1,850	2,311,495			
				200 MM - 8"		25	90	2,250	1,685,985			
				250 MM - 10"		2	150	300	60,174			
				TOTAL		87,349		112,389	32,581,863			
Halifax Water Consumption Summary												
		Consumption m3			Share		Peaking Factors <sup>(2)</sup>		Distrib. Design Factors		Extra-Capacity	
Class		2014 - 2019 <sup>(1)</sup>	Realloc. of 5/8"	Revised Total	Calculated	Loudon	Max Day	Max Hour	Max Day	Max Hour	Max Day	Max Hour
Commercial		5,962,201	1,890,782	7,852,983	24.15%	19%	1.22	1.70			4,733	430
Industrial		1,946,458		1,946,458	5.99%	8%	1.22	1.70			1,173	107
Institutional		4,419,305		4,419,305	13.59%	14%	1.22	1.70			2,664	242
Multi-Family		7,530,275		7,530,275	23.16%		1.22	1.70			4,539	413
Single Family Residential		12,605,213	(1,890,782)	10,714,431	32.95%		1.22	1.70	1.66	2.50	6,458	587
Subtotal Res					56%	59-66%						
Unmetered		55,850		55,850	0.17%							
Total		32,519,301		32,519,301								
(1) Water Consumption based on 5 year average spanning fiscal years 2015/16 to 2019/20 inclusive. The fiscal year 2020/21 has been excluded due to the probable effects of COVID-19.												
(2) Loudon Report Pages 70-71												
Avg Use												
		Commercial	Industrial	Institutional	Total Non-Residential	Multi-Family	Single Family Residential	Total Residential	Unmetered	Total System		
		5,962,201	1,946,458	4,419,305	12,327,964	7,530,275	12,605,213	20,135,488	55,850	32,519,301		

## Worksheet W-2 Operations

Worksheet W-2 provides a comparative Statement of Operations for Water Services for fiscal years as follows:

- Actual results for the fiscal years 2018/2019, 2019/2020 and 2020/2021 for Water Services.
- Approved budgets by Halifax Water's Board of Commissioners for 2021/2022 and 2022/2023, with 2022/2023 representing Test Year #1 for the purposes of the Rate Study.
- Projections for 2023/24, representing Test Year #2 for the purposes of the Rate Study.

Revenues are budgeted/projected based on current rates, and revenues and expenditures have been segregated between regulated and unregulated activities. This worksheet details the budgeted deficits at current rates in Water Services for the two test years.

Water Services had a cumulative surplus of \$23.1 million as at March 31, 2021 however, with budgeted deficits in 2021/22 and 2022/23 of \$5.2 million and \$4.2 million respectively, and a projected deficit of \$6.8 million in 2023/24, the projected accumulated surplus as at March 31, 2024 is estimated at \$6.9 million. Of note, the current forecast for the 2021/22 fiscal year to December 31, 2021 is reporting a projected loss of \$2.4 million, an improvement of approximately \$2.9 million compared to the approved budget. Based on this, the projected accumulated surplus as at March 31, 2021 would be \$9.8 million.

Unregulated revenues and expenditures have been identified on Worksheet W-2 and are excluded in the determination of revenue requirements for rate making purposes. The calculation of revenue requirements is reported on Worksheet W-3.

Depreciation in Test Year #1 is \$29,000 higher than the 2022/23 operating budget. Both calculations begin with the same data, the 2022/23 capital budget. This is then adjusted to align with projected additions to rate-based assets. For the 2022/23 operating budget, the adjustment is amortized over thirty-one years, whereas for the test year data the adjustment is prorated between assets classes, therefore spreading the depreciation more evenly amongst the asset classes. In addition, corporate projects are amortized over ten years within the 2022/23 operating budget, whereas for the test year data, projects are reviewed further and more appropriately aligned with an asset class, therefore allocating depreciation into future years.



## Worksheet W-2

<b>Halifax Water</b> <b>Water Rate Study</b> <b>Comparative Statement of Operations</b> Fiscal Years ending March 31st						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating revenues</b>						
<b>Regulated activities</b>						
Water	\$48,040,166	\$47,917,584	\$47,630,852	\$48,423,826	\$48,770,894	\$48,770,894
Public fire protection	\$7,074,373	\$7,074,373	\$7,336,110	\$7,627,564	\$7,627,564	\$7,627,564
Private fire protection	\$868,836	\$880,898	\$1,000,754	\$1,312,239	\$1,335,396	\$1,335,396
Bulk water stations	\$226,839	\$299,743	\$317,644	\$336,936	\$334,196	\$334,196
Late payment and other connection fees	\$244,372	\$207,113	\$154,727	\$236,300	\$264,400	\$264,400
Miscellaneous	\$59,508	\$123,668	\$165,869	\$237,341	\$257,841	\$257,841
Sub-total	\$56,514,094	\$56,503,379	\$56,605,956	\$58,174,206	\$58,590,291	\$58,590,291
<b>Unregulated activities</b>						
Contract Revenue	\$38,235	\$38,235	\$38,235	\$38,235	\$38,235	\$38,235
<b>Total</b>	<b>\$56,552,329</b>	<b>\$56,541,614</b>	<b>\$56,644,191</b>	<b>\$58,212,441</b>	<b>\$58,628,526</b>	<b>\$58,628,526</b>
<b>Operating Expenditures</b>						
<b>Regulated activities</b>						
Supply and treatment	\$9,746,865	\$9,541,164	\$9,970,068	\$10,746,345	\$11,214,097	\$11,628,655
Transmission and distribution	\$10,014,084	\$9,866,815	\$10,959,903	\$11,875,800	\$12,440,867	\$12,784,103
Engineering and technology services	\$3,749,257	\$3,229,721	\$3,653,601	\$4,638,033	\$3,536,378	\$3,630,252
Technical services (SCADA)	\$888,872	\$976,258	\$1,071,084	\$1,015,671	\$1,131,103	\$1,165,726
Regulatory services	\$679,318	\$859,461	\$1,090,870	\$1,200,898	\$1,464,998	\$1,511,175
Corporate services	\$0	\$0	\$0	\$1,591,673	\$1,514,417	\$1,553,894
Customer service	\$2,524,093	\$2,520,184	\$2,614,139	\$2,973,779	\$2,470,388	\$2,546,846
Administration	\$3,991,704	\$3,536,099	\$3,618,993	\$2,511,094	\$2,986,050	\$3,070,875
Calculated depreciation - funded assets	\$9,046,160	\$9,817,801	\$10,878,773	\$12,051,545	\$12,199,822	\$13,292,311
Sub-total	\$40,640,353	\$40,347,503	\$43,857,431	\$48,604,838	\$48,958,120	\$51,183,837
<b>Unregulated activities</b>						
Contract Systems	\$19,791	\$32,101	\$17,282	\$32,022	\$31,947	\$32,985
<b>Total</b>	<b>\$40,660,144</b>	<b>\$40,379,604</b>	<b>\$43,874,713</b>	<b>\$48,636,860</b>	<b>\$48,990,067</b>	<b>\$51,216,822</b>
<b>Earnings from operations</b>	<b>\$15,892,185</b>	<b>\$16,162,010</b>	<b>\$12,769,478</b>	<b>\$9,575,581</b>	<b>\$9,638,459</b>	<b>\$7,411,704</b>
<b>Financial and other revenues</b>						
<b>Regulated activities</b>						
Investment Income	\$520,919	\$222,238	\$126,586	\$96,000	\$72,000	\$72,000
Miscellaneous	\$217,568	\$197,954	\$152,625	\$24,000	\$24,000	\$24,000
Sub-total	\$738,487	\$420,192	\$279,211	\$120,000	\$96,000	\$96,000
<b>Unregulated activities</b>						
Tower Leases	\$163,202	\$174,824	\$212,973	\$177,975	\$215,690	\$215,690
Energy Projects	\$165,038	\$164,877	\$198,219	\$188,639	\$224,639	\$224,639
Rental Income	\$13,400	\$6,300	\$8,400	\$8,400	\$8,400	\$8,400
<b>Total</b>	<b>\$1,080,127</b>	<b>\$766,193</b>	<b>\$698,802</b>	<b>\$495,014</b>	<b>\$544,729</b>	<b>\$544,729</b>
<b>Financial and other expenditures</b>						
<b>Regulated Activities</b>						
Interest on long term debt	\$1,924,443	\$1,828,464	\$2,028,475	\$2,615,664	\$2,305,922	\$2,459,156
Repayment on long term debt	\$7,181,215	\$4,721,518	\$5,330,905	\$6,696,386	\$6,062,697	\$6,194,437
Amortization of debt discount	\$84,849	\$63,700	\$74,091	\$100,412	\$83,989	\$87,472
Dividend/ grant in lieu of taxes	\$4,999,488	\$5,078,373	\$5,497,608	\$5,862,991	\$5,918,398	\$5,977,582
Sub-total	\$14,189,995	\$11,692,055	\$12,931,079	\$15,275,453	\$14,371,006	\$14,718,647
<b>Unregulated activities</b>						
Miscellaneous	\$23,702	\$32,236	\$42,846	\$16,244	\$16,244	\$16,244
<b>Total</b>	<b>\$14,213,697</b>	<b>\$11,724,291</b>	<b>\$12,973,925</b>	<b>\$15,291,697</b>	<b>\$14,387,250</b>	<b>\$14,734,891</b>
<b>Earnings (loss) for the year</b>	<b>\$2,758,615</b>	<b>\$5,203,912</b>	<b>\$494,355</b>	<b>(\$5,221,102)</b>	<b>(\$4,204,062)</b>	<b>(\$6,778,458)</b>
<b>Surplus, beginning of year</b>	<b>\$14,676,092</b>	<b>\$17,434,707</b>	<b>\$22,638,619</b>	<b>\$23,132,974</b>	<b>\$17,911,872</b>	<b>\$13,707,810</b>
<b>Surplus, end of year</b>	<b>\$17,434,707</b>	<b>\$22,638,619</b>	<b>\$23,132,974</b>	<b>\$17,911,872</b>	<b>\$13,707,810</b>	<b>\$6,929,352</b>

### **Worksheet W-3 – Revenue Requirements**

Worksheet W-3 takes the operating and financial expense information from Worksheet W-2 to develop revenue requirements for the test years 2022/23 and 2020/24.

Financial and other operating revenues, excluding those related to unregulated activities, are deducted from the expenditures to determine the revenue required from Water Services customers and fire protection.

## Worksheet W-3

<b>Halifax Water</b> <b>Water Rate Study</b> <b>Statement of Operating Expenses and Revenue Requirements</b> Fiscal Years ending March 31st						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating expenditures</b>						
Supply and treatment	\$9,746,865	\$9,541,164	\$9,970,068	\$10,746,345	\$11,214,097	\$11,628,655
Transmission and distribution	\$10,014,084	\$9,866,815	\$10,959,903	\$11,875,800	\$12,440,867	\$12,784,103
Engineering and technology services	\$3,749,257	\$3,229,721	\$3,653,601	\$4,638,033	\$3,536,378	\$3,630,252
Technical services (SCADA)	\$888,872	\$976,258	\$1,071,084	\$1,015,671	\$1,131,103	\$1,165,726
Regulatory services	\$679,318	\$859,461	\$1,090,870	\$1,200,898	\$1,464,998	\$1,511,175
Corporate services	\$0	\$0	\$0	\$1,591,673	\$1,514,417	\$1,553,894
Customer service	\$2,524,093	\$2,520,184	\$2,614,139	\$2,973,779	\$2,470,388	\$2,546,846
Administration	\$3,991,704	\$3,536,099	\$3,618,993	\$2,511,094	\$2,986,050	\$3,070,875
Sub-total	\$31,594,193	\$30,529,702	\$32,978,658	\$36,553,293	\$36,758,298	\$37,891,526
Calculated depreciation - funded assets	\$9,046,160	\$9,817,801	\$10,878,773	\$12,051,545	\$12,199,822	\$13,292,311
<b>Total</b>	<b>\$40,640,353</b>	<b>\$40,347,503</b>	<b>\$43,857,431</b>	<b>\$48,604,838</b>	<b>\$48,958,120</b>	<b>\$51,183,837</b>
<b>Add: non-operating expenditures</b>						
Interest on long term debt	\$1,924,443	\$1,828,464	\$2,028,475	\$2,615,664	\$2,305,922	\$2,459,156
Repayment on long term debt	\$7,181,215	\$4,721,518	\$5,330,905	\$6,696,386	\$6,062,697	\$6,194,437
Amortization of debt discount	\$84,849	\$63,700	\$74,091	\$100,412	\$83,989	\$87,472
Dividend/ grant in lieu of taxes	\$4,999,488	\$5,078,373	\$5,497,608	\$5,862,991	\$5,918,398	\$5,977,582
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0
	\$14,189,995	\$11,692,055	\$12,931,079	\$15,275,453	\$14,371,006	\$14,718,647
Test year #1 - new interest on long term debt						\$385,103
Test year #1 - new repayment of long term debt						\$513,470
<b>Total</b>	<b>\$14,189,995</b>	<b>\$11,692,055</b>	<b>\$12,931,079</b>	<b>\$15,275,453</b>	<b>\$14,371,006</b>	<b>\$15,617,220</b>
<b>Less: other revenues</b>						
Bulk water stations	\$226,839	\$299,743	\$317,644	\$336,936	\$334,196	\$334,196
Late payment and other connection fees	\$244,372	\$207,113	\$154,727	\$236,300	\$264,400	\$264,400
Miscellaneous	\$277,076	\$321,622	\$318,494	\$261,341	\$281,841	\$281,841
Investment Income	\$520,919	\$222,238	\$126,586	\$96,000	\$72,000	\$72,000
<b>Total</b>	<b>\$1,269,206</b>	<b>\$1,050,716</b>	<b>\$917,451</b>	<b>\$930,577</b>	<b>\$952,437</b>	<b>\$952,437</b>
<b>Less: other adjustments</b>						
Sponsorships and donations	\$21,912	\$18,990	\$19,741	\$16,881	\$16,881	\$16,881
Help to others (H2O) program	\$17,850	\$19,801	\$27,844	\$20,400	\$20,400	\$20,400
Administration				\$56,237	\$60,502	\$60,502
<b>Total</b>	<b>\$39,762</b>	<b>\$38,791</b>	<b>\$47,585</b>	<b>\$93,518</b>	<b>\$97,783</b>	<b>\$97,783</b>
<b>Revenue required from customers</b>	<b>\$53,521,380</b>	<b>\$50,950,051</b>	<b>\$55,823,475</b>	<b>\$62,856,196</b>	<b>\$62,278,906</b>	<b>\$65,750,837</b>

## Worksheet W-4 Operating Expenditure Analysis

Worksheet W-4 details the operating expenditures by cost element group for each of the functional areas within the Water Services, consisting of the following:

- Water Supply and Treatment,
- Transmission and Distribution,
- Technical Services (SCADA),
- Engineering and Technology Services (TS),
- Regulatory Services,
- Corporate Services, and
- Administration.

Data provided as part of the review and analysis includes:

- Actual results for 2018/19, 2019/20, and 2020/21,
- Approved budgets for 2021/22 and 2022/23 (Test Year # 1), and
- Projected results for 2023/24 (Test Year #2).

For operating expenditures related to 2023/24 (Test Year #2), the key assumptions regarding projected increases are as follows:

- Salaries and benefits: 3.5%
- Chemicals: 5.0%
- Electricity: 3.0%
- Other: 2.0%

On subsequent pages within this section, operating expenditures are reported for the core cost element groups within each functional area. As part of the analysis, variances have been provided with changes expressed as both dollar and percentage values, comparing year-over-year changes for the fiscal years 2019/20 through 2023/24. Commentary is provided for each of the cost elements groups falling within the functional areas, with additional details provided in situations where variances have increased over \$50 thousand.

**Water Supply and Treatment**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. Increased overtime led to the increase in costs in 2020/21 compared to the prior year, and in 2022/23 there were two new full-time equivalents added to meet operational needs.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content of the offering and the expiration of certifications of staff. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21 conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The expectation for the 2021/22 budget was that conferences and training would return to more normal levels with in-person sessions or virtual platforms to allow staff to update and maintain certifications. This same expectation was carried forward into 2022/23.
- Contract Services – In 2019/20 there was a reduction in costs due to the reclassification of consulting performed by Dalhousie University from Contract Services to the cost element group Professional Services. Additionally, 2018/19 costs were higher than normal due to the moving of waste residuals at the Lake Major plant, and the stabilization of upstream flows to the Lake Lamont Dam. For 2020/21 there was a further reduction in costs due to COVID-19 and the inability to contract external services because of restrictions imposed during the pandemic. The expectation for the 2021/22 budget was that contract services return to more normal levels however, for replacements an effort was made to have those costs covered under the capital program where feasible. A similar expectation was carried forward into 2022/23, which also included an increase in water quality monitoring programs, and in particular, the algal program.
- Electricity – Costs are reflective of price and consumption/usage, with the variability in consumption directly related to water production. Production during the pandemic period may have been skewed somewhat which saw more people working from home. In addition, production at the Bennery Lake plant would have been adversely affected by the inactivity at the airport during the pandemic.
- Materials Supplies and Services – Costs in this cost element group support Halifax Water's infrastructure and equipment. Costs vary year-over-year, not only for scheduled maintenance, but also to emergency repairs required to an aging infrastructure. In 2020/21, there was a failure in one of the raw water pumps at the J.D. Kline plant, as well as a higher than expected repair cost to another raw water pump. In 2021/22, there was an expectation to return to more normal levels, and for 2022/23 significant pump overhauls anticipated at the Lake Major plant will be capitalized.
- Professional Services – As mentioned in Contract Services above, costs in 2019/20 increase due to a reclassification of consulting performed by Dalhousie University, which in the prior year was reported under Contract Services. For 2021/22, the budget was increased by approximately \$200 thousand for the Inundation Mapping coming from the Dam Safety Review. In 2022/23, this initiative was reversed, whereby the Inundation Mapping will now be capitalized.
- Fleet Services – Costs are assigned to the various production plants based on the types of vehicles and/or equipment to meet operational needs. Fleet costs are relatively stable over the periods in question.

- Chemicals – Costs are reflective of price and consumption/usage. Chemicals costs are extremely volatile from a pricing perspective, and historically, Halifax Water procures chemical pricing annually. In 2019/20 and 2020/21, cost increases appear to be trending as expected however, for 2021/22 and beyond chemical prices in the market has become increasing more volatile adding to the overall costs. In addition, the dosage usage for phosphate at the J.D. Kline and Lake Major plants has increased 1.5 times the norm, affecting mainly the 2022/23 budget. With the volatility in chemical prices in the market, suppliers are no longer willing to lock themselves into long-term contracts.

Worksheet W-4

Halifax Regional Water Commission  
Water Rate Study

Operating Expenditures and Financial Analysis  
(excluding depreciation expense)

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Water Supply and Treatment</b>											
Salaries and benefits	\$3,208,556	\$3,309,828	\$3,477,703	\$3,418,397	\$3,741,126	\$3,872,065	\$101,272 3%	\$167,875 5%	(\$59,306) (2%)	\$322,729 9%	\$130,939 3%
Training and development	\$39,184	\$28,661	\$11,730	\$52,216	\$54,216	\$55,300	(\$10,523) (27%)	(\$16,931) (59%)	\$40,486 345%	\$2,000 4%	\$1,084 2%
Contract services	\$1,404,815	\$936,431	\$726,902	\$985,505	\$941,190	\$960,014	(\$468,384) (33%)	(\$209,529) (22%)	\$258,603 36%	(\$44,315) (4%)	\$18,824 2%
Electricity	\$1,856,775	\$1,789,237	\$1,960,837	\$1,868,741	\$1,908,696	\$1,965,957	(\$67,538) (4%)	\$171,600 10%	(\$92,096) (5%)	\$39,955 2%	\$57,261 3%
Materials, supplies and services	\$830,322	\$744,986	\$988,425	\$920,770	\$787,394	\$803,142	(\$85,336) (10%)	\$243,439 33%	(\$67,655) (7%)	(\$133,376) (14%)	\$15,748 2%
Professional services	\$120,434	\$374,131	\$357,513	\$568,950	\$370,705	\$378,119	\$253,697 211%	(\$16,618) (4%)	\$211,437 59%	(\$198,245) (35%)	\$7,414 2%
Fleet	\$272,966	\$249,515	\$217,407	\$216,744	\$203,024	\$207,084	(\$23,451) (9%)	(\$32,108) (13%)	(\$663) (0%)	(\$13,720) (6%)	\$4,060 2%
Chemicals	\$2,608,985	\$2,706,339	\$2,858,959	\$3,379,007	\$4,095,814	\$4,300,605	\$97,354 4%	\$152,620 6%	\$520,048 18%	\$716,807 21%	\$204,791 5%
Applied overheads and other allocations	\$107,930	\$130,527	\$130,068	\$129,766	\$110,261	\$112,466	\$22,597 21%	(\$459) (0%)	(\$302) (0%)	(\$19,505) (15%)	\$2,205 2%
Allocated to Transmission and Distribution	(\$703,102)	(\$728,491)	(\$759,476)	(\$793,751)	(\$998,329)	(\$1,026,097)	(\$25,389) 4%	(\$30,985) 4%	(\$34,275) 5%	(\$204,578) 26%	(\$27,768) 3%
<b>Total Water Supply and Treatment</b>	<b>\$9,746,865</b>	<b>\$9,541,164</b>	<b>\$9,970,068</b>	<b>\$10,746,345</b>	<b>\$11,214,097</b>	<b>\$11,628,655</b>	<b>(\$205,701) (2%)</b>	<b>\$428,904 4%</b>	<b>\$776,277 8%</b>	<b>\$467,752 4%</b>	<b>\$414,558 4%</b>

**Transmission and Distribution**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. In 2020/21, further cost increases resulted from the addition of 1 new full-time equivalent, as well as the requirement for additional personal protective equipment (PPE) for staff, to operate under the imposed pandemic restrictions. For 2021/22, cost reductions were budgeted due to a manager previously reported under Transmission and Distribution being moved to Supply and Treatment. In 2022/23, cost reductions resulted from the retirement of one senior manager; the position was not filled, but rather one manager is now covering the operations of two regions. Additionally, in 2022/23 overtime has been reduced to better reflect current spending levels, and more staff time has been allocated to capital projects.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content of the offering and the expiration of certifications of staff. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21 conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The expectation for the 2021/22 budget was that conferences and training would return to more normal levels with in-person sessions or virtual platforms to allow staff to update and maintain certifications. This same expectation was carried forward into 2022/23, especially regarding additional training for works supervisors.
- Contract Services – In 2019/20, there was a significant decrease in costs compared to the prior year however, in 2018/19 there was a major repair necessary to the tunnel section of the North End Feeder Transmission Main. For 2021/22, costs increases are mainly the result of the newly introduced Lead Service Line Replacement Program. Further, additional traffic control services are required to implement enhanced safety measures, as well as additional asphalt patching is now required to comply with HRM permit standards. Increased costs in 2022/23 are reflective of increased rates for traffic control and hired equipment.
- Electricity - Costs are reflective of price and consumption/usage. Electricity is not a significant cost related to Transmission and Distribution.
- Materials Supplies and Services – Costs in this cost element group support Halifax Water's infrastructure and equipment. Costs vary year-over-year, not only for scheduled maintenance, but also to emergency repairs required to an aging infrastructure. For 2019/20 and 2020/21, costs increased due to more work being completed in-house requiring additional materials and supplies. In 2021/22, there was an expectation repair and maintenance work would return to more normal levels however, in 2022/23, there has been a realization that costs for materials and supplies have increased because of supply and demand issues, partly the result of the pandemic.
- Professional Services – Professional services costs have typically not been significant related to Transmission and Distribution however, in 2022/23, each region has been given the responsibility of

advertising for such initiatives as the spring flush program, operational public service announcement (PSA) work, etc., which is the main cost driver for 2022/23 and beyond.

- Fleet Services – Costs are assigned to the regions based on the types of vehicles and/or equipment required to meet operational needs. The increase, in 2020/21, was due to additional units purchased and assigned to Transmission and Distribution, including a hydro excavation unit, thus increasing cost assignments to the regions. Costs can vary year-over-year based on vehicle assignment and/or disposal of units over time.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Transmission and Distribution</b>											
Salaries and benefits	\$4,808,706	\$5,075,977	\$5,525,486	\$5,460,502	\$5,294,673	\$5,479,987	\$267,271 6%	\$449,509 9%	(\$64,984) (1%)	(\$165,829) (3%)	\$185,314 4%
Training and development	\$20,845	\$24,525	\$3,280	\$39,550	\$52,800	\$53,856	\$3,680 18%	(\$21,245) (87%)	\$36,270 1106%	\$13,250 34%	\$1,056 2%
Contract services	\$3,222,933	\$2,495,629	\$2,469,942	\$3,787,674	\$4,074,790	\$4,156,286	(\$727,304) (23%)	(\$25,687) (1%)	\$1,317,732 53%	\$287,116 8%	\$81,496 2%
Electricity	\$125,979	\$141,617	\$138,035	\$153,000	\$150,200	\$154,706	\$15,638 12%	(\$3,582) (3%)	\$14,965 11%	(\$2,800) (2%)	\$4,506 3%
Materials, supplies and services	\$752,456	\$967,684	\$1,062,610	\$964,819	\$1,058,127	\$1,079,290	\$215,228 29%	\$94,926 10%	(\$97,791) (9%)	\$93,308 10%	\$21,163 2%
Professional services	\$24,422	\$33,008	\$19,226	\$20,500	\$87,250	\$88,995	\$8,586 35%	(\$13,782) (42%)	\$1,274 7%	\$66,750 326%	\$1,745 2%
Fleet	\$367,440	\$388,730	\$918,379	\$703,975	\$788,098	\$803,860	\$21,290 6%	\$529,649 136%	(\$214,404) (23%)	\$84,123 12%	\$15,762 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$261,125	\$285,322	\$335,202	\$223,295	\$221,295	\$225,721	\$24,197 9%	\$49,880 17%	(\$111,907) (33%)	(\$2,000) (1%)	\$4,426 2%
Allocated from Supply and Treatment	\$703,102	\$728,491	\$759,476	\$793,751	\$998,329	\$1,026,097	\$25,389 4%	\$30,985 4%	\$34,275 5%	\$204,578 26%	\$27,768 3%
Recoveries	(\$272,924)	(\$274,168)	(\$271,733)	(\$271,266)	(\$284,695)	(\$284,695)	(\$1,244) 0%	\$2,435 (1%)	\$467 (0%)	(\$13,429) 5%	\$0 0%
<b>Total Transmission and Distribution</b>	<b>\$10,014,084</b>	<b>\$9,866,815</b>	<b>\$10,959,903</b>	<b>\$11,875,800</b>	<b>\$12,440,867</b>	<b>\$12,784,103</b>	(\$147,269) (1%)	\$1,093,088 11%	\$915,897 8%	\$565,067 5%	\$343,236 3%



**Technical Services (SCADA)**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs, in 2019/20, increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. In 2020/21 the increase was due to 3 new full-time equivalents added during the year. A reduction in 2021/22 was reported due to an allocation of salaries and benefits to support capital projects. For 2022/23, there are 2 additional hires projected for the year equating to 1 full-time equivalent based the timing of the hires.
- Training and Development – Conferences and training are typically impacted by the content and timing of offerings. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21, conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The expectation for the 2021/22 budget was that conferences and training would return to normal levels, with that same expectation carried forward into 2022/23.
- Contract Services – Not a major cost for Technical Services (SCADA), and relates mainly to situations where external contractors are required to perform specialized repairs or services in support of booster stations, etc.
- Electricity – Not a major cost for Technical Services (SCADA), with its primary purpose of running the pump station at Bennery Lake.
- Materials Supplies, and Services– Costs within this cost element group vary year-over-year however have remained consistent throughout. Computer software, cellular charges and equipment repair and maintenance are the primary costs within this grouping.
- Professional Services – Not a major cost for Technical Services (SCADA) however, the main cost driver within this cost element group are costs related to licenses and agreements, required for data collection and the various software applications.
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Technical Services (SCADA)</b>											
Salaries and benefits	\$1,743,432	\$1,897,180	\$2,135,788	\$1,948,861	\$2,077,712	\$2,150,432	\$153,748 9%	\$238,608 13%	(\$186,927) (9%)	\$128,851 7%	\$72,720 4%
Training and development	\$28,112	\$27,749	\$6,928	\$51,000	\$45,900	\$46,818	(\$363) (1%)	(\$20,821) (75%)	\$44,072 636%	(\$5,100) (10%)	\$918 2%
Contract services	\$20,256	\$38,168	\$43,043	\$18,400	\$18,400	\$18,768	\$17,912 88%	\$4,875 13%	(\$24,643) (57%)	\$0 0%	\$368 2%
Electricity	\$144,345	\$141,006	\$144,785	\$150,175	\$154,680	\$159,320	(\$3,339) (2%)	\$3,779 3%	\$5,390 4%	\$4,505 3%	\$4,640 3%
Materials, supplies and services	\$184,832	\$229,431	\$252,060	\$308,220	\$301,620	\$307,652	\$44,599 24%	\$22,629 10%	\$56,160 22%	(\$6,600) (2%)	\$6,032 2%
Professional services	\$12,255	\$48,695	\$55,367	\$47,500	\$47,900	\$48,858	\$36,440 297%	\$6,672 14%	(\$7,867) (14%)	\$400 1%	\$958 2%
Fleet	\$206,605	\$210,893	\$202,970	\$155,861	\$176,484	\$180,014	\$4,288 2%	(\$7,923) (4%)	(\$47,109) (23%)	\$20,623 13%	\$3,530 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$47,864	\$47,610	\$48,588	\$63,191	\$54,525	\$55,616	(\$254) (1%)	\$978 2%	\$14,603 30%	(\$8,666) (14%)	\$1,091 2%
Allocated to Wastewater Services	(\$1,449,682)	(\$1,608,926)	(\$1,756,754)	(\$1,683,650)	(\$1,730,801)	(\$1,785,964)	(\$159,244) 11%	(\$147,828) 9%	\$73,104 (4%)	(\$47,151) 3%	(\$55,163) 3%
Allocated to Stormwater Services	(\$49,147)	(\$55,548)	(\$61,691)	(\$43,887)	(\$15,317)	(\$15,788)	(\$6,401) 13%	(\$6,143) 11%	\$17,804 (29%)	\$28,570 (65%)	(\$471) 3%
<b>Total Technical Services (SCADA)</b>	<b>\$888,872</b>	<b>\$976,258</b>	<b>\$1,071,084</b>	<b>\$1,015,671</b>	<b>\$1,131,103</b>	<b>\$1,165,726</b>	<b>\$87,386 10%</b>	<b>\$94,826 10%</b>	<b>(\$55,413) (5%)</b>	<b>\$115,432 11%</b>	<b>\$34,623 3%</b>

**Engineering and Technology Services (TS)**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. Further, in 2019/20, there is an addition of 4 new full-time equivalents which would have also contributed to the increase in that fiscal year. Modest increases were reported in 2020/21 and 2021/22 again due in part to vacancies and staff movement during the respective years, and new hires were limited in 2021/22 as the new Director of Engineering and TS wanted to complete an evaluation of the department. For 2022/23, although the addition of 10.25 full-time equivalents were included in the budget, due to the nature of the positions, not all costs were considered operational and were allocated to capital accordingly. Further, existing staff were also re-evaluated and allocations to capital were increased where deemed appropriate.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content and timing of any offerings. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21, conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The expectation for the 2021/22 budget was that conferences and training may not return to normal levels however, virtual platforms offered could provide savings compared to in-person offerings. The expectation for 2022/23 is a return to more normal pre-COVID-19 levels offering in-person conferences and training.
- Contract Services – Contract services are not a significant cost related to Engineering and TS. Cost reductions in 2019/20 were the result of being able to renegotiate existing contracts at the time, achieving better pricing for services.
- Materials Supplies and Services – Costs for material, supplies, and services are predominately costs associated with Information Services, and specifically related to computer software and licensing. Cost reductions were experienced in 2019/20 due to the removal of support services associated with the HP3000, Halifax Water's legacy system prior to SAP. For 2020/21, there were further cost reductions when the purchase of server and network equipment costs were moved to the capital budget. In 2021/22, as more and newer computer systems were added, the associated maintenance for those systems were added to the operating budget. Additionally, some costs that were capitalized in the past were deemed to be operational costs and budgeted accordingly. The increased costs budgeted in 2022/23 relate partially to the customer portal, whereby the actual customer enrolment in the portal significantly exceeded expectations, resulting in increased operating costs. Additionally, Information Services has also incorporated into the budget licensing fees associated with several other software products as projects continue to transition into operations.
- Professional Services – Similar to materials, supplies, and services, costs related to professional services are associated predominately with Information Services, and specifically related to consulting. The department uses a model to engage external consultants, and the amount varies depending system performance. In 2019/20, actual costs were lower compared to the prior year however, in 2020/21, the opposite occurred, where the introduction of new systems required additional support that required external consultants. For 2022/23 and

beyond, it is anticipated the use of external consultants will diminish as new staff will be hired to fill the void however, this again will be contingent upon system performance.

- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Engineering and Technology Services</b>											
Salaries and benefits	\$4,492,656	\$5,164,145	\$5,316,835	\$5,443,869	\$4,930,359	\$5,102,922	\$671,489 15%	\$152,690 3%	\$127,034 2%	(\$513,510) (9%)	\$172,563 4%
Training and development	\$185,018	\$180,590	\$39,007	\$240,235	\$435,846	\$444,563	(\$4,428) (2%)	(\$141,583) (78%)	\$201,228 516%	\$195,611 81%	\$8,717 2%
Contract services	\$105,222	\$36,750	\$29,404	\$6,250	\$6,000	\$6,120	(\$68,472) (65%)	(\$7,346) (20%)	(\$23,154) (79%)	(\$250) (4%)	\$120 2%
Electricity	\$295	\$0	\$0	\$0	\$0	\$0	(\$295) (100%)	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Materials, supplies and services	\$2,451,952	\$2,349,866	\$1,778,304	\$3,969,328	\$5,168,550	\$5,271,921	(\$102,086) (4%)	(\$571,562) (24%)	\$2,191,024 123%	\$1,199,222 30%	\$103,371 2%
Professional services	\$449,889	\$199,045	\$762,261	\$109,535	\$116,742	\$119,077	(\$250,844) (56%)	\$563,216 283%	(\$652,726) (86%)	\$7,207 7%	\$2,335 2%
Fleet	\$220,866	\$245,700	\$93,769	\$103,540	\$107,860	\$110,017	\$24,834 11%	(\$151,931) (62%)	\$9,771 10%	\$4,320 4%	\$2,157 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$250,244	\$259,693	\$260,739	\$315,288	\$299,051	\$305,032	\$9,449 4%	\$1,046 0%	\$54,549 21%	(\$16,237) (5%)	\$5,981 2%
Allocated to Wastewater Services	(\$3,782,763)	(\$4,477,998)	(\$4,186,504)	(\$4,197,779)	(\$5,378,043)	(\$5,519,483)	(\$695,235) 18%	\$291,494 (7%)	(\$11,275) 0%	(\$1,180,264) 28%	(\$141,440) 3%
Allocated to Stormwater Services	(\$624,122)	(\$728,070)	(\$440,214)	(\$1,352,233)	(\$2,149,987)	(\$2,209,917)	(\$103,948) 17%	\$287,856 (40%)	(\$912,019) 207%	(\$797,754) 59%	(\$59,930) 3%
<b>Total Engineering and Technology Services</b>	<b>\$3,749,257</b>	<b>\$3,229,721</b>	<b>\$3,653,601</b>	<b>\$4,638,033</b>	<b>\$3,536,378</b>	<b>\$3,630,252</b>	(\$519,536) (14%)	\$423,880 13%	\$984,432 27%	(\$1,101,655) (24%)	\$93,874 3%

**Regulatory Services**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. The number of full-time equivalents has increased by an estimated 14 positions since 2018/19, with the largest increase within Development Approvals of approximately 8 positions. For Regulatory Services, 4.5 full-time equivalents have been added since 2021/22, with an additional 1.75 full-time equivalent approved as part of the 2022/23 budget.
- Training and Development – Training and development costs have varied year-over-year. In 2020/21, a significant portion of budgets for the individual business units were underspent due to COVID-19, where conferences were cancelled, in-person training not , and virtual offerings had yet to be formally established. The expectation, for the 2021/22 budget, was that conferences and training would return to a more normal level with in-person sessions, or, more virtual platforms. This expectation carried forward in the formulation of the 2022/23 budget, with a slight reduction in projected spend as several of the offerings were able to be accommodated in the 2021/22 fiscal year.
- Contract Services – The main cost driver within contract services relates to water quality testing. The actual level of spend did not varied significantly during 2019/20 and 2020/21, although costs for 2020/21 were under budget. For 2021/22, the budget levels for water quality testing are comparable to the prior year, and consistent through 2022/23.
- Materials Supplies and Services – Costs for materials, supplies and services are not significant costs in relation to Regulatory Services. In 2019/20 and 2020/21, there was a reduction in costs because of the pandemic. Costs have increased for 2021/22 and 2022/23 in anticipation of activities within Regulatory Services returning to more normal levels.
- Professional Services – The main cost driver within professional services relates to consulting costs. The actual level of spend did not vary significantly during 2018/19 and 2019/20, and although costs did increase in 2020/21, the level of spend was still below budget for that year. Costs increased 2021/22 due to several special initiatives including, J.D. Kline water withdrawal, investigations, and various internal compliance audits for facilities.
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Regulatory Services</b>											
Salaries and benefits	\$2,539,456	\$3,192,752	\$3,398,921	\$3,536,308	\$4,016,353	\$4,156,925	\$653,296 26%	\$206,169 6%	\$137,387 4%	\$480,045 14%	\$140,572 3%
Training and development	\$17,874	\$30,457	\$38,741	\$95,800	\$84,927	\$86,626	\$12,583 70%	\$8,284 27%	\$57,059 147%	(\$10,873) (11%)	\$1,699 2%
Contract services	\$201,174	\$192,368	\$186,308	\$288,900	\$285,420	\$291,128	(\$8,806) (4%)	(\$6,060) (3%)	\$102,592 55%	(\$3,480) (1%)	\$5,708 2%
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Materials, supplies and services	\$78,859	\$45,294	\$46,963	\$90,455	\$96,665	\$98,598	(\$33,565) (43%)	\$1,669 4%	\$43,492 93%	\$6,210 7%	\$1,933 2%
Professional services	\$108,364	\$116,648	\$155,150	\$240,800	\$185,525	\$189,236	\$8,284 8%	\$38,502 33%	\$85,650 55%	(\$55,275) (23%)	\$3,711 2%
Fleet	\$119,446	\$114,780	\$63,496	\$109,106	\$92,484	\$94,334	(\$4,666) (4%)	(\$51,284) (45%)	\$45,610 72%	(\$16,622) (15%)	\$1,850 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$90,775	\$94,695	\$95,663	\$109,849	\$105,105	\$107,207	\$3,920 4%	\$968 1%	\$14,186 15%	(\$4,744) (4%)	\$2,102 2%
Recoveries	(\$3,750)	(\$5,020)	(\$4,165)	\$0	\$0	\$0	(\$1,270) 34%	\$855 (17%)	\$4,165 (100%)	\$0 0%	\$0 0%
Allocated to Wastewater Services	(\$1,185,591)	(\$1,432,311)	(\$1,384,724)	(\$1,586,600)	(\$1,674,027)	(\$1,727,980)	(\$246,720) 21%	\$47,587 (3%)	(\$201,876) 15%	(\$87,427) 6%	(\$53,953) 3%
Allocated to Stormwater Services	(\$1,287,289)	(\$1,490,202)	(\$1,505,483)	(\$1,683,720)	(\$1,727,454)	(\$1,784,899)	(\$202,913) 16%	(\$15,281) 1%	(\$178,237) 12%	(\$43,734) 3%	(\$57,445) 3%
<b>Total Regulatory Services</b>	<b>\$679,318</b>	<b>\$859,461</b>	<b>\$1,090,870</b>	<b>\$1,200,898</b>	<b>\$1,464,998</b>	<b>\$1,511,175</b>	<b>\$180,143 27%</b>	<b>\$231,409 27%</b>	<b>\$110,028 10%</b>	<b>\$264,100 22%</b>	<b>\$46,177 3%</b>

**Customer Service**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. A decrease is reported in 2020/21 compared to the prior year because of the retroactive amounts paid. Normal increases are projected for 2021/22, and increases for 2022/23 are lower than expected because of a reduction in the number of full-time equivalents of 2.5 compared to the 2021/22 budget.
- Training and Development – Training and development are not significant costs related Customer Service, and has remained relatively low historically. Cost reductions were indicative of the effect the COVID-19 pandemic was having with respect to conferences and training.
- Materials Supplies, and Services – Customer Service costs for materials, supplies, and services are centered within the Customer Billing department, and specifically the cost element for postage. The most dramatic increase occurred in the 2021/22 budget where it was anticipated Halifax Water would implement monthly billing for all customers, discontinuing quarterly billing, at a potential additional cost of \$550 thousand in postage alone. For the 2022/23, budget the decision to move to monthly billing was reversed and will be reconsidered based on the approval of rate increases.
- Professional Services – Historical costs related to professional services were mainly in support of the Help to Others (H2O) Program. In 2021/22, the budget and associated costs related to this program were moved to the General Manager's Office, under Administration.
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

	Operating Expenditures						Variances ( year over year - \$ and % )				
					Test Year #1	Test Year #2				Test Year #1	Test Year #2
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	2022/23 Budget	2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	2022/23 Budget	2023/24 Budget
Customer Service											
Salaries and benefits	\$3,197,892	\$3,519,150	\$3,390,362	\$3,520,075	\$3,535,947	\$3,659,705	\$321,258 10%	(\$128,788) (4%)	\$129,713 4%	\$15,872 0%	\$123,758 3%
Training and development	\$35,133	\$30,325	\$3,681	\$43,400	\$24,500	\$24,990	(\$4,808) (14%)	(\$26,644) (88%)	\$39,719 1079%	(\$18,900) (44%)	\$490 2%
Contract services	\$256,110	\$133,665	\$164,044	\$342,340	\$295,633	\$301,546	(\$122,445) (48%)	\$30,379 23%	\$178,296 109%	(\$46,707) (14%)	\$5,913 2%
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Materials, supplies and services	\$471,156	\$510,766	\$535,927	\$1,326,675	\$538,215	\$548,979	\$39,610 8%	\$25,161 5%	\$790,748 148%	(\$788,460) (59%)	\$10,764 2%
Professional services	\$36,300	\$40,169	\$62,958	\$0	\$0	\$0	\$3,869 11%	\$22,789 57%	(\$62,958) (100%)	\$0 0%	\$0 0%
Fleet	\$279,059	\$331,715	\$223,389	\$96,590	\$80,000	\$81,600	\$52,656 19%	(\$108,326) (33%)	(\$126,799) (57%)	(\$16,590) (17%)	\$1,600 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$644,320	\$601,936	\$700,321	\$507,579	\$369,603	\$376,995	(\$42,384) (7%)	\$98,385 16%	(\$192,742) (28%)	(\$137,976) (27%)	\$7,392 2%
Allocated to Wastewater Services	(\$2,061,287)	(\$2,277,188)	(\$2,188,838)	(\$2,521,849)	(\$2,170,237)	(\$2,237,450)	(\$215,901) 10%	\$88,350 (4%)	(\$333,011) 15%	\$351,612 (14%)	(\$67,213) 3%
Allocated to Stormwater Services	(\$334,590)	(\$370,354)	(\$277,705)	(\$341,031)	(\$203,273)	(\$209,519)	(\$35,764) 11%	\$92,649 (25%)	(\$63,326) 23%	\$137,758 (40%)	(\$6,246) 3%
Total Customer Service	\$2,524,093	\$2,520,184	\$2,614,139	\$2,973,779	\$2,470,388	\$2,546,846	(\$3,909) (0%)	\$93,955 4%	\$359,640 14%	(\$503,391) (17%)	\$76,458 3%



## **Corporate Services**

For 2021/22, costs related to Corporate Services were separated from the former “Administration and Pension” into two separate divisions within the organizational hierarchy. The remaining portion of Administration and Pension became the Administration Section. Corporate Services is headed by the Director, Corporate Services/CFO, who is responsible for the functions of Accounting, Finance, Procurement, and Customer Service. For purposes of the analysis below, all except Customer Service is included, as Customer Service is dealt with separately from a cost-of-service rate making perspective.

- **Salaries and Benefits** – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). In 2022/23, cost reductions have been projected due to staff currently engaged in the new ERP capital project which is due to go-live later in November 2022. There was 1 new full-time equivalent included within the approved 2022/23 budget.
- **Training and Development** – Training and development are not significant costs related Corporate Services. The modest decrease for 2022/23 recognizes a cautious optimism that conferences and training may return to normal, however, continued virtual offerings by organizations provide savings in terms of travel costs, etc.
- **Contract Services** – Costs here relate to services required for the Cost-of-Service Manual review, a water demand analysis and a pending rate application. Costs decrease in 2022/23 as some of this work was completed in the 2021/22 fiscal year.
- **Materials, Supplies and Services** – Costs within this cost element group are not significant related to Corporate Services, and include expenditures such as postage, telephones, etc.
- **Professional Services** – Costs within this cost element group include expenditures such as the annual corporate audit and consulting services as required. There was a decrease in 2022/23 associated with a request for proposal (RFP) for the annual corporate audit. Additionally there were other initiatives included in 2021/22 such as a procurement and Dispute Resolution Officer (DRO) audit that were either performed in-house or deemed not necessary.
- **Fleet Services** – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. In the 2021/22 budget an error was discovered, wherein a vehicle was inadvertently charged to Corporate Services, which was corrected in 2022/23. Typically, the only costs for fleet would be reimbursements to staff for mileage, travel, and parking.
- **Applied Overheads and Other Allocations** – Included here are several other operating costs, the largest of which is the annual insurance policy premium. Budgeted costs in 2022/23 amounted to \$1.2 million compared to \$1.0 million in 2021/22, which accounts for the change reported between the respective years.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Corporate Services</b>											
Salaries and benefits				\$1,306,623	\$1,201,125	\$1,243,164				(\$105,498) (8%)	\$42,039 3%
Training and development				\$53,000	\$36,600	\$37,332				(\$16,400) (31%)	\$732 2%
Contract services				\$269,660	\$230,200	\$234,804				(\$39,460) (15%)	\$4,604 2%
Electricity				\$0	\$0	\$0				\$0 0%	\$0 0%
Materials, supplies and services				\$41,030	\$19,080	\$19,462				(\$21,950) (53%)	\$382 2%
Professional services				\$256,800	\$74,436	\$75,925				(\$182,364) (71%)	\$1,489 2%
Fleet				\$10,096	\$766	\$781				(\$9,330) (92%)	\$15 2%
Chemicals				\$0	\$0	\$0				\$0 0%	\$0 0%
Applied overheads and other allocations				\$1,186,730	\$1,407,241	\$1,435,386				\$220,511 19%	\$28,145 2%
Allocated to Wastewater Services				(\$1,317,924)	(\$1,309,528)	(\$1,343,664)				\$8,396 (1%)	(\$34,136) 3%
Allocated to Stormwater Services				(\$214,342)	(\$145,503)	(\$149,296)				\$68,839 (32%)	(\$3,793) 3%
<b>Total Corporate Services</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,591,673</b>	<b>\$1,514,417</b>	<b>\$1,553,894</b>				(\$77,256) (5%)	\$39,477 3%

## **Administration**

For 2021/22, costs related to Corporate Services were separated from the former “Administration and Pension” into two separate divisions within the organizational hierarchy. The remaining portion of Administration and Pension became the Administration Section. The Administration Section is headed by the General Manager, who is responsible for the functions of the General Manager’s Office, Human Resources, Legal, and Communications.

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 would have increased due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019, however, a decrease has been reported due to an offsetting reduction related to Halifax Water no longer being responsible to make payments to fund the unfunded liability of the pension plan. This payment amounted to approximately \$0.8 million per year in the three prior years. The decrease in 2021/22 relates to the segregation of Administration and Pension as noted above. Increases in 2022/23 are due to 4.5 new full-time equivalents budgeted.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content and timing of any offerings. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21, conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The main driver of costs in Administration are those initiatives within the Human Resources department, which include core training for staff, but also leadership/supervisory training and professional development. The expectation for the 2021/22 budget was that conferences and training would return to more normal levels, with that same expectation carried forward into 2022/23 and beyond.
- Contract Services – Costs appearing within this cost element group are driven mainly by initiatives within the Human Resources department, including harassment investigations, work site assessments, and specialized services requiring external contractors. Expenditures vary year-over-year, for example in 2018/19 costs predominately were directed towards executive recruitment, which would explain cost reductions reported in 2019/20. The reductions experienced in 2020/21 are due to COVID-19 and the inability to contract external services, especially for onsite work, because of restrictions imposed during the pandemic. For 2021/22 and beyond, the expectation was that contract services would return to normal levels.
- Materials Supplies and Services – Costs for materials, supplies, and services vary year-over-year, and cover a wide variety of cost elements. Cost reductions in 2020/21 are likely due to the pandemic, where staff were working from home with more reliance placed on digital options. For 2021/22, the reduction reported was due to the allocation between Corporate Services and Administration.
- Professional Services – Costs associated with professional services vary year-over-year and include mainly regulatory fees, legal fees, and consulting. Cost increases in 2019/20 were due to a \$240 thousand increase in legal fees compared 2018/19. The decrease experienced in 2020/21 was a reversal of the higher legal cost of 2019/20, offset somewhat by increased costs related to regulatory fees. For 2022/23, professional services are budget to increase with respect to regulatory and legal fees in anticipation of the proposed rate application for water, wastewater and stormwater, and revisions to the Cost-of-Service Manual.

- Fleet – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs, and include for reimbursements to staff for mileage, travel, and parking.

	Operating Expenditures						Variances <i>( year over year - \$ and % )</i>				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Administration											
Salaries and benefits	\$5,022,077	\$3,968,378	\$4,174,233	\$2,843,503	\$3,357,868	\$3,475,393	(\$1,053,699) (21%)	\$205,855 5%	(\$1,330,730) (32%)	\$514,365 18%	\$117,525 3%
Training and development	\$259,173	\$212,585	\$183,999	\$367,353	\$397,562	\$405,513	(\$46,588) (18%)	(\$28,586) (13%)	\$183,354 100%	\$30,209 8%	\$7,951 2%
Contract services	\$244,482	\$221,440	\$176,915	\$218,623	\$199,195	\$203,179	(\$23,042) (9%)	(\$44,525) (20%)	\$41,708 24%	(\$19,428) (9%)	\$3,984 2%
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Materials, supplies and services	\$219,231	\$219,580	\$175,163	\$113,180	\$104,834	\$105,791	\$349 0%	(\$44,417) (20%)	(\$61,983) (35%)	(\$8,346) (7%)	\$957 1%
Professional services	\$1,032,338	\$1,341,216	\$1,061,611	\$1,115,415	\$1,513,674	\$1,543,947	\$308,878 30%	(\$279,605) (21%)	\$53,804 5%	\$398,259 36%	\$30,273 2%
Fleet	\$23,582	\$20,612	\$15,917	\$10,390	\$19,993	\$20,393	(\$2,970) (13%)	(\$4,695) (23%)	(\$5,527) (35%)	\$9,603 92%	\$400 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$954,618	\$1,060,048	\$1,278,190	\$260,130	\$261,875	\$267,113	\$105,430 11%	\$218,142 21%	(\$1,018,060) (80%)	\$1,745 1%	\$5,238 2%
Allocated to Wastewater Services	(\$3,242,216)	(\$3,023,641)	(\$2,964,892)	(\$2,079,326)	(\$2,582,056)	(\$2,655,409)	\$218,575 (7%)	\$58,749 (2%)	\$885,566 (30%)	(\$502,730) 24%	(\$73,353) 3%
Allocated to Stormwater Services	(\$521,581)	(\$484,119)	(\$482,143)	(\$338,174)	(\$286,895)	(\$295,045)	\$37,462 (7%)	\$1,976 (0%)	\$143,969 (30%)	\$51,279 (15%)	(\$8,150) 3%
Total Administration	\$3,991,704	\$3,536,099	\$3,618,993	\$2,511,094	\$2,986,050	\$3,070,875	(\$455,605) (11%)	\$82,894 2%	(\$1,107,899) (31%)	\$474,956 19%	\$84,825 3%

## **Worksheet W-5 Cost-of-Service (COS) Structure**

Worksheet W-5 details the customer classifications, cost functions with allocated percentages, service characteristics and operating and capital cost classifications for Water Services as detailed in the Cost-of-Service Manual.

# Halifax Water Water Rate Study

## Customer Classifications, Cost Functions & Service Characteristics

## Operating Cost Classifications

## Capital Cost Classifications

[illegible]

## **Worksheet W-6 Operating Expense Functionalization**

Worksheet W-6 details the Water Services operating expense cost element groups, by the system functions detailed in the Cost-of-Service Manual. The total of the service functions equals the operating expense category in the revenue requirement for the year 2022/23, and are reported as both a dollar and percentage value. These values are used in Worksheet W-10 to allocate the costs to the service characteristics.

[illegible]



Engineering and TS	
Salaries and benefits	\$4,930,359
Training and development	\$435,846
Contract services	\$6,000
Electricity	\$0
Materials, supplies and services	\$5,168,550
Professional services	\$116,742
Fleet	\$107,860
Chemicals	\$0
Applied overheads and other allocations	\$299,051
Allocation to Wastewater Service	(\$5,378,043)
Allocation to Stormwater Service	(\$2,149,987)
Total Engineering and TS	\$3,536,378
Regulatory Services	
Salaries and benefits	\$4,016,353
Training and development	\$84,927
Contract services	\$285,420
Electricity	\$0
Materials, supplies and services	\$96,665
Professional services	\$185,525
Fleet	\$92,484
Chemicals	\$0
Applied overheads and other allocations	\$105,105
Allocation to Wastewater Service	(\$1,674,027)
Allocation to Stormwater Service	(\$1,727,454)
Total Regulatory Services	\$1,464,998
Customer Service	
Salaries and benefits	\$3,535,947
Training and development	\$24,500
Contract services	\$295,633
Electricity	\$0
Materials, supplies and services	\$538,215
Professional services	\$0
Fleet	\$80,000
Chemicals	\$0
Applied overheads and other allocations	\$369,603
Allocation to Wastewater Service	(\$2,170,237)
Allocation to Stormwater Service	(\$203,273)
Total Customer Service	\$2,470,388

Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,930,359	\$0	\$0	\$0	\$4,930,359
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$435,846	\$0	\$0	\$0	\$435,846
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,000	\$0	\$0	\$0	\$6,000
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,168,550	\$0	\$0	\$0	\$5,168,550
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$116,742	\$0	\$0	\$0	\$116,742
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$107,860	\$0	\$0	\$0	\$107,860
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$299,051	\$0	\$0	\$0	\$299,051
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$5,378,043)	\$0	\$0	\$0	(\$5,378,043)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$2,149,987)	\$0	\$0	\$0	(\$2,149,987)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,536,378	\$0	\$0	\$0	\$3,536,378
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,016,353	\$0	\$0	\$4,016,353
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$84,927	\$0	\$0	\$84,927
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$285,420	\$0	\$0	\$285,420
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$96,665	\$0	\$0	\$96,665
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$185,525	\$0	\$0	\$185,525
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$92,484	\$0	\$0	\$92,484
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$105,105	\$0	\$0	\$105,105
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$1,674,027)	\$0	\$0	(\$1,674,027)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$1,727,454)	\$0	\$0	(\$1,727,454)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,464,998	\$0	\$0	\$1,464,998
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,541,514	\$563,146	\$431,287	\$0	\$0	\$0	\$0	\$3,535,947
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$20,900	\$3,600	\$0	\$0	\$0	\$0	\$0	\$24,500
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$151,855	\$34,900	\$108,878	\$0	\$0	\$0	\$0	\$295,633
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$94,025	\$23,840	\$420,350	\$0	\$0	\$0	\$0	\$538,215
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,000	\$64,000	\$0	\$0	\$0	\$0	\$0	\$80,000
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$358,053	\$4,826	\$6,724	\$0	\$0	\$0	\$0	\$369,603
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$1,356,077)	(\$340,213)	(\$473,947)	\$0	\$0	\$0	\$0	(\$2,170,237)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$203,273)	\$0	\$0	\$0	\$0	\$0	\$0	(\$203,273)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,622,997	\$354,099	\$493,292	\$0	\$0	\$0	\$0	\$2,470,388

Corporate Services		Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
Salaries and benefits	\$1,201,125	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,201,125	\$0	\$1,201,125
Training and development	\$36,600	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$36,600	\$0	\$36,600
Contract services	\$230,200	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$230,200	\$0	\$230,200
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Materials, supplies and services	\$19,080	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,080	\$0	\$19,080
Professional services	\$74,436	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$74,436	\$0	\$74,436
Fleet	\$766	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$766	\$0	\$766
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Applied overheads and other allocations	\$1,407,241	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,407,241	\$0	\$1,407,241
Allocation of Costs to Wastewater Services	(\$1,309,528)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$1,309,528)	\$0	(\$1,309,528)
Allocation of Costs to Stormwater Services	(\$145,503)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$145,503)	\$0	(\$145,503)
Total Corporate Services	\$1,514,417	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,514,417	\$0	\$1,514,417
Administration		Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
Salaries and benefits	\$3,357,868	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,357,868	\$3,357,868
Training and development	\$397,562	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$397,562	\$397,562
Contract services	\$199,195	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$199,195	\$199,195
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Materials, supplies and services	\$104,834	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$104,834	\$104,834
Professional services	\$1,513,674	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,513,674	\$1,513,674
Fleet	\$19,993	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,993	\$19,993
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Applied overheads and other allocations	\$261,875	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$261,875	\$261,875
Allocation of Costs to Wastewater Services	(\$2,582,056)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$2,582,056)	(\$2,582,056)
Allocation of Costs to Stormwater Services	(\$286,895)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$286,895)	(\$286,895)
Total Administration	\$2,986,050	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,986,050	\$2,986,050
Total O&M Expense	\$36,758,298	\$371,537	\$15,729	\$1,022,402	\$9,804,430	\$213,446	\$6,475,720	\$266,815	\$2,322,392	\$3,162,494	\$1,131,103	\$1,622,997	\$354,099	\$493,292	\$3,536,378	\$1,464,998	\$1,514,417	\$2,986,050	\$36,758,299



<b>Engineering and TS</b>	
Salaries and benefits	\$4,930,359
Training and development	\$435,846
Contract services	\$6,000
Electricity	\$0
Materials, supplies and services	\$5,168,550
Professional services	\$116,742
Fleet	\$107,860
Chemicals	\$0
Applied overheads and other allocations	\$299,051
Allocation to Wastewater Service	(\$5,378,043)
Allocation to Stormwater Service	(\$2,149,987)
<b>Total Engineering and TS</b>	<b>\$3,536,378</b>

<b>Regulatory Services</b>	
Salaries and benefits	\$4,016,353
Training and development	\$84,927
Contract services	\$285,420
Electricity	\$0
Materials, supplies and services	\$96,665
Professional services	\$185,525
Fleet	\$92,484
Chemicals	\$0
Applied overheads and other allocations	\$105,105
Allocation to Wastewater Service	(\$1,674,027)
Allocation to Stormwater Service	(\$1,727,454)
<b>Total Regulatory Services</b>	<b>\$1,464,998</b>

<b>Customer Service</b>	
Salaries and benefits	\$3,535,947
Training and development	\$24,500
Contract services	\$295,633
Electricity	\$0
Materials, supplies and services	\$538,215
Professional services	\$0
Fleet	\$80,000
Chemicals	\$0
Applied overheads and other allocations	\$369,603
Allocation to Wastewater Service	(\$2,170,237)
Allocation to Stormwater Service	(\$203,273)
<b>Total Customer Service</b>	<b>\$2,470,388</b>

Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%

[illegible]

Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
	0%	0%	0%	0%	0%	0%	0%	0%	0%	72%	16%	12%	0%	0%	0%	0%
	0%	0%	0%	0%	0%	0%	0%	0%	0%	85%	15%	0%	0%	0%	0%	0%
	0%	0%	0%	0%	0%	0%	0%	0%	0%	51%	12%	37%	0%	0%	0%	0%
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	4%	78%	0%	0%	0%	0%
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	80%	0%	0%	0%	0%	0%
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	0%	0%	0%	0%	0%	0%	0%	0%	0%	97%	1%	2%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	62%	16%	22%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%

<b>Corporate Services</b>	
Salaries and benefits	\$1,201,125
Training and development	\$36,600
Contract services	\$230,200
Electricity	\$0
Materials, supplies and services	\$19,080
Professional services	\$74,436
Fleet	\$766
Chemicals	\$0
Applied overheads and other allocations	\$1,407,241
Allocation of Costs to Wastewater Services	(\$1,309,528)
Allocation of Costs to Stormwater Services	(\$145,503)
<b>Total Corporate Services</b>	<b>\$1,514,417</b>
<b>Administration</b>	
Salaries and benefits	\$3,357,868
Training and development	\$397,562
Contract services	\$199,195
Electricity	\$0
Materials, supplies and services	\$104,834
Professional services	\$1,513,674
Fleet	\$19,993
Chemicals	\$0
Applied overheads and other allocations	\$261,875
Allocation of Costs to Wastewater Services	(\$2,582,056)
Allocation of Costs to Stormwater Services	(\$286,895)
<b>Total Administration</b>	<b>\$2,986,050</b>
<b>Total O&amp;M Expense</b>	<b>\$36,758,298</b>

Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

## **Worksheet W-7 Continuity Schedule Utility Plant in Service**

Worksheet W-7 provides additional detail on the following:

- Funded utility plant in service,
- Contributed assets,
- Projected utility plant in service additions, net of projected retirements,
- Accumulated depreciation, net of projected retirements,
- Calculated depreciation, and
- Projected net book value.

The spreadsheet is broken down by asset class and asset. For the purposes of the revenue requirement, depreciation for Water transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services.

Halifax Regional Water Commission Utility Plant in Service-Water  Continuity Schedule/ Depreciation for Utility Plant in Service 2022-23																	
	Useful Life in years	Funded Utility Plant in Service	Contributed Utility Plant in Service	Total Utility Plant in Service	Work in Process approved in Prior Years	Utility Plant in Service Additions	Contributed Utility Plant in Service Additions	Projected Retirements	Projected Utility Plant in Service	Accumulated Depreciation	Accumulated Depreciation on funded assets	Accumulated Depreciation on donated assets	Projected Retirement of Accumulated Depreciation	Projected Net Book Value before Depreciation	Depreciation on Donated assets	Depreciation expense on funded assets	Projected Net Book Value after Depreciation
		Mar-22	Mar-22	Mar-22	2022-23	2022-23	2022-23	2022-23	Mar-23	Mar-22	Mar-22	Mar-22	2022-23	Mar-23	2022-23	2022-23	Mar-23
Intangible Plant																	
Organization and Working Capital	10	5,180,495	29,941	5,210,436					5,210,436	2,753,300	2,739,826	13,473	-	2,457,136	2,994	423,546	2,030,596
										-	-	-	-				-
Tangible Plant										-	-	-	-				-
LAND AND LAND RIGHTS										-	-	-	-				-
Source of Supply Land	N/A	13,788,234	-	13,788,234		156,000			13,944,234	-	-	-	-	13,944,234			13,944,234
Power and pumping	N/A	215,345	-	215,345					215,345	-	-	-	-	215,345			215,345
Transmission Right of Ways	N/A	1,256,951	-	1,256,951					1,256,951	-	-	-	-	1,256,951			1,256,951
Reservoir Land	N/A	463,258	-	463,258					463,258	-	-	-	-	463,258			463,258
Office Land	N/A	2,573,529	-	2,573,529					2,573,529	-	-	-	-	2,573,529			2,573,529
Other Land	N/A	218,401	-	218,401					218,401	-	-	-	-	218,401			218,401
Easements & Rights of Ways	N/A	1,331,175	-	1,331,175					1,331,175	-	-	-	-	1,331,175			1,331,175
STRUCTURES AND IMPROVEMENTS				-					-	-	-	-	-	-			-
Source of Supply Structures	5 - 100	808,183	-	808,183					808,183	564,132	564,132	-	-	244,051		12,582	231,469
Power and Pumping Structures	5 - 100	15,186,105	1,809,864	16,995,969		10,745,537	-		27,741,505	3,371,702	3,070,576	301,126	-	24,369,803	34,395	109,534	24,225,874
Purification Structures	5 - 75	50,327,543	5,411,966	55,739,509		357,026	443,000		56,539,535	15,335,019	14,976,415	358,604	-	41,204,515	64,415	641,037	40,499,063
Distribution Reservoirs and Standpipes	20 - 75	20,922,962	3,172,127	24,095,089					24,095,089	9,596,636	9,085,181	511,455	-	14,498,453	43,435	409,279	14,045,739
General	5 - 75	6,775,898	-	6,775,898					6,775,898	1,187,570	1,187,570	-	-	5,588,328		65,350	5,522,978
Office Building	5 - 75	16,686,989	35,266	16,722,255					16,722,255	4,107,872	4,101,877	5,995	-	12,614,382	705	552,564	12,061,113
Collection and Inpounding	75 - 100	8,214,156	3,388,471	11,602,628					11,602,628	1,428,944	1,259,521	169,424	-	10,173,684	67,769	151,944	9,953,970
Small systems	5 - 75	3,583,213	5,105,807	8,689,020		806,831			9,495,850	3,460,719	1,464,506	1,996,213	-	6,035,131	143,698	142,730	5,748,703
Aerotech WTP		1,711,288	61,433	1,772,721		164,525			1,937,246	778,648	741,567	37,081	-	1,158,598	753	78,477	1,079,368
Other Security		41,000	-	41,000		81,000			122,000	4,100	4,100	-	-	117,900		16,300	101,600

Halifax Regional Water Commission Utility Plant in Service-Water  Continuity Schedule/ Depreciation for Utility Plant in Service 2022-23																	
	Useful Life in years	Funded Utility Plant in Service Mar-22	Contributed Utility Plant in Service Mar-22	Total Utility Plant in Service Mar-22	Work in Process approved in Prior Years 2022-23	Utility Plant in Service Additions 2022-23	Contributed Utility Plant in Service Additions 2022-23	Projected Retirements 2022-23	Projected Utility Plant in Service Mar-23	Accumulated Depreciation Mar-22	Accumulated Depreciation on funded assets Mar-22	Accumulated Depreciation on donated assets Mar-22	Projected Retirement of Accumulated Depreciation 2022-23	Projected Net Book Value before Depreciation Mar-23	Depreciation on Donated assets 2022-23	Depreciation expense on funded assets 2022-23	Projected Net Book Value after Depreciation Mar-23
Equipment				-					-	-	-	-	-	-			-
Electrical Pumping	5 - 25	8,767,753	2,058,746	10,826,499		225,543			11,052,042	8,946,876	8,141,881	804,995	-	2,105,166	106,591	627,866	1,370,709
Purification Equipment	5 - 25	30,002,091	35,584	30,037,675		421,619			30,459,294	21,319,217	21,312,990	6,227	-	9,140,076	1,779	1,474,782	7,663,515
Information Technology	5 - 25	11,369,721	3,342	11,373,063					11,373,063	5,468,374	5,461,266	7,108	-	5,904,689	13,360	501,212	5,390,117
Tools and Work Equipment - Ops	5 - 20	2,967,264	-	2,967,264					2,967,264	2,833,909	2,833,909	-	-	133,355		53,025	80,330
Tools and Work Equipment - Plants	5 - 20	369,905	-	369,905					369,905	279,608	279,608	-	-	90,297		35,977	54,320
Tools and Work Equipment - Other	5 - 20	562,778	-	562,778					562,778	336,160	336,160	-	-	226,618		79,071	147,547
Transportation Equipment	5	6,204,978	-	6,204,978		231,000		250,000	6,185,978	4,527,208	4,527,208	-	250,000	1,908,770		640,218	1,268,552
Office Furniture and Equipment	5 - 30	2,969,321	-	2,969,321					2,969,321	2,912,601	2,912,601	-	-	56,720		28,089	28,631
Computer Equipment and Software	3 - 10	17,238,228	-	17,238,228		4,456,982			21,695,210	5,636,116	5,636,116	-	-	16,059,094		1,959,604	14,099,490
Other Equipment		-	-	-					-	-	-	-	-	-			-
Mains				-					-	-		-	-	-			-
Transmission	75 - 100	118,382,084	15,881,364	134,263,448		1,386,980	9,041,020		144,691,448	31,860,166	30,875,728	984,439	-	112,831,282	221,277	1,360,224	111,249,780
Distribution	60 - 75	159,336,010	128,329,452	287,665,462		4,026,990	3,200,000	50,000	294,842,452	73,374,394	51,293,459	22,080,936	40,000	221,508,057	1,721,722	2,012,422	217,773,914
Meters	20 - 25	18,837,251	23,069	18,860,319		174,397	-	50,000	18,984,716	6,457,570	6,434,501	23,069	20,000	12,547,146	-	907,538	11,639,608
Hydrants	50	12,026,796	10,318,353	22,345,149		125,000	280,000	50,000	22,700,149	5,538,188	2,867,969	2,670,219	40,000	17,201,961	216,755	147,558	16,837,647
Services	50	26,353,329	18,025,031	44,378,359		1,382,010	520,000		46,280,369	9,838,240	5,123,631	4,714,609	-	36,442,129	369,064	409,110	35,663,955
Other				-		-	-		-	-				-			-
TOTAL		564,672,232	193,689,815	758,362,048	-	24,741,438	13,484,020	400,000	796,187,506	221,917,271	187,232,297	34,684,974	350,000	574,620,235	3,008,713	12,840,040	558,771,482



## **Worksheet W-8 Depreciation Functionalization**

Worksheet W-8 allocates the budgeted annual depreciation charge included in the revenue requirement for test year 2022/23 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, and reported as both a dollar and percentage value. These are used in Worksheet W-10 to allocate depreciation to the service characteristics. As noted previously, depreciation for Water transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services.

## Worksheet W-8

Calculation of Depreciation of Tangible Plant at Total Cost 2022/23	
	Annual Depreciation
<b>Intangible Plant</b>	
Organization and Working Capital	\$423,546
<b>Tangible Plant</b>	
<b>LAND AND LAND RIGHTS</b>	
Source of Supply Land	\$0
Power and pumping	\$0
Transmission Right of Ways	\$0
Water Rights	\$0
Reservoir Land	\$0
Office Land	\$0
Other Land	\$0
Easements & Rights of Ways	\$0
<b>STRUCTURES AND IMPROVEMENTS</b>	
Source of Supply Structures	\$12,582
Power and Pumping Structures	\$109,534
Purification Structures	\$641,037
Distribution Reservoirs and Standpipes	\$409,279
General	\$65,350
Office Building	\$552,564
Collection and Impounding	\$151,944
Small systems	\$142,730
Aerotech Water Treatment Plant	\$78,477
Other - Security	\$16,300
<b>EQUIPMENT</b>	
Electrical Pumping	\$627,866
Purification Equipment	\$1,474,782
Information Technology	\$501,212
Tools and Work Equipment - Ops	\$53,025
Tools and Work Equipment - Plants	\$35,977
Tools and Work Equipment - Other	\$79,071
Office Furniture and Equipment	\$28,089
Computer Equipment and Software	\$1,959,604
Other Equipment	\$0
<b>MAINS</b>	
Transmission	\$1,360,224
Distribution	\$2,012,422
<b>Meters</b>	\$907,538
<b>Hydrants</b>	\$147,558
Sprinkler Connections	\$0
<b>Services</b>	\$409,110
<b>Other</b>	\$0
<b>TOTAL</b>	\$12,199,822

[illegible]

Worksheet W-8

Halifax Water Water Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2022/23	
	Annual Depreciation
Intangible Plant	
Organization and Working Capital	\$423,546
Tangible Plant	
LAND AND LAND RIGHTS	
Source of Supply Land	\$0
Power and pumping	\$0
Transmission Right of Ways	\$0
Water Rights	\$0
Reservoir Land	\$0
Office Land	\$0
Other Land	\$0
Easements & Rights of Ways	\$0
STRUCTURES AND IMPROVEMENTS	
Source of Supply Structures	\$12,582
Power and Pumping Structures	\$109,534
Purification Structures	\$641,037
Distribution Reservoirs and Standpipes	\$409,279
General	\$65,350
Office Building	\$552,564
Collection and Impounding	\$151,944
Small systems	\$142,730
Aerotech Water Treatment Plant	\$78,477
Other - Security	\$16,300
EQUIPMENT	
Electrical Pumping	\$627,866
Purification Equipment	\$1,474,782
Information Technology	\$501,212
Tools and Work Equipment - Ops	\$53,025
Tools and Work Equipment - Plants	\$35,977
Tools and Work Equipment - Other	\$79,071
Office Furniture and Equipment	\$28,089
Computer Equipment and Software	\$1,959,604
Other Equipment	\$0
MAINS	
Transmission	\$1,360,224
Distribution	\$2,012,422
Meters	\$907,538
Hydrants	\$147,558
Sprinkler Connections	\$0
Services	\$409,110
Other	\$0
TOTAL	\$12,199,822

Halifax Water Water Rate Study																	
Calculation of Depreciation of Tangible Plant at Total Cost Functionalization of Depreciation Expressed in Dollars (\$) 2022/23																	
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
Intangible Plant																	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$423,546	\$423,546
LAND AND LAND RIGHTS																	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
STRUCTURES AND IMPROVEMENTS																	
\$0	\$6,291	\$0	\$6,291	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$12,582
\$0	\$0	\$0	\$54,767	\$27,384	\$27,384	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$109,535
\$0	\$0	\$0	\$641,037	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$641,037
\$0	\$0	\$0	\$0	\$0	\$0	\$409,279	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$409,279
\$0	\$0	\$0	\$29,408	\$29,408	\$6,535	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$65,351
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$552,564	\$552,564
\$0	\$151,944	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$151,944
\$0	\$0	\$0	\$114,184	\$14,273	\$14,273	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$142,730
\$0	\$0	\$0	\$45,517	\$0	\$11,772	\$12,556	\$0	\$0	\$0	\$0	\$3,139	\$0	\$0	\$0	\$0	\$5,493	\$78,477
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,300	\$16,300
EQUIPMENT																	
\$0	\$0	\$0	\$313,933	\$156,967	\$156,967	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$627,867
\$0	\$0	\$0	\$1,474,782	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,474,782
\$0	\$0	\$0	\$250,606	\$125,303	\$125,303	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$501,212
\$0	\$0	\$0	\$5,302	\$15,907	\$21,210	\$0	\$5,302	\$5,302	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$53,023
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$35,977	\$35,977
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$79,071	\$0	\$0	\$0	\$0	\$0	\$79,071
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$28,089	\$28,089
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$489,901	\$0	\$0	\$489,901	\$0	\$0	\$979,802	\$1,959,604
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MAINS																	
\$0	\$0	\$0	\$0	\$1,360,224	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,360,224
\$0	\$0	\$0	\$0	\$0	\$2,012,422	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,012,422
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$907,538	\$0	\$0	\$0	\$0	\$0	\$907,538
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$147,558	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$147,558
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$409,110	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$409,110
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$158,235	\$0	\$2,935,827	\$1,729,466	\$2,375,866	\$421,835	\$152,860	\$414,412	\$0	\$489,901	\$989,748	\$0	\$489,901	\$0	\$0	\$2,041,771	\$12,199,822
0.00%	1.30%	0.00%	24.06%	14.18%	19.47%	3.46%	1.25%	3.40%	0.00%	4.02%	8.11%	0.00%	4.02%	0.00%	0.00%	16.74%	100.01%

### **Worksheet W-9 Allocation of Utility Plant in Service**

Worksheet W-9 allocates the budgeted utility plant in service for the test year 2022/23 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, and reported as both a dollar and percentage value. These are used in Worksheet W-10 to allocate debt service costs to the service characteristics.

Worksheet W-9

Halifax Water Water Rate Study					
Allocation of Utility Plant in Service 2022/23					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Donated or Contributed Assets	Rate Base (Col F - Col G)
ntangible Plant					
Organization and Working Capital	\$5,210,436	\$3,179,840	\$2,030,596	\$13,473	\$2,017,123
Tangible Plant					
LAND AND LAND RIGHTS					
Source of Supply Land	\$13,944,234	\$0	\$13,944,234	\$0	\$13,944,234
Power and pumping	\$215,345	\$0	\$215,345	\$0	\$215,345
Transmission Right of Ways	\$1,256,951	\$0	\$1,256,951	\$0	\$1,256,951
Reservoir Land	\$463,258	\$0	\$463,258	\$0	\$463,258
Office Land	\$2,573,529	\$0	\$2,573,529	\$0	\$2,573,529
Other Land	\$218,401	\$0	\$218,401	\$0	\$218,401
Easements & Rights of Ways	\$1,331,175	\$0	\$1,331,175	\$0	\$1,331,175
STRUCTURES AND IMPROVEMENTS					
Source of Supply Structures	\$808,183	\$576,714	\$231,469	\$0	\$231,469
Power and Pumping Structures	\$27,741,505	\$3,515,631	\$24,225,874	\$1,474,342	\$22,751,531
Purification Structures	\$56,539,535	\$16,040,471	\$40,499,063	\$5,431,947	\$35,067,116
Distribution Reservoirs and Standpipes	\$24,095,089	\$10,049,350	\$14,045,739	\$2,617,237	\$11,428,502
General	\$6,775,898	\$1,252,920	\$5,522,978	\$0	\$5,522,978
Office Building	\$16,722,255	\$4,661,142	\$12,061,113	\$28,565	\$12,032,547
Collection and Impounding	\$11,602,628	\$1,648,658	\$9,953,970	\$3,151,278	\$6,802,691
Small systems	\$9,495,850	\$3,747,147	\$5,748,703	\$2,965,896	\$2,782,808
Aerotech Water Treatment Plant	\$1,937,246	\$857,878	\$1,079,368	\$23,599	\$1,055,769
Other - Security	\$122,000	\$20,400	\$101,600	\$0	\$101,600
EQUIPMENT					
Electrical Pumping	\$11,052,042	\$9,681,333	\$1,370,709	\$1,147,160	\$223,549
Purification Equipment	\$30,459,294	\$22,795,778	\$7,663,515	\$27,577	\$7,635,938
Information Technology	\$11,373,063	\$5,982,946	\$5,390,117	(\$17,126)	\$5,407,243
Tools and Work Equipment - Ops	\$2,967,264	\$2,886,934	\$80,330	\$0	\$80,330
Tools and Work Equipment - Plants	\$369,905	\$315,585	\$54,320	\$0	\$54,320
Tools and Work Equipment - Other	\$562,778	\$415,231	\$147,547	\$0	\$147,547
Transportation Equipment	\$6,185,978	\$4,917,426	\$1,268,552	\$0	\$1,268,552
Office Furniture and Equipment	\$2,969,321	\$2,940,690	\$28,631	\$0	\$28,631
Computer Equipment and Software	\$21,695,210	\$7,595,720	\$14,099,490	\$0	\$14,099,490
Other Equipment	\$0	\$0	\$0	\$0	\$0
MAINS					
Transmission	\$144,691,448	\$33,441,668	\$111,249,780	\$23,716,669	\$87,533,112
Distribution	\$294,842,452	\$77,068,538	\$217,773,914	\$107,726,794	\$110,047,120
Meters	\$18,984,716	\$7,345,108	\$11,639,608	\$0	\$11,639,608
Hydrants	\$22,700,149	\$5,862,501	\$16,837,647	\$7,711,378	\$9,126,269
Sprinkler Connections	\$0	\$0	\$0	\$0	\$0
Services	\$46,280,369	\$10,616,414	\$35,663,955	\$13,461,358	\$22,202,598
Other	\$0	\$0	\$0	\$0	\$0
TOTAL	\$796,187,506	\$237,416,024	\$558,771,482	\$169,480,149	\$389,291,334

Halifax Water Water Rate Study																	
Allocation of Utility Plant in Service Functionalization of the Rate Base Expressed as a Percentage (%) 2022/23																	
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	
Intangible Plant																	
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Tangible Plant																	
LAND AND LAND RIGHTS																	
95%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	50%	25%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
50%	0%	0%	15%	0%	35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
STRUCTURES AND IMPROVEMENTS																	
0%	50%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	50%	25%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	45%	45%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	80%	10%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	58%	0%	15%	16%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	7%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
EQUIPMENT																	
0%	0%	0%	50%	25%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	50%	25%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	10%	30%	40%	0%	10%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	25%	0%	0%	0%	50%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
MAINS																	
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

Worksheet W-9

Halifax Water Water Rate Study						Halifax Water Water Rate Study																							
Allocation of Utility Plant in Service 2022/23						Allocation of Utility Plant in Service Functionalization of Rate Base Expressed in Dollars (\$) 2022/23																							
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Donated or Contributed Assets	Rate Base (Col F - Col G)	Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total						
Intangible Plant						Intangible Plant																							
Organization and Working Capital						\$5,210,436	\$3,179,840	\$2,030,596	\$13,473	\$2,017,123																		\$2,017,123	\$2,017,123
Tangible Plant LAND AND LAND RIGHTS						Tangible Plant LAND AND LAND RIGHTS																							
Source of Supply Land	\$13,944,234	\$0	\$13,944,234	\$0	\$13,944,234	\$13,247,022	\$697,212	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,944,234					
Power and pumping	\$215,345	\$0	\$215,345	\$0	\$215,345	\$0	\$0	\$0	\$107,673	\$53,836	\$53,836	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$215,345					
Transmission Right of Ways	\$1,256,951	\$0	\$1,256,951	\$0	\$1,256,951	\$0	\$0	\$0	\$0	\$1,256,951	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,256,951					
Reservoir Land	\$463,258	\$0	\$463,258	\$0	\$463,258	\$0	\$0	\$0	\$0	\$0	\$0	\$463,258	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$463,258					
Office Land	\$2,573,529	\$0	\$2,573,529	\$0	\$2,573,529	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,573,529	\$2,573,529					
Other Land	\$218,401	\$0	\$218,401	\$0	\$218,401	\$218,401	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$218,401					
Easements & Rights of Ways	\$1,331,175	\$0	\$1,331,175	\$0	\$1,331,175	\$665,588	\$0	\$0	\$199,676	\$0	\$465,911	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,331,175					
STRUCTURES AND IMPROVEMENTS						STRUCTURES AND IMPROVEMENTS																							
Source of Supply Structures	\$808,183	\$576,714	\$231,469	\$0	\$231,469	\$0	\$115,734	\$0	\$115,734	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$231,469					
Power and Pumping Structures	\$27,741,505	\$3,515,631	\$24,225,874	\$1,474,342	\$22,751,531	\$0	\$0	\$0	\$11,375,766	\$5,687,883	\$5,687,883	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$22,751,532					
Purification Structures	\$56,539,535	\$16,040,471	\$40,499,063	\$5,431,947	\$35,067,116	\$0	\$0	\$0	\$35,067,116	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$35,067,116					
Distribution Reservoirs and Standpipes	\$24,095,089	\$10,049,350	\$14,045,739	\$2,617,237	\$11,428,502	\$0	\$0	\$0	\$0	\$0	\$0	\$11,428,502	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,428,502					
General	\$6,775,898	\$1,252,920	\$5,522,978	\$0	\$5,522,978	\$0	\$0	\$0	\$2,485,340	\$2,485,340	\$552,298	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,522,978					
Office Building	\$16,722,255	\$4,661,142	\$12,061,113	\$28,565	\$12,032,547	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$12,032,547	\$12,032,547					
Collection and Impounding	\$11,602,628	\$1,648,658	\$9,953,970	\$3,151,278	\$6,802,691	\$0	\$6,802,691	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,802,691					
Small systems	\$9,495,850	\$3,747,147	\$5,748,703	\$2,965,896	\$2,782,808	\$0	\$0	\$0	\$2,226,246	\$278,281	\$278,281	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,782,808					
Aerotech Water Treatment Plant	\$1,937,246	\$857,878	\$1,079,368	\$23,599	\$1,055,769	\$0	\$0	\$0	\$612,346	\$0	\$158,365	\$168,923	\$0	\$0	\$0	\$0	\$42,231	\$0	\$0	\$0	\$0	\$0	\$73,904	\$1,055,769					
Other - Security	\$122,000	\$20,400	\$101,600	\$0	\$101,600	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$101,600	\$101,600					
EQUIPMENT						EQUIPMENT																							
Electrical Pumping	\$11,052,042	\$9,681,333	\$1,370,709	\$1,147,160	\$223,549	\$0	\$0	\$0	\$111,774	\$55,887	\$55,887	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$223,548					
Purification Equipment	\$30,459,294	\$22,795,778	\$7,663,515	\$27,577	\$7,635,938	\$0	\$0	\$0	\$7,635,938	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,635,938					
Information Technology	\$11,373,063	\$5,982,946	\$5,390,117	(\$17,126)	\$5,407,243	\$0	\$0	\$0	\$2,703,622	\$1,351,811	\$1,351,811	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,407,244					
Tools and Work Equipment - Ops	\$2,967,264	\$2,886,934	\$80,330	\$0	\$80,330	\$0	\$0	\$0	\$8,033	\$24,099	\$32,132	\$0	\$8,033	\$8,033	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$80,330					
Tools and Work Equipment - Plants	\$369,905	\$315,585	\$54,320	\$0	\$54,320	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$54,320	\$54,320					
Tools and Work Equipment - Other	\$562,778	\$415,231	\$147,547	\$0	\$147,547	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$147,547	\$0	\$0	\$0	\$0	\$0	\$0	\$147,547					
Transportation Equipment	\$6,185,978	\$4,917,426	\$1,268,552	\$0	\$1,268,552	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,268,552	\$1,268,552					
Office Furniture and Equipment	\$2,969,321	\$2,940,690	\$28,631	\$0	\$28,631	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$28,631	\$28,631					
Computer Equipment and Software	\$21,695,210	\$7,595,720	\$14,099,490	\$0	\$14,099,490	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,524,873	\$0	\$0	\$3,524,873	\$0	\$0	\$0	\$7,049,745	\$14,099,491					
Other Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0					
MAINS						MAINS																							
Transmission	\$144,691,448	\$33,441,668	\$111,249,780	\$23,716,669	\$87,533,112	\$0	\$0	\$0	\$0	\$87,533,112	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$87,533,112					
Distribution	\$294,842,452	\$77,068,538	\$217,773,914	\$107,726,794	\$110,047,120	\$0	\$0	\$0	\$0	\$0	\$110,047,120	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$110,047,120					
Meters	\$18,984,716	\$7,345,108	\$11,639,608	\$0	\$11,639,608	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,639,608	\$0	\$0	\$0	\$0	\$0	\$0	\$11,639,608					
Hydrants	\$22,700,149	\$5,862,501	\$16,837,647	\$7,711,378	\$9,126,269	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,126,269	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,126,269					
Sprinkler Connections	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0					
Services	\$46,280,369	\$10,616,414	\$35,663,955	\$13,461,358	\$22,202,598	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$22,202,598	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$22,202,598					
Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0					
TOTAL	\$796,187,506	\$237,416,024	\$558,771,482	\$169,480,149	\$389,291,334	\$14,131,011	\$7,615,637	\$0	\$62,649,264	\$98,727,200	\$118,683,524	\$12,060,683	\$9,134,302	\$22,210,631	\$0	\$3,524,873	\$11,829,386	\$0	\$3,524,873	\$0	\$0	\$25,199,951	\$389,291,335	\$389,291,335					
	0				0	3.63%	1.96%	0.00%	16.09%	25.36%	30.49%	3.10%	2.35%	5.71%	0.00%	0.91%	3.04%	0.00%	0.91%	0.00%	0.00%	0.00%	6.47%	100.02%					

**Worksheet W-10 Cost Classification**

Worksheet W-10 details the costs as allocated to the system functions from Worksheets W-6, W-8 and W-9 and allocates them to the service characteristics based on the percentages for each characteristic detailed in the Cost-of-Service Manual. The amounts are then totaled for operation and maintenance, and depreciation then used in Worksheet W-11 to calculate the water unit rate and bill calculation. The plant in service function is also totaled and the percentages by service function are used to allocate the net debt servicing costs also appearing in Worksheet W-11.

Worksheet W-10

Halifax Water Water Rate Study																								
Cost Classification - Percents & Amounts 2022/23																								
Cost Classifications																								
		Average Day Demand	Maximum- Day Demand	Maximum- Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect									Average Day Demand	Maximum-Day Demand	Maximum-Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Total
O&M Expenses by Function		Classification Percentages							Classification Amounts															
Watershed Management	\$371,537	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$371,537	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$371,537			
Dams	\$15,729	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$15,729	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,729			
Water Quality	\$1,022,402	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$1,022,402	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,022,402			
Water Treatment	\$9,804,430	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$8,922,031	\$882,399	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,804,430			
Transmission	\$213,446	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$194,236	\$19,210	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$213,446			
Distribution	\$6,475,720	28.00%	16.00%	25.00%	0.00%	0.00%	31.00%	0.00%	\$1,813,202	\$1,036,115	\$1,618,930	\$0	\$0	\$0	\$2,007,473	\$0	\$0	\$0	\$0	\$0	\$6,475,720			
Water Storage Tanks	\$266,815	52.00%	5.00%	14.00%	0.00%	0.00%	29.00%	0.00%	\$138,744	\$13,341	\$37,354	\$0	\$0	\$0	\$77,376	\$0	\$0	\$0	\$0	\$0	\$266,815			
Hydrants	\$2,322,392	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$2,322,392	\$0	\$0	\$0	\$0	\$0	\$2,322,392			
Service Laterals	\$3,162,494	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$3,162,494	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,162,494			
Technical Services	\$1,131,103	25.00%	25.00%	25.00%	0.00%	0.00%	25.00%	0.00%	\$282,776	\$282,776	\$282,776	\$0	\$0	\$0	\$282,776	\$0	\$0	\$0	\$0	\$0	\$1,131,104			
Customer Service	\$1,622,997	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$1,622,997	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,622,997			
O&M Meters	\$354,099	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$354,099	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$354,099			
Meter Reading and Billing	\$493,292	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$493,292	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$493,292			
Engineering and TS	\$3,536,378	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$3,536,378	\$0	\$0	\$0	\$0	\$0	\$3,536,378			
Regulatory Services	\$1,464,998	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$1,464,998	\$0	\$0	\$0	\$0	\$0	\$1,464,998			
Corporate Services	\$1,514,417	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$1,514,417	\$0	\$0	\$0	\$0	\$0	\$1,514,417			
Administration	\$2,986,050	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$2,986,050	\$0	\$0	\$0	\$0	\$0	\$2,986,050			
Sub-Total	\$36,758,299								\$12,760,657	\$2,233,841	\$1,939,060	\$3,516,593	\$2,116,289	\$4,690,017	\$9,501,843						\$36,758,300			
Depreciation Expenses by Function		Classification Percentages							Classification Amounts															
Watershed Management	\$0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
Dams	\$158,235	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$158,235	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$158,235			
Water Quality	\$0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
Water Treatment	\$2,935,827	81.00%	19.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$2,378,020	\$557,807	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,935,827			
Transmission	\$1,729,466	81.00%	19.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$1,400,867	\$328,599	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,729,466			
Distribution	\$2,375,866	30.00%	14.00%	27.00%	0.00%	0.00%	29.00%	0.00%	\$712,760	\$332,621	\$641,484	\$0	\$0	\$0	\$689,001	\$0	\$0	\$0	\$0	\$0	\$2,375,866			
Water Storage Tanks	\$421,835	52.00%	5.00%	14.00%	0.00%	0.00%	29.00%	0.00%	\$219,354	\$21,092	\$59,057	\$0	\$0	\$0	\$122,332	\$0	\$0	\$0	\$0	\$0	\$421,835			
Hydrants	\$152,860	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$152,860	\$0	\$0	\$0	\$0	\$0	\$152,860			
Service Laterals	\$414,412	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$414,412	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$414,412			
Technical Services	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
Customer Service	\$489,901	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$489,901	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$489,901			
O&M Meters	\$989,748	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$989,748	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$989,748			
Meter Reading and Billing	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
Engineering and TS	\$489,901	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$489,901	\$0	\$0	\$0	\$0	\$0	\$489,901			
Regulatory Services	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
Corporate Services	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
Administration	\$2,041,771	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$2,041,771	\$0	\$0	\$0	\$0	\$0	\$2,041,771			
Sub-Total	\$12,199,822								\$4,869,236	\$1,240,119	\$700,541	\$1,404,160	\$489,901	\$964,193	\$2,531,672						\$12,199,822			



Halifax Water Water Rate Study																
Cost Classification - Percents & Amounts 2022/23																
Cost Classifications																
Plant in Service by Function		Average Day Demand	Maximum- Day Demand	Maximum- Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Average Day Demand	Maximum-Day Demand	Maximum-Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Total
		Classification Percentages							Classification Amounts							
	Watershed Management	\$14,131,011	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$14,131,011	\$0	\$0	\$0	\$0	\$0	\$0	\$14,131,011
	Dams	\$7,615,637	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$7,615,637	\$0	\$0	\$0	\$0	\$0	\$0	\$7,615,637
	Water Quality	\$0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Water Treatment	\$62,649,264	81.00%	19.00%	0.00%	0.00%	0.00%	0.00%	\$50,745,904	\$11,903,360	\$0	\$0	\$0	\$0	\$0	\$62,649,264
	Transmission	\$98,727,200	81.00%	19.00%	0.00%	0.00%	0.00%	0.00%	\$79,969,032	\$18,758,168	\$0	\$0	\$0	\$0	\$0	\$98,727,200
	Distribution	\$118,683,524	30.00%	14.00%	27.00%	0.00%	0.00%	29.00%	\$35,605,057	\$16,615,693	\$32,044,551	\$0	\$0	\$34,418,222	\$0	\$118,683,523
	Water Storage Tanks	\$12,060,683	52.00%	5.00%	14.00%	0.00%	0.00%	29.00%	\$6,271,555	\$603,034	\$1,688,496	\$0	\$0	\$3,497,598	\$0	\$12,060,683
	Hydrants	\$9,134,302	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$9,134,302	\$0	\$9,134,302
	Service Laterals	\$22,210,631	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$22,210,631	\$0	\$0	\$0	\$22,210,631
	Technical Services	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Customer Service	\$3,524,873	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$3,524,873	\$0	\$0	\$3,524,873
	O&M Meters	\$11,829,386	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$11,829,386	\$0	\$0	\$0	\$11,829,386
	Meter Reading and Billing	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Engineering and TS	\$3,524,873	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$3,524,873	\$3,524,873
	Regulatory Services	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Corporate Services	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Administration	\$25,199,951	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$25,199,951	\$25,199,951
	Sub-Total	\$389,291,335							\$194,338,196	\$47,880,255	\$33,733,047	\$34,040,017	\$3,524,873	\$47,050,122	\$28,724,824	\$389,291,334
									49.92%	12.30%	8.67%	8.74%	0.91%	12.09%	7.38%	

## **Worksheet W-11 Unit Costs and Returns**

Worksheet W-11 uses the costs from Worksheet W-10 allocated to the system functions to calculate the unit water rates and fire protection charge for 2022/23. The percentage of average day, maximum day, maximum hour, equivalent meters, customer service and fire protection are used to allocate the indirect costs for operation and maintenance expenses, depreciation expense and debt service. The dividend/grant in lieu of taxes is allocated based on the total allocated revenue requirements. Worksheet W-11 also calculates the return on rate base.

Worksheet W-11

Halifax Regional Water Commission Water Rate Study								
Water Unit Rate and Bill Calculations 2022/23								
Unit Cost Calculations								
	Average Day Demand	Maximum-Day Demand	Maximum-Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Total
Revenue Requirements								
O&M Expenses (including Indirects)	\$12,760,657	\$2,233,841	\$1,939,060	\$3,516,593	\$2,116,289	\$4,690,017	\$9,501,843	\$36,758,300
Direct Allocation Percentages	46.82%	8.20%	7.11%	12.90%	7.76%	17.21%		100.00%
O&M Expenses by Service Characteristics	\$17,209,135	\$3,012,578	\$2,615,034	\$4,742,509	\$2,854,046	\$6,324,999		\$36,758,301
Depreciation Expenses	\$4,869,236	\$1,240,119	\$700,541	\$1,404,160	\$489,901	\$964,193	\$2,531,672	\$12,199,822
Direct Allocation Percentages	50.36%	12.83%	7.25%	14.52%	5.07%	9.97%		100.00%
Depreciation Expenses by Service Characteristics	\$6,144,279	\$1,564,853	\$883,983	\$1,771,849	\$618,185	\$1,216,674		\$12,199,823
Plant in Service by Serv Characteristic Percents	49.92%	12.30%	8.67%	8.74%	0.91%	12.09%	7.38%	100.01%
Debt Service (Principal, Interest, Fees)								
\$8,452,608	\$4,219,542	\$1,039,671	\$732,841	\$738,758	\$76,919	\$1,021,920	\$623,802	\$8,453,453
Direct Allocation Percentages	53.89%	13.28%	9.36%	9.44%	0.98%	13.05%		100.00%
Debt Service (Principal, Interest, Fees) by Service Characteristics	\$4,555,720	\$1,122,503	\$791,228	\$797,616	\$83,047	\$1,103,338		\$8,453,452
Total Allocated Revenue Requirements	\$27,909,134	\$5,699,934	\$4,290,245	\$7,311,974	\$3,555,278	\$8,645,011	\$0	\$57,411,576
	48.61%	9.93%	7.47%	12.74%	6.19%	15.06%		100.00%
Add: Dividend/ Grant in lieu of Taxes								
\$5,918,398	\$2,877,074	\$587,590	\$442,269	\$753,771	\$366,504	\$891,190	\$0	\$5,918,398
Less: Non-Rate Revenues and Other Adjustments								
(\$1,050,220)	(\$510,537)	(\$104,268)	(\$78,481)	(\$133,757)	(\$65,036)	(\$158,142)	\$0	(\$1,050,221)
Net Rate Revenue Requirements	\$30,275,671	\$6,183,256	\$4,654,033	\$7,931,988	\$3,856,746	\$9,378,059	\$0	\$62,279,753
Rate Base								
				\$389,291,334	Return on Rate Base			\$13,321,629
					Calculated Percent Return on Rate Base			3.42%

Halifax Regional Water Commission Water Rate Study							
Water Unit Rate and Bill Calculations 2022/23							
Unit Cost Calculations							
Billing Determinations		Billable Water Consumption		Meters / Availability	Customers		Fire Protection
	32,581,863	Percent of Total		Annual Equivalents	Annual		
	Commercial	24.15%	7,868,520				
	Industrial	5.99%	1,951,654				
	Institutional	13.59%	4,427,875				
			-				
	Multi-Family	23.16%	7,545,959				
	Single Family Residential	33.12%	10,791,113				
		100.01%	32,585,121	112,389	87,349		
	Rate Per Billing Unit		\$1.262	\$70.58	\$44.15		\$9,378,059
Average Per Account / Monthly							
Residential	13		\$16.40	\$5.88	\$3.68	\$25.96	

## **Worksheet W-12 Rates, Revenues and Bills**

Worksheet W-12 uses the data from Worksheet W-11 to calculate proposed rates for customer charge, base charge, and volumetric charges for 2022/23. Worksheet W-12 also provides a revenue test based on the budgeted customer connections, equivalent meters and consumption and details the annual fixed charges (base and customer charge) and the annual consumption charge based on the arithmetic average of consumption by meter size.

Worksheet W-12

<div>Halifax Water</div> <div>Water Rate Study</div> <div>Rates, Revenues &amp; Annual Bills by Alternative</div> <div>2022/23</div>		
Proposed Cost-of-Service Rates and Charges		
Customer Charge	\$/Account	\$44.15
Base Charge	\$/Meter Equivalent	\$70.58
Volumetric Charges	\$ / Billed Cubic Meter	\$1.2617
Revenue Test	Billing Determinant	
Customer Charge Revenues	87,349	\$3,856,746
Number of Services		
Base Charge Revenues	112,389	\$7,931,988
System Equivalents		
Volumetric Charges Revenues	32,581,863	\$41,108,849
Estimated Consumption		
Total User Charge Revenues		\$52,897,583
Fire Protection Charges		\$9,378,059
Total Revenues		\$62,275,642

Proposed Cost-of-Service Rates and Charges		
Bill Calculations		
Annual Fixed Charges		
(Customer & Base Charges by Meter Size)	Capacity Ratio	
Meter Size		
Unmetered 5/8"	1	\$114.73
Unmetered 3/4"	1.5	\$150.02
Unmetered 1"	2.5	\$220.59
5/8" - 15mm	1	\$114.73
3/4" - 20mm	1.5	\$150.02
1" - 25mm	2.5	\$220.59
1.5" - 40mm	5	\$397.03
2" - 50mm	8	\$608.76
3" - 80mm	16	\$1,173.37
4" - 100mm	25	\$1,808.56
6" - 150mm	50	\$3,572.96
8" - 200mm	90	\$6,396.01
10" - 250mm	150	\$10,630.58
Annual Volumetric Charges		
	Average Annual Consumption	
Meter Size		
Unmetered 5/8"	161	\$203.14
Unmetered 3/4"	524	\$661.14
Unmetered 1"	1,017	\$1,283.16
5/8" - 15MM	161	\$203.14
3/4" - 20MM	524	\$661.14
1" - 25MM	1,017	\$1,283.16
1.5" - 40MM	2,161	\$2,726.55
2" - 50MM	5,448	\$6,873.79
3" - 80MM	12,436	\$15,690.62
4" - 100MM	20,845	\$26,300.34
6" - 150MM	62,473	\$78,822.78
8" - 200MM	67,439	\$85,088.43
10" - 250MM	30,087	\$37,961.06
Total Bill - Average Consumption		
	Average Annual Consumption	
Meter Size		
Unmetered 5/8"	161	\$317.87
Unmetered 3/4"	524	\$811.16
Unmetered 1"	1,017	\$1,503.75
5/8" - 15MM	161	\$317.87
3/4" - 20MM	524	\$811.16
1" - 25MM	1,017	\$1,503.75
1.5" - 40MM	2,161	\$3,123.58
2" - 50MM	5,448	\$7,482.55
3" - 80MM	12,436	\$16,863.99
4" - 100MM	20,845	\$28,108.90
6" - 150MM	62,473	\$82,395.74
8" - 200MM	67,439	\$91,484.44
10" - 250MM	30,087	\$48,591.64

**Worksheet W-13 – Bulk Water Rates**

Worksheet W-13 details the calculation of proposed Bulk Water Rates for water sold through Halifax Water's bulk water depots for the test years 2022/23 and 2023/24 based on the budgeted operating and financial costs (revenue requirements) and budgeted water consumption with a 30% mark-up consistent with previous applications.

**Worksheet W-13**

<b>Halifax Water</b> <b>Water Rate Study</b>  <b>Calculation of Bulk Water Rate</b> <b>Years Ending March 31st</b>						
	<b>2018/19 Actual</b>	<b>2019/20 Actual</b>	<b>2020/21 Actual</b>	<b>2021/22 Budget</b>	<b>Test Year #1 2022/23 Budget</b>	<b>Test Year #2 2023/24 Budget</b>
<b>Cost Base</b>						
Total Operating Expenses (Rev. Req.)	\$40,640,353	\$40,347,503	\$43,857,431	\$48,604,838	\$48,958,120	\$51,183,837
Total Non Operating Expenses (Rev Req)	\$14,189,995	\$11,692,055	\$12,931,079	\$15,275,453	\$14,371,006	\$15,617,220
Total Expenses	\$54,830,348	\$52,039,558	\$56,788,510	\$63,880,291	\$63,329,126	\$66,801,056
<b>Water Consumption in Cubic Meters</b>	<b>32,636,401</b>	<b>32,572,914</b>	<b>32,185,646</b>	<b>32,501,704</b>	<b>32,581,863</b>	<b>32,581,863</b>
<b>Unit Calculations</b>						
Unit cost per cubic metre	1.68	1.60	1.76	1.97	1.94	2.05
Operating cost and profit mark-up	30%	30%	30%	30%	30%	30%
Bulk rate per cubic metre	2.18	2.08	2.29	2.56	2.53	2.67



## **Worksheet Appendix W-1 – Additions to Utility Plant in Service**

Appendix W-1 details the proposed additions to utility plant in service and capital funding for the test year 2022/23.

Additions to utility plant in service for 2022/23 are estimated based on status of capital work in progress (projects approved in prior fiscal years), the projects from the 2022/23 capital budget, and historical levels of contributed utility plant in service.

Halifax Water projects the addition of \$38.2 million in assets to utility plant in service during the 2022/23 fiscal year.

## Appendix W-1

<b>Halifax Water</b> <b>Water Rate Study</b>  <b>Proposed Additions to Utility Plant in Service and Capital Funding</b> <b>2022/23</b>				
	Additions to the Utility Plant in Service	Capital Cost Contribution from Others	Utility Cost of Plant in Service	
<b>Intangible Plant</b>				
Organization and Working Capital	\$0	\$0	\$0	
<b>Tangible Plant</b>				
<b>LAND AND LAND RIGHTS</b>				
Source of Supply Land	\$156,000	\$0	\$156,000	
Power and pumping	\$0	\$0	\$0	
Transmission Right of Ways	\$0	\$0	\$0	
Reservoir Land	\$0	\$0	\$0	
Office Land	\$0	\$0	\$0	
Other Land	\$0	\$0	\$0	
Easements & Right of Ways	\$0	\$0	\$0	
<b>STRUCTURES AND IMPROVEMENTS</b>				
Source of Supply Structures	\$0	\$0	\$0	
Power and Pumping Structures	\$10,745,537	\$0	\$10,745,537	
Purification Structures	\$800,026	\$443,000	\$357,026	
Distribution Reservoirs and Standpipes	\$0	\$0	\$0	
General	\$0	\$0	\$0	
Office Building	\$0	\$0	\$0	
Collection and Inpounding	\$0	\$0	\$0	
Small systems	\$806,831	\$0	\$806,831	
Aerotech Water Treatment Plant	\$164,525	\$0	\$164,525	
Other - Security	\$81,000	\$0	\$81,000	
<b>Equipment</b>				
Electrical Pumping	\$225,543	\$0	\$225,543	
Purification Equipment	\$421,619	\$0	\$421,619	
Information Technology	\$0	\$0	\$0	
Tools and Work Equipment - Ops	\$0	\$0	\$0	
Tools and Work Equipment - Plants	\$0	\$0	\$0	
Tools and Work Equipment - Other	\$0	\$0	\$0	
Transportation Equipment	\$231,000	\$0	\$231,000	
Office Furniture and Equipment	\$0	\$0	\$0	
Computer Equipment and Software	\$4,456,982	\$0	\$4,456,982	
Other Equipment	\$0	\$0	\$0	
<b>Mains</b>				
Transmission	\$10,428,000	\$9,041,020	\$1,386,980	
Distribution	\$7,226,990	\$3,200,000	\$4,026,990	
<b>Meters</b>	\$174,397	\$0	\$174,397	
<b>Hydrants</b>	\$405,000	\$280,000	\$125,000	
<b>Services</b>	\$1,902,010	\$520,000	\$1,382,010	
<b>Other</b>	\$0	\$0	\$0	
<b>TOTAL</b>	<b>\$38,225,458</b>	<b>\$13,484,020</b>	<b>\$24,741,438</b>	
<b>Sources of Funding</b>				
Capital Cost Contribution	\$0	Depreciation Fund Balance, beginning of year	\$0	
Regional Development Charge	\$9,041,020	Add:		
External Funding	\$453,000	Interest earned on fund balance	\$0	
Contributions - other	\$3,990,000	Depreciation funded in Current year	\$12,199,822	
Working Capital	(\$18,266,586)	Depreciation Fund Balance available	\$12,199,822	
Depreciation fund	\$12,199,822	Less:		
Long Term Debt	\$30,808,202	Expenditure in Current Year	(\$12,199,822)	
<b>TOTAL</b>	<b>\$38,225,458</b>	Depreciation Fund Balance, end of year	(\$0)	

## **Worksheet Appendix W-2 Amortization Schedule for Long Term Debt**

Appendix W-2 details the amortization schedule of the proposed long-term debt associated with 2022/23. The amortization is based on a 30-year blended serial debenture at a rate of 2.5% per annum. Debt servicing costs related to principle and interest will commence in test year 2023/24.

## Appendix W-2

Halifax Water Water Rate Study								
Amortization Schedule for Projected Long Term Debt 2022/23								
<table><tr><td rowspan="3">Interest Rate Term in years Capital</td><td>2.50%</td></tr><tr><td>30</td></tr><tr><td>\$30,808,202</td></tr></table>					Interest Rate Term in years Capital	2.50%	30	\$30,808,202
Interest Rate Term in years Capital	2.50%							
	30							
	\$30,808,202							
Amortization Schedule								
	Principal	Interest	Total	Balance				
Year								
1	\$1,026,940.07	\$770,205.05	\$1,797,145.13	\$29,781,262.08				
2	\$1,026,940.07	\$744,531.55	\$1,771,471.62	\$28,754,322.01				
3	\$1,026,940.07	\$718,858.05	\$1,745,798.12	\$27,727,381.94				
4	\$1,026,940.07	\$693,184.55	\$1,720,124.62	\$26,700,441.86				
5	\$1,026,940.07	\$667,511.05	\$1,694,451.12	\$25,673,501.79				
6	\$1,026,940.07	\$641,837.54	\$1,668,777.62	\$24,646,561.72				
7	\$1,026,940.07	\$616,164.04	\$1,643,104.11	\$23,619,621.65				
8	\$1,026,940.07	\$590,490.54	\$1,617,430.61	\$22,592,681.58				
9	\$1,026,940.07	\$564,817.04	\$1,591,757.11	\$21,565,741.51				
10	\$1,026,940.07	\$539,143.54	\$1,566,083.61	\$20,538,801.43				
11	\$1,026,940.07	\$513,470.04	\$1,540,410.11	\$19,511,861.36				
12	\$1,026,940.07	\$487,796.53	\$1,514,736.61	\$18,484,921.29				
13	\$1,026,940.07	\$462,123.03	\$1,489,063.10	\$17,457,981.22				
14	\$1,026,940.07	\$436,449.53	\$1,463,389.60	\$16,431,041.15				
15	\$1,026,940.07	\$410,776.03	\$1,437,716.10	\$15,404,101.08				
16	\$1,026,940.07	\$385,102.53	\$1,412,042.60	\$14,377,161.00				
17	\$1,026,940.07	\$359,429.03	\$1,386,369.10	\$13,350,220.93				
18	\$1,026,940.07	\$333,755.52	\$1,360,695.59	\$12,323,280.86				
19	\$1,026,940.07	\$308,082.02	\$1,335,022.09	\$11,296,340.79				
20	\$1,026,940.07	\$282,408.52	\$1,309,348.59	\$10,269,400.72				
21	\$1,026,940.07	\$256,735.02	\$1,283,675.09	\$9,242,460.65				
22	\$1,026,940.07	\$231,061.52	\$1,258,001.59	\$8,215,520.57				
23	\$1,026,940.07	\$205,388.01	\$1,232,328.09	\$7,188,580.50				
24	\$1,026,940.07	\$179,714.51	\$1,206,654.58	\$6,161,640.43				
25	\$1,026,940.07	\$154,041.01	\$1,180,981.08	\$5,134,700.36				
26	\$1,026,940.07	\$128,367.51	\$1,155,307.58	\$4,107,760.29				
27	\$1,026,940.07	\$102,694.01	\$1,129,634.08	\$3,080,820.22				
28	\$1,026,940.07	\$77,020.51	\$1,103,960.58	\$2,053,880.14				
29	\$1,026,940.07	\$51,347.00	\$1,078,287.08	\$1,026,940.07				
30	\$1,026,940.07	\$25,673.50	\$1,052,613.57	\$0.00				

**Halifax Regional Water Commission**  
**(“Halifax Water”)**  
**Water Rate Study**  
**2023/24**

Prepared By:

Halifax Water Staff

## Notes on Worksheet

### Worksheet W-1 System Data

Worksheet W-1 provides Water Services related data including:

- Water plant production for the three previous fiscal years, and 3-year average water plant production.
- Average day and maximum day production with related percentages and ratios for the plants.
- Budgeted service connections, system equivalents, and billed consumption for test year 2023/24.
- Average water consumption history by customer class for the five fiscal years spanning 2015/16 to 2019/20 inclusive, including a reallocation of estimated commercial consumption from the residential 15 mm (5/8) meter size. The fiscal year 2020/21 has been excluded due to the probable effects COVID-19 had on consumption patterns.

Assumptions - 2023/24 (Test Year #2):

1. After a long-term trend of declining water consumption, Halifax Water has been experiencing modest increases recently. Consumption in 2022/23 is budgeted to grow at a rate of 1% based on the assumption related to customer growth noted below and having consumption patterns among customer classes return to pre' COVID-19 levels. For Test Year #2 consumption levels are expected to stabilize, thus Halifax Water is projecting no change in total consumption in 2023/24 compared to 2022/23.
2. Customer connections are projected to increase by 680 connections in 2023/24, based on customer growth in recent years.

# Halifax Water Water Rate Study

## Water Production

	2018/19	2019/20	2020/21	Average
<b>Average Day Production</b> (in cubic meters)				
Lake Major	33,917	32,121	33,198	33,079
Lake Pockwock	74,615	73,385	78,736	75,579
Bennery Lake	895	780	535	737
<b>System</b>	109,427	106,286	112,469	109,394

	2018/19	2019/20	2020/21	Average
<b>Average Day as a Percent of Maximum Day</b>				
	68%	70%	74%	71%
	84%	82%	81%	82%
	51%	49%	41%	47%
	78%	78%	79%	78%

	2018/19	2019/20	2020/21	Average
<b>Maximum-Day Production</b> (in cubic meters)				
Lake Major	50,020	45,780	44,910	46,903
Lake Pockwock	88,829	89,052	97,040	91,640
Bennery Lake	1,771	1,607	1,302	1,560
<b>System</b>	140,620	136,439	143,252	140,104

	2018/19	2019/20	2020/21	Average
<b>Max-Day / Average Day Ratio</b>				
	1.47	1.43	1.35	1.42
	1.19	1.21	1.23	1.21
	1.98	2.06	2.43	2.12
	1.29	1.28	1.27	1.28

### Service Connections, Equivalents and Billed Usage

Date	February 24, 2022	2023/24					Estimated Consumption
		Meter Size		Number of Services	Capacity Ratio	System Equivalents	(Cubic Meters)
Test Years		Unmetered 5/8"		0	1	0	0
1	2022/23	Unmetered 3/4"		0	1.5	0	0
2	2023/24	Unmetered 1"		0	2.5	0	0
		15 MM - 5/8"		82,735	1	82,735	13,233,999
Current Year	2021/22	20 MM - 3/4"		1,068	1.5	1,601	551,275
Historical Year	2020/21	25 MM - 1"		1,622	2.5	4,054	1,628,425
		40 MM - 1.5"		1,242	5	6,208	2,617,709
		50 MM - 2"		879	7	7,032	4,679,444
Customer Classes		80 MM - 3"		335	16	5,352	4,072,824
Residential	Non-Residential	100 MM - 4"		87	25	2,163	1,740,532
Single Family Residential	Commercial	150 MM - 6"		37	50	1,850	2,311,495
Multi-Family	Industrial	200 MM - 8"		25	90	2,250	1,685,985
	Institutional	250 MM - 10"		2	150	300	60,174
	Unmetered	TOTAL		88,029		113,544	32,581,863

	Consumption m3			Share		Peaking Factors <sup>(2)</sup>		Distrib. Design Factors		Extra-Capacity	
Class	2014 - 2019 <sup>(1)</sup>	Realloc. of 5/8'	Revised Total	Calculated	Loudon	Max Day	Max Hour	Max Day	Max Hour	Max Day	Max Hour
Commercial	5,962,201	1,890,782	7,852,983	24.15%	19%	1.22	1.70			4,733	430
Industrial	1,946,458		1,946,458	5.99%	8%	1.22	1.70			1,173	107
Institutional	4,419,305		4,419,305	13.59%	14%	1.22	1.70			2,664	242
Multi-Family	7,530,275		7,530,275	23.16%		1.22	1.70			4,539	413
Single Family Residential	12,605,213	(1,890,782)	10,714,431	32.95%		1.22	1.70	1.66	2.50	6,458	587
<i>Subtotal Res</i>				56%	59-66%						
Unmetered	55,850		55,850	0.17%							
Total	32,519,301		32,519,301								

(1) Water Consumption based on 5 year average spanning fiscal years 2015/16 to 2019/20 inclusive. The fiscal year 2020/21 has been excluded due the probable effects of COVID-19.

(2) Loudon Report Pages 70-71

	Total				Single Family	Total			
	Commercial	Industrial	Institutional	Non-Residential	Multi-Family	Residential	Residential	Unmetered	Total System
<i>Avg Use</i>	5,962,201	1,946,458	4,419,305	12,327,964	7,530,275	12,605,213	20,135,488	55,850	32,519,301

## Worksheet W-2 Operations

Worksheet W-2 provides a comparative Statement of Operations for Water Services for fiscal years as follows:

- Actual results for the fiscal years 2018/2019, 2019/2020 and 2020/2021 for Water Services.
- Approved budgets by Halifax Water's Board of Commissioners for 2021/2022 and 2022/2023, with 2022/2023 representing Test Year #1 for the purposes of the Rate Study.
- Projections for 2023/24, representing Test Year #2 for the purposes of the Rate Study.

Revenues are budgeted/projected based on current rates, and revenues and expenditures have been segregated between regulated and unregulated activities. This worksheet details the budgeted deficits at current rates in Water Services for the two test years.

Water Services had a cumulative surplus of \$23.1 million as at March 31, 2021 however, with budgeted deficits in 2021/22 and 2022/23 of \$5.2 million and \$4.2 million respectively, and a projected deficit of \$6.8 million in 2023/24, the projected accumulated surplus as at March 31, 2024 is estimated at \$6.9 million. Of note, the current forecast for the 2021/22 fiscal year to December 31, 2021 is reporting a projected loss of \$2.4 million, an improvement of approximately \$2.9 million compared to the approved budget. Based on this, the projected accumulated surplus as at March 31, 2021 would be \$9.8 million.

Unregulated revenues and expenditures have been identified on Worksheet W-2 and are excluded in the determination of revenue requirements for rate making purposes. The calculation of revenue requirements is reported on Worksheet W-3.

Depreciation in Test Year #2 has been calculated the same way as Test Year #1, there is no approved operating budget to compare against. The calculation begins with the same data, the 2023/24 capital budget. This is then adjusted to align with projected additions to rate-based assets. For an operating budget, the adjustment is amortized over thirty-one years, whereas for the test year data the adjustment is prorated between assets classes, therefore spreading the depreciation more evenly amongst the asset classes. In addition, corporate projects are amortized over ten years within an operating budget, whereas for the test year data, projects are reviewed further and more appropriately aligned with an asset class, therefore allocating depreciation into future years.



## Worksheet W-2

<b>Halifax Water</b> <b>Water Rate Study</b> <b>Comparative Statement of Operations</b> Fiscal Years ending March 31st						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating revenues</b>						
<b>Regulated activities</b>						
Water	\$48,040,166	\$47,917,584	\$47,630,852	\$48,423,826	\$48,770,894	\$48,770,894
Public fire protection	\$7,074,373	\$7,074,373	\$7,336,110	\$7,627,564	\$7,627,564	\$7,627,564
Private fire protection	\$868,836	\$880,898	\$1,000,754	\$1,312,239	\$1,335,396	\$1,335,396
Bulk water stations	\$226,839	\$299,743	\$317,644	\$336,936	\$334,196	\$334,196
Late payment and other connection fees	\$244,372	\$207,113	\$154,727	\$236,300	\$264,400	\$264,400
Miscellaneous	\$59,508	\$123,668	\$165,869	\$237,341	\$257,841	\$257,841
Sub-total	\$56,514,094	\$56,503,379	\$56,605,956	\$58,174,206	\$58,590,291	\$58,590,291
<b>Unregulated activities</b>						
Contract Revenue	\$38,235	\$38,235	\$38,235	\$38,235	\$38,235	\$38,235
<b>Total</b>	<b>\$56,552,329</b>	<b>\$56,541,614</b>	<b>\$56,644,191</b>	<b>\$58,212,441</b>	<b>\$58,628,526</b>	<b>\$58,628,526</b>
<b>Operating Expenditures</b>						
<b>Regulated activities</b>						
Supply and treatment	\$9,746,865	\$9,541,164	\$9,970,068	\$10,746,345	\$11,214,097	\$11,628,655
Transmission and distribution	\$10,014,084	\$9,866,815	\$10,959,903	\$11,875,800	\$12,440,867	\$12,784,103
Engineering and technology services	\$3,749,257	\$3,229,721	\$3,653,601	\$4,638,033	\$3,536,378	\$3,630,252
Technical services (SCADA)	\$888,872	\$976,258	\$1,071,084	\$1,015,671	\$1,131,103	\$1,165,726
Regulatory services	\$679,318	\$859,461	\$1,090,870	\$1,200,898	\$1,464,998	\$1,511,175
Corporate services	\$0	\$0	\$0	\$1,591,673	\$1,514,417	\$1,553,894
Customer service	\$2,524,093	\$2,520,184	\$2,614,139	\$2,973,779	\$2,470,388	\$2,546,846
Administration	\$3,991,704	\$3,536,099	\$3,618,993	\$2,511,094	\$2,986,050	\$3,070,875
Calculated depreciation - funded assets	\$9,046,160	\$9,817,801	\$10,878,773	\$12,051,545	\$12,199,822	\$13,292,311
Sub-total	\$40,640,353	\$40,347,503	\$43,857,431	\$48,604,838	\$48,958,120	\$51,183,837
<b>Unregulated activities</b>						
Contract Systems	\$19,791	\$32,101	\$17,282	\$32,022	\$31,947	\$32,985
<b>Total</b>	<b>\$40,660,144</b>	<b>\$40,379,604</b>	<b>\$43,874,713</b>	<b>\$48,636,860</b>	<b>\$48,990,067</b>	<b>\$51,216,822</b>
<b>Earnings from operations</b>	<b>\$15,892,185</b>	<b>\$16,162,010</b>	<b>\$12,769,478</b>	<b>\$9,575,581</b>	<b>\$9,638,459</b>	<b>\$7,411,704</b>
<b>Financial and other revenues</b>						
<b>Regulated activities</b>						
Investment Income	\$520,919	\$222,238	\$126,586	\$96,000	\$72,000	\$72,000
Miscellaneous	\$217,568	\$197,954	\$152,625	\$24,000	\$24,000	\$24,000
Sub-total	\$738,487	\$420,192	\$279,211	\$120,000	\$96,000	\$96,000
<b>Unregulated activities</b>						
Tower Leases	\$163,202	\$174,824	\$212,973	\$177,975	\$215,690	\$215,690
Energy Projects	\$165,038	\$164,877	\$198,219	\$188,639	\$224,639	\$224,639
Rental Income	\$13,400	\$6,300	\$8,400	\$8,400	\$8,400	\$8,400
<b>Total</b>	<b>\$1,080,127</b>	<b>\$766,193</b>	<b>\$698,802</b>	<b>\$495,014</b>	<b>\$544,729</b>	<b>\$544,729</b>
<b>Financial and other expenditures</b>						
<b>Regulated Activities</b>						
Interest on long term debt	\$1,924,443	\$1,828,464	\$2,028,475	\$2,615,664	\$2,305,922	\$2,459,156
Repayment on long term debt	\$7,181,215	\$4,721,518	\$5,330,905	\$6,696,386	\$6,062,697	\$6,194,437
Amortization of debt discount	\$84,849	\$63,700	\$74,091	\$100,412	\$83,989	\$87,472
Dividend/ grant in lieu of taxes	\$4,999,488	\$5,078,373	\$5,497,608	\$5,862,991	\$5,918,398	\$5,977,582
Sub-total	\$14,189,995	\$11,692,055	\$12,931,079	\$15,275,453	\$14,371,006	\$14,718,647
<b>Unregulated activities</b>						
Miscellaneous	\$23,702	\$32,236	\$42,846	\$16,244	\$16,244	\$16,244
<b>Total</b>	<b>\$14,213,697</b>	<b>\$11,724,291</b>	<b>\$12,973,925</b>	<b>\$15,291,697</b>	<b>\$14,387,250</b>	<b>\$14,734,891</b>
<b>Earnings (loss) for the year</b>	<b>\$2,758,615</b>	<b>\$5,203,912</b>	<b>\$494,355</b>	<b>(\$5,221,102)</b>	<b>(\$4,204,062)</b>	<b>(\$6,778,458)</b>
<b>Surplus, beginning of year</b>	<b>\$14,676,092</b>	<b>\$17,434,707</b>	<b>\$22,638,619</b>	<b>\$23,132,974</b>	<b>\$17,911,872</b>	<b>\$13,707,810</b>
<b>Surplus, end of year</b>	<b>\$17,434,707</b>	<b>\$22,638,619</b>	<b>\$23,132,974</b>	<b>\$17,911,872</b>	<b>\$13,707,810</b>	<b>\$6,929,352</b>

### **Worksheet W-3 – Revenue Requirements**

Worksheet W-3 takes the operating and financial expense information from Worksheet W-2 to develop revenue requirements for the test years 2022/23 and 2020/24.

Financial and other operating revenues, excluding those related to unregulated activities, are deducted from the expenditures to determine the revenue required from Water Services customers and fire protection.

## Worksheet W-3

<b>Halifax Water</b> <b>Water Rate Study</b> <b>Statement of Operating Expenses and Revenue Requirements</b> Fiscal Years ending March 31st						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating expenditures</b>						
Supply and treatment	\$9,746,865	\$9,541,164	\$9,970,068	\$10,746,345	\$11,214,097	\$11,628,655
Transmission and distribution	\$10,014,084	\$9,866,815	\$10,959,903	\$11,875,800	\$12,440,867	\$12,784,103
Engineering and technology services	\$3,749,257	\$3,229,721	\$3,653,601	\$4,638,033	\$3,536,378	\$3,630,252
Technical services (SCADA)	\$888,872	\$976,258	\$1,071,084	\$1,015,671	\$1,131,103	\$1,165,726
Regulatory services	\$679,318	\$859,461	\$1,090,870	\$1,200,898	\$1,464,998	\$1,511,175
Corporate services	\$0	\$0	\$0	\$1,591,673	\$1,514,417	\$1,553,894
Customer service	\$2,524,093	\$2,520,184	\$2,614,139	\$2,973,779	\$2,470,388	\$2,546,846
Administration	\$3,991,704	\$3,536,099	\$3,618,993	\$2,511,094	\$2,986,050	\$3,070,875
Sub-total	\$31,594,193	\$30,529,702	\$32,978,658	\$36,553,293	\$36,758,298	\$37,891,526
Calculated depreciation - funded assets	\$9,046,160	\$9,817,801	\$10,878,773	\$12,051,545	\$12,199,822	\$13,292,311
<b>Total</b>	<b>\$40,640,353</b>	<b>\$40,347,503</b>	<b>\$43,857,431</b>	<b>\$48,604,838</b>	<b>\$48,958,120</b>	<b>\$51,183,837</b>
<b>Add: non-operating expenditures</b>						
Interest on long term debt	\$1,924,443	\$1,828,464	\$2,028,475	\$2,615,664	\$2,305,922	\$2,459,156
Repayment on long term debt	\$7,181,215	\$4,721,518	\$5,330,905	\$6,696,386	\$6,062,697	\$6,194,437
Amortization of debt discount	\$84,849	\$63,700	\$74,091	\$100,412	\$83,989	\$87,472
Dividend/ grant in lieu of taxes	\$4,999,488	\$5,078,373	\$5,497,608	\$5,862,991	\$5,918,398	\$5,977,582
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0
	\$14,189,995	\$11,692,055	\$12,931,079	\$15,275,453	\$14,371,006	\$14,718,647
Test year #1 - new interest on long term debt						\$385,103
Test year #1 - new repayment of long term debt						\$513,470
<b>Total</b>	<b>\$14,189,995</b>	<b>\$11,692,055</b>	<b>\$12,931,079</b>	<b>\$15,275,453</b>	<b>\$14,371,006</b>	<b>\$15,617,220</b>
<b>Less: other revenues</b>						
Bulk water stations	\$226,839	\$299,743	\$317,644	\$336,936	\$334,196	\$334,196
Late payment and other connection fees	\$244,372	\$207,113	\$154,727	\$236,300	\$264,400	\$264,400
Miscellaneous	\$277,076	\$321,622	\$318,494	\$261,341	\$281,841	\$281,841
Investment Income	\$520,919	\$222,238	\$126,586	\$96,000	\$72,000	\$72,000
<b>Total</b>	<b>\$1,269,206</b>	<b>\$1,050,716</b>	<b>\$917,451</b>	<b>\$930,577</b>	<b>\$952,437</b>	<b>\$952,437</b>
<b>Less: other adjustments</b>						
Sponsorships and donations	\$21,912	\$18,990	\$19,741	\$16,881	\$16,881	\$16,881
Help to others (H2O) program	\$17,850	\$19,801	\$27,844	\$20,400	\$20,400	\$20,400
Administration				\$56,237	\$60,502	\$60,502
<b>Total</b>	<b>\$39,762</b>	<b>\$38,791</b>	<b>\$47,585</b>	<b>\$93,518</b>	<b>\$97,783</b>	<b>\$97,783</b>
<b>Revenue required from customers</b>	<b>\$53,521,380</b>	<b>\$50,950,051</b>	<b>\$55,823,475</b>	<b>\$62,856,196</b>	<b>\$62,278,906</b>	<b>\$65,750,837</b>

## **Worksheet W-4 Operating Expenditure Analysis**

### **Worksheet W-4 Operating Expenditure Analysis**

Worksheet W-4 details the operating expenditures by cost element group for each of the functional areas within the Water Services, consisting of the following:

- Water Supply and Treatment,
- Transmission and Distribution,
- Technical Services (SCADA),
- Engineering and Technology Services (TS),
- Regulatory Services,
- Corporate Services, and
- Administration.

Data provided as part of the review and analysis includes:

- Actual results for 2018/19, 2019/20, and 2020/21,
- Approved budgets for 2021/22 and 2022/23 (Test Year # 1), and
- Projected results for 2023/24 (Test Year #2).

For operating expenditures related to 2023/24 (Test Year #2), the key assumptions regarding projected increases are as follows:

- Salaries and benefits: 3.5%
- Chemicals: 5.0%
- Electricity: 3.0%
- Other: 2.0%

On subsequent pages within this section, operating expenditures are reported for the core cost element groups within each functional area. As part of the analysis, variances have been provided with changes expressed as both dollar and percentage values, comparing year-over-year changes for the fiscal years 2019/20 through 2023/24. Commentary is provided for each of the cost elements groups falling within the functional areas, with additional details provided in situations where variances have increased over \$50 thousand.

**Water Supply and Treatment**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. Increased overtime lead to the increase in costs in 2020/21 compared to the prior year, and in 2022/23 there were two new full-time equivalents added to meet operational needs.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content of the offering and the expiration of certifications of staff. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21 conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The expectation for the 2021/22 budget was that conferences and training would return to more normal levels with in-person sessions or virtual platforms to allow staff to update and maintain certifications. This same expectation was carried forward into 2022/23.
- Contract Services – In 2019/20, there was a reduction in costs due to the reclassification of consulting performed by Dalhousie University from Contract Services to the cost element group Professional Services. Additionally, 2018/19 costs were higher than normal due to the moving of waste residuals at the Lake Major plant, and the stabilization of upstream flows to the Lake Lamont Dam. For 2020/21, there was a further reduction in costs due to COVID-19 and the inability to contract external services because of restrictions imposed during the pandemic. The expectation for the 2021/22 budget was that contract services return to more normal levels however, for replacements an effort was made to have those costs covered under the capital program where feasible. A similar expectation was carried forward into 2022/23, which also included an increase in water quality monitoring programs, and in particular, the algal program.
- Electricity – Costs are reflective of price and consumption/usage, with the variability in consumption directly related to water production. Production during the pandemic period may have been skewed somewhat which saw more people working from home. In addition, production at the Bennery Lake plant would have been adversely affected by the inactivity at the airport during the pandemic.
- Materials Supplies and Services – Costs in this cost element group support Halifax Water's infrastructure and equipment. Costs vary year-over-year, not only for scheduled maintenance, but also to emergency repairs required to an aging infrastructure. In 2020/21 there was a failure in one of the raw water pumps at the J.D. Kline plant, as well as a higher than expected repair cost to another raw water pump. In 2021/22, there was an expectation to return to more normal levels, and for 2022/23 significant pump overhauls anticipated at the Lake Major plant will be capitalized.
- Professional Services – As mentioned in Contract Services above, costs in 2019/20 increase due to a reclassification of consulting performed by Dalhousie University, which in the prior year was reported under Contract Services. For 2021/22, the budget was increased by approximately \$200 thousand for the Inundation Mapping coming from the Dam Safety Review. In 2022/23, this initiative was reversed, whereby the Inundation Mapping will now be capitalized.
- Fleet Services – Costs are assigned to the various production plants based on the types of vehicles and/or equipment to meet operational needs. Fleet costs are relatively stable over the periods in question.

- Chemicals – Costs are reflective of price and consumption/usage. Chemicals costs are extremely volatile from a pricing perspective, and historically Halifax Water procures chemical pricing annually. In 2019/20 and 2020/21 costs increases appear to be trending as expected however, for 2021/22 and beyond chemical prices in the market has become increasing more volatile adding to the overall costs. In addition, the dosage usage for phosphate at the J.D. Kline and Lake Major plants has increased 1.5 times the norm, affecting mainly the 2022/23 budget. With the volatility in chemical prices in the market, suppliers are no longer willing to lock themselves into long-term contracts.

Worksheet W-4

Halifax Regional Water Commission  
Water Rate Study  
Operating Expenditures and Financial Analysis  
(excluding depreciation expense)

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Water Supply and Treatment</b>											
Salaries and benefits	\$3,208,556	\$3,309,828	\$3,477,703	\$3,418,397	\$3,741,126	\$3,872,065	\$101,272 3%	\$167,875 5%	(\$59,306) (2%)	\$322,729 9%	\$130,939 3%
Training and development	\$39,184	\$28,661	\$11,730	\$52,216	\$54,216	\$55,300	(\$10,523) (27%)	(\$16,931) (59%)	\$40,486 345%	\$2,000 4%	\$1,084 2%
Contract services	\$1,404,815	\$936,431	\$726,902	\$985,505	\$941,190	\$960,014	(\$468,384) (33%)	(\$209,529) (22%)	\$258,603 36%	(\$44,315) (4%)	\$18,824 2%
Electricity	\$1,856,775	\$1,789,237	\$1,960,837	\$1,868,741	\$1,908,696	\$1,965,957	(\$67,538) (4%)	\$171,600 10%	(\$92,096) (5%)	\$39,955 2%	\$57,261 3%
Materials, supplies and services	\$830,322	\$744,986	\$988,425	\$920,770	\$787,394	\$803,142	(\$85,336) (10%)	\$243,439 33%	(\$67,655) (7%)	(\$133,376) (14%)	\$15,748 2%
Professional services	\$120,434	\$374,131	\$357,513	\$568,950	\$370,705	\$378,119	\$253,697 211%	(\$16,618) (4%)	\$211,437 59%	(\$198,245) (35%)	\$7,414 2%
Fleet	\$272,966	\$249,515	\$217,407	\$216,744	\$203,024	\$207,084	(\$23,451) (9%)	(\$32,108) (13%)	(\$663) (0%)	(\$13,720) (6%)	\$4,060 2%
Chemicals	\$2,608,985	\$2,706,339	\$2,858,959	\$3,379,007	\$4,095,814	\$4,300,605	\$97,354 4%	\$152,620 6%	\$520,048 18%	\$716,807 21%	\$204,791 5%
Applied overheads and other allocations	\$107,930	\$130,527	\$130,068	\$129,766	\$110,261	\$112,466	\$22,597 21%	(\$459) (0%)	(\$302) (0%)	(\$19,505) (15%)	\$2,205 2%
Allocated to Transmission and Distribution	(\$703,102)	(\$728,491)	(\$759,476)	(\$793,751)	(\$998,329)	(\$1,026,097)	(\$25,389) 4%	(\$30,985) 4%	(\$34,275) 5%	(\$204,578) 26%	(\$27,768) 3%
<b>Total Water Supply and Treatment</b>	<b>\$9,746,865</b>	<b>\$9,541,164</b>	<b>\$9,970,068</b>	<b>\$10,746,345</b>	<b>\$11,214,097</b>	<b>\$11,628,655</b>	<b>(\$205,701) (2%)</b>	<b>\$428,904 4%</b>	<b>\$776,277 8%</b>	<b>\$467,752 4%</b>	<b>\$414,558 4%</b>

## **Transmission and Distribution**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. In 2020/21, further cost increases resulted from the addition of 1 new full-time equivalent, as well as the requirement for additional personal protective equipment (PPE) for staff, in order to operate under the imposed pandemic restrictions. For 2021/22, cost reductions were budgeted due to a manager previously reported under Transmission and Distribution being moved to Supply and Treatment. In 2022/23, cost reductions resulted from the retirement of one senior manager; the position was not filled, but rather one manager is now covering the operations of two regions. Additionally, in 2022/23, overtime has been reduced to better reflect current spending levels, and more staff time has been allocated to capital projects.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content of the offering and the expiration of certifications of staff. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21 conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The expectation for the 2021/22 budget was that conferences and training would return to more normal levels with in-person sessions or virtual platforms to allow staff to update and maintain certifications. This same expectation was carried forward into 2022/23, especially regarding additional training for works supervisors.
- Contract Services – In 2019/20 there was a significant decrease in costs compared to the prior year however, in 2018/19 there was a major repair necessary to the tunnel section of the North End Feeder Transmission Main. For 2021/22 costs increases are mainly the result of the newly introduced Lead Replacement Program. Further, additional traffic control services are required to implement enhanced safety measures, as well as additional asphalt patching is now required to comply with HRM permit standards. Increased costs in 2022/23 are reflective of increased rates for traffic control and hired equipment.
- Electricity - Costs are reflective of price and consumption/usage. Electricity is not a significant cost related to Transmission and Distribution.
- Materials Supplies and Services – Costs in this cost element group support Halifax Water's infrastructure and equipment. Costs vary year-over-year, not only for scheduled maintenance, but also to emergency repairs required to an aging infrastructure. For 2019/20 and 2020/21, costs increased due to more work being completed in-house requiring additional materials and supplies. In 2021/22, there was an expectation repair and maintenance work return to more normal levels however, in 2022/23, there has been a realization costs for materials and supplies have increased because of supply and demand issues, partly the result of the pandemic.
- Professional Services – Professional services costs have typically not been significant related to Transmission and Distribution however, in 2022/23, each region has been given the responsibility of advertising for such initiatives as the spring flush program, operational public service announcement (PSA) work, etc., which is the main cost driver for 2022/23 and beyond.

- Fleet Services – Costs are assigned to the regions based on the types of vehicles and/or equipment required to meet operational needs. The increase, in 2020/21, was due to additional units purchased and assigned to Transmission and Distribution, including a hydro excavation unit, thus increasing cost assignments to the regions. Costs can vary year-over-year based on vehicle assignment and/or disposal of units over time.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Transmission and Distribution</b>											
Salaries and benefits	\$4,808,706	\$5,075,977	\$5,525,486	\$5,460,502	\$5,294,673	\$5,479,987	\$267,271 6%	\$449,509 9%	(\$64,984) (1%)	(\$165,829) (3%)	\$185,314 4%
Training and development	\$20,845	\$24,525	\$3,280	\$39,550	\$52,800	\$53,856	\$3,680 18%	(\$21,245) (87%)	\$36,270 1106%	\$13,250 34%	\$1,056 2%
Contract services	\$3,222,933	\$2,495,629	\$2,469,942	\$3,767,674	\$4,074,790	\$4,156,286	(\$727,304) (23%)	(\$25,687) (1%)	\$1,317,732 53%	\$287,116 8%	\$81,496 2%
Electricity	\$125,979	\$141,617	\$138,035	\$153,000	\$150,200	\$154,706	\$15,638 12%	(\$3,582) (3%)	\$14,965 11%	(\$2,800) (2%)	\$4,506 3%
Materials, supplies and services	\$752,456	\$967,684	\$1,062,610	\$964,819	\$1,058,127	\$1,079,290	\$215,228 29%	\$94,926 10%	(\$97,791) (9%)	\$93,308 10%	\$21,163 2%
Professional services	\$24,422	\$33,008	\$19,226	\$20,500	\$87,250	\$88,995	\$8,586 35%	(\$13,782) (42%)	\$1,274 7%	\$66,750 326%	\$1,745 2%
Fleet	\$367,440	\$388,730	\$918,379	\$703,975	\$788,098	\$803,860	\$21,290 6%	\$529,649 136%	(\$214,404) (23%)	\$84,123 12%	\$15,762 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$261,125	\$285,322	\$335,202	\$223,295	\$221,295	\$225,721	\$24,197 9%	\$49,880 17%	(\$111,907) (33%)	(\$2,000) (1%)	\$4,426 2%
Allocated from Supply and Treatment	\$703,102	\$728,491	\$759,476	\$793,751	\$998,329	\$1,026,097	\$25,389 4%	\$30,985 4%	\$34,275 5%	\$204,578 26%	\$27,768 3%
Recoveries	(\$272,924)	(\$274,168)	(\$271,733)	(\$271,266)	(\$284,695)	(\$284,695)	(\$1,244) 0%	\$2,435 (1%)	\$467 (0%)	(\$13,429) 5%	\$0 0%
<b>Total Transmission and Distribution</b>	<b>\$10,014,084</b>	<b>\$9,866,815</b>	<b>\$10,959,903</b>	<b>\$11,875,800</b>	<b>\$12,440,867</b>	<b>\$12,784,103</b>	(\$147,269) (1%)	\$1,093,088 11%	\$915,897 8%	\$565,067 5%	\$343,236 3%



**Technical Services (SCADA)**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. In 2020/21 the increase was due to 3 new full-time equivalents added during the year. A reduction in 2021/22 was reported due to an allocation of salaries and benefits to support capital projects. For 2022/23 there are 2 additional hires projected for the year equating to 1 full-time equivalent based the timing of the hires.
- Training and Development – Conferences and training are typically impacted by the content and timing of offerings. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21, conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The expectation for the 2021/22 budget was that conferences and training would return to normal levels, with that same expectation carried forward into 2022/23.
- Contract Services – Not a major cost for Technical Services (SCADA), and relates mainly to situations where external contractors are required to perform specialized repairs or services in support of booster stations, etc.
- Electricity – Not a major cost for Technical Services (SCADA), with its primary purpose of running the pump station at Bennery Lake.
- Materials Supplies, and Services– Costs within this cost element group vary year-over-year however have remained consistent throughout. Computer software, cellular charges and equipment repair and maintenance are the primary costs within this grouping.
- Professional Services – Not a major cost for Technical Services (SCADA) however, the main cost driver within this cost element group are costs related to licenses and agreements, required for data collection and the various software applications.
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Technical Services (SCADA)</b>											
Salaries and benefits	\$1,743,432	\$1,897,180	\$2,135,788	\$1,948,861	\$2,077,712	\$2,150,432	\$153,748 9%	\$238,608 13%	(\$186,927) (9%)	\$128,851 7%	\$72,720 4%
Training and development	\$28,112	\$27,749	\$6,928	\$51,000	\$45,900	\$46,818	(\$363) (1%)	(\$20,821) (75%)	\$44,072 636%	(\$5,100) (10%)	\$918 2%
Contract services	\$20,256	\$38,168	\$43,043	\$18,400	\$18,400	\$18,768	\$17,912 88%	\$4,875 13%	(\$24,643) (57%)	\$0 0%	\$368 2%
Electricity	\$144,345	\$141,006	\$144,785	\$150,175	\$154,680	\$159,320	(\$3,339) (2%)	\$3,779 3%	\$5,390 4%	\$4,505 3%	\$4,640 3%
Materials, supplies and services	\$184,832	\$229,431	\$252,060	\$308,220	\$301,620	\$307,652	\$44,599 24%	\$22,629 10%	\$56,160 22%	(\$6,600) (2%)	\$6,032 2%
Professional services	\$12,255	\$48,695	\$55,367	\$47,500	\$47,900	\$48,858	\$36,440 297%	\$6,672 14%	(\$7,867) (14%)	\$400 1%	\$958 2%
Fleet	\$206,605	\$210,893	\$202,970	\$155,861	\$176,484	\$180,014	\$4,288 2%	(\$7,923) (4%)	(\$47,109) (23%)	\$20,623 13%	\$3,530 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$47,864	\$47,610	\$48,588	\$63,191	\$54,525	\$55,616	(\$254) (1%)	\$978 2%	\$14,603 30%	(\$8,666) (14%)	\$1,091 2%
Allocated to Wastewater Services	(\$1,449,682)	(\$1,608,926)	(\$1,756,754)	(\$1,683,650)	(\$1,730,801)	(\$1,785,964)	(\$159,244) 11%	(\$147,828) 9%	\$73,104 (4%)	(\$47,151) 3%	(\$55,163) 3%
Allocated to Stormwater Services	(\$49,147)	(\$55,548)	(\$61,691)	(\$43,887)	(\$15,317)	(\$15,788)	(\$6,401) 13%	(\$6,143) 11%	\$17,804 (29%)	\$28,570 (65%)	(\$471) 3%
<b>Total Technical Services (SCADA)</b>	<b>\$888,872</b>	<b>\$976,258</b>	<b>\$1,071,084</b>	<b>\$1,015,671</b>	<b>\$1,131,103</b>	<b>\$1,165,726</b>	<b>\$87,386 10%</b>	<b>\$94,826 10%</b>	<b>(\$55,413) (5%)</b>	<b>\$115,432 11%</b>	<b>\$34,623 3%</b>

### **Engineering and Technology Services (TS)**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. Further, in 2019/20, there is an addition of 4 new full-time equivalents which would have also contributed to the increase in that fiscal year. Modest increases were reported in 2020/21 and 2021/22 again due in part to vacancies and staff movement during the respective years, and new hires were limited in 2021/22 as the new Director of Engineering and TS wanted to complete an evaluation of the department. For 2022/23, although the addition of 10.25 full-time equivalents were included in the budget, due to the nature of the positions, not all costs were considered operational and were allocated to capital accordingly. Further, existing staff were also re-evaluated and allocations to capital were increased where deemed appropriate.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content and timing of any offerings. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21, conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The expectation for the 2021/22 budget was that conferences and training may not return to normal levels however, virtual platforms offered could provide savings compared to in-person offerings. The expectation for 2022/23 is a return to more normal pre-COVID-19 levels offering in-person conferences and training.
- Contract Services – Contract services are not a significant cost related to Engineering and TS. Cost reductions in 2019/20 were the result of being able to renegotiate existing contracts at the time, achieving better pricing for services.
- Materials Supplies and Services – Costs for material, supplies, and services are predominately costs associated with Information Services, and specifically related to computer software and licensing. Cost reductions were experienced in 2019/20 due to the removal of support services associated with the HP3000, Halifax Water's legacy system prior to SAP. For 2020/21 there were further cost reductions when the server and network equipment costs were moved to the capital budget. In 2021/22, as more and newer computer systems were added, the associated maintenance for those systems were added to the operating budget. Additionally, some costs that were capitalized in the past were deemed to be operational costs and budgeted accordingly. The increased costs budgeted in 2022/23 relate partially to the customer portal, whereby the actual customer enrolment in the portal significantly exceeded expectations, resulting in increased operating costs. Additionally, Information Services has also incorporated into the budget licensing fees associated with several other software products as projects continue to transition into operations.
- Professional Services – Similar to materials, supplies, and services, costs related to professional services are associated predominately with Information Services, and specifically related to consulting. The department uses a model to engage external consultants, and the amount varies depending upon the system performance. In 2019/20 actual costs were lower compared to the prior year however, in 2020/21, the opposite occurred, where the introduction of new systems required additional support that required external consultants. For

2022/23 and beyond, it is anticipated the use of external consultants will diminish as new staff will be hired to fill the void however, this again will be contingent upon the system performance.

- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Engineering and Technology Services</b>											
Salaries and benefits	\$4,492,656	\$5,164,145	\$5,316,835	\$5,443,869	\$4,930,359	\$5,102,922	\$671,489 15%	\$152,690 3%	\$127,034 2%	(\$513,510) (9%)	\$172,563 4%
Training and development	\$185,018	\$180,590	\$39,007	\$240,235	\$435,846	\$444,563	(\$4,428) (2%)	(\$141,583) (78%)	\$201,228 516%	\$195,611 81%	\$8,717 2%
Contract services	\$105,222	\$36,750	\$29,404	\$6,250	\$6,000	\$6,120	(\$68,472) (65%)	(\$7,346) (20%)	(\$23,154) (79%)	(\$250) (4%)	\$120 2%
Electricity	\$295	\$0	\$0	\$0	\$0	\$0	(\$295) (100%)	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Materials, supplies and services	\$2,451,952	\$2,349,866	\$1,778,304	\$3,969,328	\$5,168,550	\$5,271,921	(\$102,086) (4%)	(\$571,562) (24%)	\$2,191,024 123%	\$1,199,222 30%	\$103,371 2%
Professional services	\$449,889	\$199,045	\$762,261	\$109,535	\$116,742	\$119,077	(\$250,844) (56%)	\$563,216 283%	(\$652,726) (86%)	\$7,207 7%	\$2,335 2%
Fleet	\$220,866	\$245,700	\$93,769	\$103,540	\$107,860	\$110,017	\$24,834 11%	(\$151,931) (62%)	\$9,771 10%	\$4,320 4%	\$2,157 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$250,244	\$259,693	\$260,739	\$315,288	\$299,051	\$305,032	\$9,449 4%	\$1,046 0%	\$54,549 21%	(\$16,237) (5%)	\$5,981 2%
Allocated to Wastewater Services	(\$3,782,763)	(\$4,477,998)	(\$4,186,504)	(\$4,197,779)	(\$5,378,043)	(\$5,519,483)	(\$695,235) 18%	\$291,494 (7%)	(\$11,275) 0%	(\$1,180,264) 28%	(\$141,440) 3%
Allocated to Stormwater Services	(\$624,122)	(\$728,070)	(\$440,214)	(\$1,352,233)	(\$2,149,987)	(\$2,209,917)	(\$103,948) 17%	\$287,856 (40%)	(\$912,019) 207%	(\$797,754) 59%	(\$59,930) 3%
<b>Total Engineering and Technology Services</b>	<b>\$3,749,257</b>	<b>\$3,229,721</b>	<b>\$3,653,601</b>	<b>\$4,638,033</b>	<b>\$3,536,378</b>	<b>\$3,630,252</b>	(\$519,536) (14%)	\$423,880 13%	\$984,432 27%	(\$1,101,655) (24%)	\$93,874 3%

**Regulatory Services**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. The number of full-time equivalents has increased by an estimated 14 positions since 2018/19, with the largest increase within Development Approvals of approximately 8 positions. For Regulatory Services, 4.5 full-time equivalents have been added since 2021/22, with an additional 1.75 full-time equivalent approved as part of the 2022/23 budget.
- Training and Development – Training and development costs have varied year-over-year. In 2020/21 a significant portion of budgets for the individual business units were underspent due to COVID-19, where conferences were cancelled, in-person training was not possible, and virtual offerings had yet to be formally established. The expectation, for the 2021/22 budget, was that conferences and training would return to a more normal level with in-person sessions, or more virtual platforms. This expectation carried forward in the formulation of the 2022/23 budget, with a slight reduction in projected spend as several of the offerings were able to be accommodated in the 2021/22 fiscal year.
- Contract Services – The main cost driver within contract services relates to water quality testing. The actual level of spend did not varied significantly during 2019/20 and 2020/21, although costs for 2020/21 were under budget. For 2021/22 the budget levels for water quality testing are comparable to the prior year, and consistent through 2022/23.
- Materials Supplies and Services – Costs for materials, supplies and services are not significant costs in relation to Regulatory Services. In 2019/20 and 2020/21 there was a reduction in costs because of the pandemic. Costs have increased for 2021/22 and 2022/23 in anticipation of activities within Regulatory Service returning to more normal levels.
- Professional Services – The main cost driver within professional services relates to consulting costs. The actual level of spend did not vary significantly during 2018/19 and 2019/20, and although costs did increase in 2020/21, the level of spend was still below budget for that year. Costs increased 2021/22 due to several special initiatives including, J.D. Kline water withdrawal, investigations, and various internal compliance audits for facilities.
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Regulatory Services</b>											
Salaries and benefits	\$2,539,456	\$3,192,752	\$3,398,921	\$3,536,308	\$4,016,353	\$4,156,925	\$653,296 26%	\$206,169 6%	\$137,387 4%	\$480,045 14%	\$140,572 3%
Training and development	\$17,874	\$30,457	\$38,741	\$95,800	\$84,927	\$86,626	\$12,583 70%	\$8,284 27%	\$57,059 147%	(\$10,873) (11%)	\$1,699 2%
Contract services	\$201,174	\$192,368	\$186,308	\$288,900	\$285,420	\$291,128	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Materials, supplies and services	\$78,859	\$45,294	\$46,963	\$90,455	\$96,665	\$98,598	(\$33,565) (43%)	\$1,669 4%	\$43,492 93%	\$6,210 7%	\$1,933 2%
Professional services	\$108,364	\$116,648	\$155,150	\$240,800	\$185,525	\$189,236	\$8,284 8%	\$38,502 33%	\$85,650 55%	(\$55,275) (23%)	\$3,711 2%
Fleet	\$119,446	\$114,780	\$63,496	\$109,106	\$92,484	\$94,334	(\$4,666) (4%)	(\$51,284) (45%)	\$45,610 72%	(\$16,622) (15%)	\$1,850 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$90,775	\$94,695	\$95,663	\$109,849	\$105,105	\$107,207	\$3,920 4%	\$968 1%	\$14,186 15%	(\$4,744) (4%)	\$2,102 2%
Recoveries	(\$3,750)	(\$5,020)	(\$4,165)	\$0	\$0	\$0	(\$1,270) 34%	\$855 (17%)	\$4,165 (100%)	\$0 0%	\$0 0%
Allocated to Wastewater Services	(\$1,185,591)	(\$1,432,311)	(\$1,384,724)	(\$1,586,600)	(\$1,674,027)	(\$1,727,980)	(\$246,720) 21%	\$47,587 (3%)	(\$201,876) 15%	(\$87,427) 6%	(\$53,953) 3%
Allocated to Stormwater Services	(\$1,287,289)	(\$1,490,202)	(\$1,505,483)	(\$1,683,720)	(\$1,727,454)	(\$1,784,899)	(\$202,913) 16%	(\$15,281) 1%	(\$178,237) 12%	(\$43,734) 3%	(\$57,445) 3%
<b>Total Regulatory Services</b>	<b>\$679,318</b>	<b>\$859,461</b>	<b>\$1,090,870</b>	<b>\$1,200,898</b>	<b>\$1,464,998</b>	<b>\$1,511,175</b>	\$180,143 27%	\$231,409 27%	\$110,028 10%	\$264,100 22%	\$46,177 3%

### **Customer Service**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. A decrease is reported in 2020/21 compared to the prior year because of the retroactive amounts paid. Normal increases are projected for 2021/22, and increases for 2022/23 are lower than expected because of a reduction in the number of full-time equivalents of 2.5 compared to the 2021/22 budget.
- Training and Development – Training and development are not significant costs related Customer Service, and has remained relatively low historically. Cost reductions were indicative of the effect COVID-19 and the pandemic was having with respect to conferences and training.
- Materials Supplies, and Services – Customer Service costs for materials, supplies, and services are centered within the Customer Billing department, and specifically the cost element for postage. The most dramatic increase occurred in the 2021/22 budget where it was anticipated Halifax Water would implement monthly billing for all customers, discontinuing quarterly billing, at a potential additional cost of \$550 thousand in postage alone. For the 2022/23 budget the decision to move to monthly billing was reversed and will be reconsidered based in the approval of rate increases.
- Professional Services – Historical costs related to professional services were mainly in support of the Help to Others (H2O) Program. In 2021/22, the budget and associated costs related to this program were moved to the General Manager's Office, under Administration.
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

	Operating Expenditures						Variances ( year over year - \$ and % )				
					Test Year #1	Test Year #2				Test Year #1	Test Year #2
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	2022/23 Budget	2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	2022/23 Budget	2023/24 Budget
Customer Service											
Salaries and benefits	\$3,197,892	\$3,519,150	\$3,390,362	\$3,520,075	\$3,535,947	\$3,659,705	\$321,258 10%	(\$128,788) (4%)	\$129,713 4%	\$15,872 0%	\$123,758 3%
Training and development	\$35,133	\$30,325	\$3,681	\$43,400	\$24,500	\$24,990	(\$4,808) (14%)	(\$26,644) (88%)	\$39,719 1079%	(\$18,900) (44%)	\$490 2%
Contract services	\$256,110	\$133,665	\$164,044	\$342,340	\$295,633	\$301,546	(\$122,445) (48%)	\$30,379 23%	\$178,296 109%	(\$46,707) (14%)	\$5,913 2%
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Materials, supplies and services	\$471,156	\$510,766	\$535,927	\$1,326,675	\$538,215	\$548,979	\$39,610 8%	\$25,161 5%	\$790,748 148%	(\$788,460) (59%)	\$10,764 2%
Professional services	\$36,300	\$40,169	\$62,958	\$0	\$0	\$0	\$3,869 11%	\$22,789 57%	(\$62,958) (100%)	\$0 0%	\$0 0%
Fleet	\$279,059	\$331,715	\$223,389	\$96,590	\$80,000	\$81,600	\$52,656 19%	(\$108,326) (33%)	(\$126,799) (57%)	(\$16,590) (17%)	\$1,600 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$644,320	\$601,936	\$700,321	\$507,579	\$369,603	\$376,995	(\$42,384) (7%)	\$98,385 16%	(\$192,742) (28%)	(\$137,976) (27%)	\$7,392 2%
Allocated to Wastewater Services	(\$2,061,287)	(\$2,277,188)	(\$2,188,838)	(\$2,521,849)	(\$2,170,237)	(\$2,237,450)	(\$215,901) 10%	\$88,350 (4%)	(\$333,011) 15%	\$351,612 (14%)	(\$67,213) 3%
Allocated to Stormwater Services	(\$334,590)	(\$370,354)	(\$277,705)	(\$341,031)	(\$203,273)	(\$209,519)	(\$35,764) 11%	\$92,649 (25%)	(\$63,326) 23%	\$137,758 (40%)	(\$6,246) 3%
Total Customer Service	\$2,524,093	\$2,520,184	\$2,614,139	\$2,973,779	\$2,470,388	\$2,546,846	(\$3,909) (0%)	\$93,955 4%	\$359,640 14%	(\$503,391) (17%)	\$76,458 3%



## **Corporate Services**

For 2021/22, costs related to Corporate Services were separated from the former “Administration and Pension” into two separate divisions within the organizational hierarchy. The remaining portion of Administration and Pension became the Administration Section. Corporate Services is headed by the Director, Corporate Services/CFO, who is responsible for the functions of Accounting, Finance, Procurement, and Customer Service. For purposes of the analysis below, all except Customer Service is included, as Customer Service is dealt with separately from a cost-of-service rate making perspective.

- **Salaries and Benefits** – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). In 2022/23 cost reductions have been projected due to staff currently engaged in the new ERP capital project which is due to go-live later in November 2022. There was 1 new full-time equivalent included within the approved 2022/23 budget.
- **Training and Development** – Training and development are not significant costs related Corporate Services. The modest decrease for 2022/23 recognizes a cautious optimism that conferences and training may return to normal however, continued virtual offerings by organizations provide savings in terms of travel costs, etc.
- **Contract Services** – Costs here relate to services required for the Cost-of-Service Manual review, a water demand analysis and a pending rate application. Costs decrease in 2022/23 as some of this work was completed in the 2021/22 fiscal year.
- **Materials, Supplies and Services** – Costs within this cost element group are not significant related to Corporate Services, and include expenditures such as postage, telephones, etc.
- **Professional Services** – Costs within this cost element group include expenditures such as the annual corporate audit and consulting services as required. There was a decrease in 2022/23 associated with a request for proposal (RFP) for the annual corporate audit. Additional there were other initiatives included in 2021/22 such as a procurement and Dispute Resolution Officer (DRO) audit that were either performed in-house or deemed not necessary.
- **Fleet Services** – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. In the 2021/22 budget an error was discovered, wherein a vehicle was inadvertently charged to Corporate Services, which was corrected in 2022/23. Typically, the only costs for fleet would be reimbursements to staff for mileage, travel, and parking.
- **Applied Overheads and Other Allocations** – Included here are several other operating costs, the largest of which is the annual insurance policy premium. Budgeted costs in 2022/23 amounted to \$1.2 million compared to \$1.0 million in 2021/22, which accounts for the change reported between the respective years.

Operating Expenditures						Variances ( year over year - \$ and % )				
2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Corporate Services</b>										
Salaries and benefits			\$1,306,623	\$1,201,125	\$1,243,164				(\$105,498) (8%)	\$42,039 3%
Training and development			\$53,000	\$36,600	\$37,332				(\$16,400) (31%)	\$732 2%
Contract services			\$269,660	\$230,200	\$234,804				(\$39,460) (15%)	\$4,604 2%
Electricity			\$0	\$0	\$0				\$0 0%	\$0 0%
Materials, supplies and services			\$41,030	\$19,080	\$19,462				(\$21,950) (53%)	\$382 2%
Professional services			\$256,800	\$74,436	\$75,925				(\$182,364) (71%)	\$1,489 2%
Fleet			\$10,096	\$766	\$781				(\$9,330) (92%)	\$15 2%
Chemicals			\$0	\$0	\$0				\$0 0%	\$0 0%
Applied overheads and other allocations			\$1,186,730	\$1,407,241	\$1,435,386				\$220,511 19%	\$28,145 2%
Allocated to Wastewater Services			(\$1,317,924)	(\$1,309,528)	(\$1,343,664)				\$8,396 (1%)	(\$34,136) 3%
Allocated to Stormwater Services			(\$214,342)	(\$145,503)	(\$149,296)				\$68,839 (32%)	(\$3,793) 3%
<b>Total Corporate Services</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,591,673</b>	<b>\$1,514,417</b>				<b>(\$77,256) (5%)</b>	<b>\$39,477 3%</b>

## **Administration**

As noted in the previous section, for 2021/22, costs related to Corporate Services were separated from the former “Administration and Pension” into two separate divisions within the organizational hierarchy. The remaining portion of Administration and Pension became the Administration Section. The Administration is headed by the General Manager, who is responsible for the functions of the General Manager’s Office, Human Resources, Legal, and Communications.

- **Salaries and Benefits** – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 would have increased due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019 however, a decrease has been reported due to an offsetting reduction related to Halifax Water no longer being responsible to make payments to fund the unfunded liability of the pension plan. This payment amounted to approximately \$0.8 million per year in the three prior years. The decrease in 2021/22 relates to the segregation of Administration and Pension as noted above. Increases in 2022/23 are due to 4.5 new full-time equivalents budgeted.
- **Training and Development** – Planning and attendance for conferences and training are typically impacted by the content and timing of any offerings. Cost reductions were experienced in both 2019/20 and 2020/21, and for 2020/21, conferences were cancelled, in-person training halted, and virtual offerings either limited or non-existent due to COVID-19. The main driver of costs in Administration are those initiatives within the Human Resources department, which include core training for staff, but also leadership/supervisory training and professional development. The expectation for the 2021/22 budget was that conferences and training would return to more normal levels, with that same expectation carried forward into 2022/23 and beyond.
- **Contract Services** – Costs appearing within this cost element group are driven mainly by initiatives within the Human Resources department, including harassment investigations, work site assessments, and specialized services requiring external contractors. Expenditures vary year-over-year, for example in 2018/19 costs predominately were directed towards executive recruitment, which would explain cost reductions reported in 2019/20. The reductions experienced in 2020/21 are due to COVID-19 and the inability to contract external services, especially for onsite work, because of restrictions imposed during the pandemic. For 2021/22 and beyond the expectation was that contract services would return to normal levels.
- **Materials Supplies and Services** – Costs for materials, supplies, and services vary year-over-year, and cover a wide variety of cost elements. Cost reductions in 2020/21 are likely due to the pandemic, where staff were working from home with more reliance placed on digital options. For 2021/22 the reduction reported was due to the allocation between Corporate Services and Administration.
- **Professional Services** – Costs associated with professional services vary year-over-year and include mainly regulatory fees, legal fees, and consulting. Cost increases in 2019/20 were due to a \$240 thousand increase in legal fees compared 2018/19. The decrease experienced in 2020/21 was a reversal of the higher legal cost of 2019/20, offset somewhat by increased costs related to regulatory fees. For 2022/23, professional services are budget to increase with respect to regulatory and legal fees in anticipation of the proposed rate application for water, wastewater and stormwater, and revisions to the Cost-of-Service Manual.

- Fleet – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs, and include for reimbursements to staff for mileage, travel, and parking.

	Operating Expenditures						Variances ( year over year - \$ and % )				
	2018/19	2019/20	2020/21	2021/22	Test Year #1	Test Year #2	2019/20	2020/21	2021/22	Test Year #1	Test Year #2
	Actual	Actual	Actual	Budget	Budget	Budget	Actual	Actual	Budget	Budget	Budget
<b>Administration</b>											
Salaries and benefits	\$5,022,077	\$3,968,378	\$4,174,233	\$2,843,503	\$3,357,868	\$3,475,393	(\$1,053,699) (21%)	\$205,855 5%	(\$1,330,730) (32%)	\$514,365 18%	\$117,525 3%
Training and development	\$259,173	\$212,585	\$183,999	\$367,353	\$397,562	\$405,513	(\$46,588) (18%)	(\$28,586) (13%)	\$183,354 100%	\$30,209 8%	\$7,951 2%
Contract services	\$244,482	\$221,440	\$176,915	\$218,623	\$199,195	\$203,179	(\$23,042) (9%)	(\$44,525) (20%)	\$41,708 24%	(\$19,428) (9%)	\$3,984 2%
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Materials, supplies and services	\$219,231	\$219,580	\$175,163	\$113,180	\$104,834	\$105,791	\$349 0%	(\$44,417) (20%)	(\$61,983) (35%)	(\$8,346) (7%)	\$957 1%
Professional services	\$1,032,338	\$1,341,216	\$1,061,611	\$1,115,415	\$1,513,674	\$1,543,947	\$308,878 30%	(\$279,605) (21%)	\$53,804 5%	\$398,259 36%	\$30,273 2%
Fleet	\$23,582	\$20,612	\$15,917	\$10,390	\$19,993	\$20,393	(\$2,970) (13%)	(\$4,695) (23%)	(\$5,527) (35%)	\$9,603 92%	\$400 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$954,618	\$1,060,048	\$1,278,190	\$260,130	\$261,875	\$267,113	\$105,430 11%	\$218,142 21%	(\$1,018,060) (80%)	\$1,745 1%	\$5,238 2%
Allocated to Wastewater Services	(\$3,242,216)	(\$3,023,641)	(\$2,964,892)	(\$2,079,326)	(\$2,582,056)	(\$2,655,409)	\$218,575 (7%)	\$58,749 (2%)	\$885,566 (30%)	(\$502,730) 24%	(\$73,353) 3%
Allocated to Stormwater Services	(\$521,581)	(\$484,119)	(\$482,143)	(\$338,174)	(\$286,895)	(\$295,045)	\$37,462 (7%)	\$1,976 (0%)	\$143,969 (30%)	\$51,279 (15%)	(\$8,150) 3%
<b>Total Administration</b>	<b>\$3,991,704</b>	<b>\$3,536,099</b>	<b>\$3,618,993</b>	<b>\$2,511,094</b>	<b>\$2,986,050</b>	<b>\$3,070,875</b>	<b>(\$455,605) (11%)</b>	<b>\$82,894 2%</b>	<b>(\$1,107,899) (31%)</b>	<b>\$474,956 19%</b>	<b>\$84,825 3%</b>

## **Worksheet W-5 Cost-of-Service (COS) Structure**

Worksheet W-5 details the customer classifications, cost functions with allocated percentages, service characteristics and operating and capital cost classifications for Water Services as detailed in the Cost-of-Service Manual.

# Halifax Water Water Rate Study

## Customer Classifications, Cost Functions & Service Characteristics

## Operating Cost Classifications

## Capital Cost Classifications

[illegible]

## **Worksheet W-6 Operating Expense Functionalization**

Worksheet W-6 details the Water Services operating expense cost element groups, by the system functions detailed in the Cost-of-Service Manual. The total of the service functions equals the operating expense category in the revenue requirement for the year 2023/24, and are reported as both a dollar and percentage value. These values are used in Worksheet W-10 to allocate the costs to the service characteristics.

Halifax Water Water Rate Study	
Statement of Operating Expenditures 2023/24	
OPERATING EXPENSES	Test Year #2 2023/24 Budget
<b>Supply and Treatment</b>	
Salaries and benefits	\$3,872,065
Training and development	\$55,300
Contract services	\$960,014
Electricity	\$1,965,957
Materials, supplies and services	\$803,142
Professional services	\$378,119
Fleet	\$207,084
Chemicals	\$4,300,605
Applied overheads and other allocations	\$112,466
Allocation to Transmission and Distribution	(\$1,026,097)
<b>Total Supply and Treatment</b>	<b>\$11,628,655</b>
<b>Transmission and Distribution</b>	
Salaries and benefits	\$5,479,987
Training and development	\$53,856
Contract services	\$4,156,286
Electricity	\$154,706
Materials, supplies and services	\$1,079,290
Professional services	\$88,995
Fleet	\$803,860
Chemicals	\$0
Applied overheads and other allocations	\$225,721
Allocation from Supply and Treatment	\$1,026,097
Recoveries	(\$284,695)
<b>Total Transmission and Distribution</b>	<b>\$12,784,103</b>
<b>Technical Services (SCADA)</b>	
Salaries and benefits	\$2,150,432
Training and development	\$46,818
Contract services	\$18,768
Electricity	\$159,320
Materials, supplies and services	\$307,652
Professional services	\$48,858
Fleet	\$180,014
Chemicals	\$0
Applied overheads and other allocations	\$55,616
Allocation to Wastewater Service	(\$1,785,964)
Allocation to Stormwater Service	(\$15,788)
<b>Total Technical Services (SCADA)</b>	<b>\$1,165,726</b>

[illegible]



Engineering and TS	
Salaries and benefits	\$5,102,922
Training and development	\$444,563
Contract services	\$6,120
Electricity	\$0
Materials, supplies and services	\$5,271,921
Professional services	\$119,077
Fleet	\$110,017
Chemicals	\$0
Applied overheads and other allocations	\$305,032
Allocation to Wastewater Service	(\$5,519,483)
Allocation to Stormwater Service	(\$2,209,917)
Total Engineering and TS	\$3,630,252
Regulatory Services	
Salaries and benefits	\$4,156,925
Training and development	\$86,626
Contract services	\$291,128
Electricity	\$0
Materials, supplies and services	\$98,598
Professional services	\$189,236
Fleet	\$94,334
Chemicals	\$0
Applied overheads and other allocations	\$107,207
Allocation to Wastewater Service	(\$1,727,980)
Allocation to Stormwater Service	(\$1,784,899)
Total Regulatory Services	\$1,511,175
Customer Service	
Salaries and benefits	\$3,659,705
Training and development	\$24,990
Contract services	\$301,546
Electricity	\$0
Materials, supplies and services	\$548,979
Professional services	\$0
Fleet	\$81,600
Chemicals	\$0
Applied overheads and other allocations	\$376,995
Allocation to Wastewater Service	(\$2,237,450)
Allocation to Stormwater Service	(\$209,519)
Total Customer Service	\$2,546,847

Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,102,922	\$0	\$0	\$0	\$5,102,922
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$444,563	\$0	\$0	\$0	\$444,563
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,120	\$0	\$0	\$0	\$6,120
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,271,921	\$0	\$0	\$0	\$5,271,921
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$119,077	\$0	\$0	\$0	\$119,077
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$110,017	\$0	\$0	\$0	\$110,017
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$305,032	\$0	\$0	\$0	\$305,032
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$5,519,483)	\$0	\$0	\$0	(\$5,519,483)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$2,209,917)	\$0	\$0	\$0	(\$2,209,917)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,630,252	\$0	\$0	\$0	\$3,630,252
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,156,925	\$0	\$0	\$4,156,925
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$86,626	\$0	\$0	\$86,626
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$291,128	\$0	\$0	\$291,128
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$98,598	\$0	\$0	\$98,598
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$189,236	\$0	\$0	\$189,236
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$94,334	\$0	\$0	\$94,334
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$107,207	\$0	\$0	\$107,207
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$1,727,980)	\$0	\$0	(\$1,727,980)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$1,784,899)	\$0	\$0	(\$1,784,899)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,511,175	\$0	\$0	\$1,511,175
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,630,467	\$582,856	\$446,382	\$0	\$0	\$0	\$0	\$3,659,705
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$21,318	\$3,672	\$0	\$0	\$0	\$0	\$0	\$24,990
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$154,892	\$35,598	\$111,056	\$0	\$0	\$0	\$0	\$301,546
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$95,906	\$24,317	\$428,757	\$0	\$0	\$0	\$0	\$548,980
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,320	\$65,280	\$0	\$0	\$0	\$0	\$0	\$81,600
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$365,110	\$4,982	\$6,903	\$0	\$0	\$0	\$0	\$376,995
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$1,399,647)	(\$351,185)	(\$486,618)	\$0	\$0	\$0	\$0	(\$2,237,450)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$209,519)	\$0	\$0	\$0	\$0	\$0	\$0	(\$209,519)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,674,847	\$365,520	\$506,480	\$0	\$0	\$0	\$0	\$2,546,847

Corporate Services		Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
Salaries and benefits	\$1,243,164	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,243,164	\$0	\$1,243,164
Training and development	\$37,332	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$37,332	\$0	\$37,332
Contract services	\$234,804	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$234,804	\$0	\$234,804
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Materials, supplies and services	\$19,462	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,462	\$0	\$19,462
Professional services	\$75,925	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$75,925	\$0	\$75,925
Fleet	\$781	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$781	\$0	\$781
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Applied overheads and other allocations	\$1,435,386	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,435,386	\$0	\$1,435,386
Allocation of Costs to Wastewater Services	(\$1,343,664)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$1,343,664)	\$0	(\$1,343,664)
Allocation of Costs to Stormwater Services	(\$149,296)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$149,296)	\$0	(\$149,296)
Total Corporate Services	\$1,553,894	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,553,894	\$0	\$1,553,894
Administration		Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
Salaries and benefits	\$3,475,393	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,475,393	\$3,475,393
Training and development	\$405,513	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$405,513	\$405,513
Contract services	\$203,179	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$203,179	\$203,179
Electricity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Materials, supplies and services	\$105,791	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$105,791	\$105,791
Professional services	\$1,543,947	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,543,947	\$1,543,947
Fleet	\$20,393	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$20,393	\$20,393
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Applied overheads and other allocations	\$267,113	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$267,113	\$267,113
Allocation of Costs to Wastewater Services	(\$2,655,409)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$2,655,409)	(\$2,655,409)
Allocation of Costs to Stormwater Services	(\$295,045)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$295,045)	(\$295,045)
Total Administration	\$3,070,875	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,070,875	\$3,070,875
Total O&M Expense	\$37,891,526	\$382,377	\$16,060	\$1,050,398	\$10,179,820	\$218,887	\$6,662,346	\$273,578	\$2,387,000	\$3,242,296	\$1,165,726	\$1,674,847	\$365,520	\$506,480	\$3,630,252	\$1,511,175	\$1,553,894	\$3,070,875	\$37,891,531

## Worksheet W-6

Halifax Water Water Rate Study		Halifax Water Water Rate Study																
Statement of Operating Expenditures 2023/24		Operating Expense Cost Allocation Percent of Costs to Functions 2023/24																
Test Year #2 2023/24 Budget																		
OPERATING EXPENSES																		
Supply and Treatment																		
Salaries and benefits	\$3,872,065	7%	0%	15%	79%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Training and development	\$55,300	15%	0%	15%	70%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Contract services	\$960,014	8%	1%	39%	51%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electricity	\$1,965,957	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Materials, supplies and services	\$803,142	3%	0%	9%	88%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Professional services	\$378,119	10%	0%	16%	74%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fleet	\$207,084	7%	0%	14%	79%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chemicals	\$4,300,605	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Applied overheads and other allocations	\$112,466	3%	0%	25%	73%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allocation to Transmission and Distribution	(\$1,026,097)	3%	0%	9%	88%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Supply and Treatment	\$11,628,655																	
Transmission and Distribution																		
Salaries and benefits	\$5,479,987	0%	0%	0%	0%	1%	57%	1%	23%	18%	0%	0%	0%	0%	0%	0%	0%	0%
Training and development	\$53,856	0%	0%	0%	0%	2%	52%	2%	20%	24%	0%	0%	0%	0%	0%	0%	0%	0%
Contract services	\$4,156,286	0%	0%	0%	0%	2%	51%	3%	9%	35%	0%	0%	0%	0%	0%	0%	0%	0%
Electricity	\$154,706	0%	0%	0%	0%	0%	68%	22%	4%	5%	0%	0%	0%	0%	0%	0%	0%	0%
Materials, supplies and services	\$1,079,290	0%	0%	0%	0%	2%	30%	2%	44%	22%	0%	0%	0%	0%	0%	0%	0%	0%
Professional services	\$88,995	0%	0%	0%	0%	1%	58%	1%	31%	10%	0%	0%	0%	0%	0%	0%	0%	0%
Fleet	\$803,860	0%	0%	0%	0%	1%	54%	1%	26%	18%	0%	0%	0%	0%	0%	0%	0%	0%
Chemicals	\$0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Applied overheads and other allocations	\$225,721	0%	0%	0%	0%	1%	41%	2%	15%	40%	0%	0%	0%	0%	0%	0%	0%	0%
Allocation from Supply and Treatment	\$1,026,097	0%	0%	0%	0%	2%	67%	0%	0%	31%	0%	0%	0%	0%	0%	0%	0%	0%
Recoveries	(\$284,695)	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Transmission and Distribution	\$12,784,103																	
Technical Services (SCADA)																		
Salaries and benefits	\$2,150,432	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
Training and development	\$46,818	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Contract services	\$18,768	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Electricity	\$159,320	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Materials, supplies and services	\$307,652	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Professional services	\$48,858	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Fleet	\$180,014	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Chemicals	\$0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Applied overheads and other allocations	\$55,616	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Allocation to Wastewater Service	(\$1,785,964)	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Allocation to Stormwater Service	(\$15,788)	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Total Technical Services (SCADA)	\$1,165,726																	

<b>Engineering and TS</b>	
Salaries and benefits	\$5,102,922
Training and development	\$444,563
Contract services	\$6,120
Electricity	\$0
Materials, supplies and services	\$5,271,921
Professional services	\$119,077
Fleet	\$110,017
Chemicals	\$0
Applied overheads and other allocations	\$305,032
Allocation to Wastewater Service	(\$5,519,483)
Allocation to Stormwater Service	(\$2,209,917)
<b>Total Engineering and TS</b>	<b>\$3,630,252</b>
<b>Regulatory Services</b>	
Salaries and benefits	\$4,156,925
Training and development	\$86,626
Contract services	\$291,128
Electricity	\$0
Materials, supplies and services	\$98,598
Professional services	\$189,236
Fleet	\$94,334
Chemicals	\$0
Applied overheads and other allocations	\$107,207
Allocation to Wastewater Service	(\$1,727,980)
Allocation to Stormwater Service	(\$1,784,899)
<b>Total Regulatory Services</b>	<b>\$1,511,175</b>
<b>Customer Service</b>	
Salaries and benefits	\$3,659,705
Training and development	\$24,990
Contract services	\$301,546
Electricity	\$0
Materials, supplies and services	\$548,979
Professional services	\$0
Fleet	\$81,600
Chemicals	\$0
Applied overheads and other allocations	\$376,995
Allocation to Wastewater Service	(\$2,237,545)
Allocation to Stormwater Service	(\$209,519)
<b>Total Customer Service</b>	<b>\$2,546,846</b>

[illegible]

Corporate Services																			
Salaries and benefits	\$1,243,164		Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
Training and development	\$37,332		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Contract services	\$234,804		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Electricity	\$0		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Materials, supplies and services	\$19,462		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Professional services	\$75,925		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Fleet	\$781		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Chemicals	\$0		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Applied overheads and other allocations	\$1,435,386		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Allocation of Costs to Wastewater Services	(\$1,343,664)		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Allocation of Costs to Stormwater Services	(\$149,296)		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Total Corporate Services	\$1,553,894																		
Administration			Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
Salaries and benefits	\$3,475,393		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Training and development	\$405,513		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Contract services	\$203,179		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Electricity	\$0		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Materials, supplies and services	\$105,791		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Professional services	\$1,543,947		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Fleet	\$20,393		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Chemicals	\$0		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Applied overheads and other allocations	\$267,113		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Allocation of Costs to Wastewater Services	(\$2,655,409)		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Allocation of Costs to Stormwater Services	(\$295,045)		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Total Administration	\$3,070,875																		
Total O&M Expense	\$37,891,526																		

## **Worksheet W-7 Continuity Schedule Utility Plant in Service**

Worksheet W-7 provides additional detail on the following:

- Funded utility plant in service,
- Contributed assets,
- Projected utility plant in service additions, net of projected retirements,
- Accumulated depreciation, net of projected retirements,
- Calculated depreciation, and
- Projected net book value.

The spreadsheet is broken down by asset class and asset. For the purposes of the revenue requirement, depreciation for Water transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services.

Halifax Regional Water Commission Utility Plant in Service-Water  Continuity Schedule/ Depreciation for Utility Plant in Service 2023-24																	
	Useful Life in years	Funded Utility Plant in Service	Contributed Utility Plant in Service	Total Utility Plant in Service	Work in Process approved in Prior Years	Utility Plant in Service Additions	Contributed Utility Plant in Service Additions	Projected Retirements	Projected Utility Plant in Service	Accumulated Depreciation	Accumulated Depreciation on funded assets	Accumulated Depreciation on donated assets	Projected Retirement of Accumulated Depreciation	Projected Net Book Value before Depreciation	Depreciation on Donated assets	Depreciation expense on funded assets	Projected Net Book Value after Depreciation
		Mar-23	Mar-23	Mar-23	2023-24	2023-24	2023-24	2023-24	Mar-24	Mar-23	Mar-23	Mar-23	2023-24	Mar-24	2023-24	2023-24	Mar-24
Intangible Plant																	
Organization and Working Capital	10	5,180,495	29,941	5,210,436					5,210,436	3,179,840	3,163,372	16,468	-	2,030,596	2,994	353,752	1,673,850
		-	-								-	-	-				-
Tangible Plant		-	-								-	-	-				-
LAND AND LAND RIGHTS		-	-								-	-	-				-
Source of Supply Land	N/A	13,944,234	-	13,944,234		100,000			14,044,234	-	-	-	-	14,044,234			14,044,234
Power and pumping	N/A	215,345	-	215,345	-				215,345	-	-	-	-	215,345			215,345
Transmission Right of Ways	N/A	1,256,951	-	1,256,951					1,256,951	-	-	-	-	1,256,951			1,256,951
Reservoir Land	N/A	463,258	-	463,258					463,258	-	-	-	-	463,258			463,258
Office Land	N/A	2,573,529	-	2,573,529					2,573,529	-	-	-	-	2,573,529			2,573,529
Other Land	N/A	218,401	-	218,401					218,401	-	-	-	-	218,401			218,401
Easements & Rights of Ways	N/A	1,331,175	-	1,331,175					1,331,175	-	-	-	-	1,331,175			1,331,175
STRUCTURES AND IMPROVEMENTS		-	-	-	-				-	-	-	-	-	-			-
Source of Supply Structures	5 - 100	808,183	-	808,183	-				808,183	576,714	576,714	-	-	231,469		10,025	221,444
Power and Pumping Structures	5 - 100	25,931,641	1,809,864	27,741,505	-	17,561,960	47,040		45,350,505	3,515,631	3,180,110	335,521	-	41,834,874	34,395	109,534	41,690,945
Purification Structures	5 - 75	50,684,569	5,854,966	56,539,535	-	3,637,581	7,186,340		67,363,456	16,040,471	15,617,452	423,019	-	51,322,984	64,415	699,023	50,559,547
Distribution Reservoirs and Standpipes	20 - 75	20,922,962	3,172,127	24,095,089	-				24,095,089	10,049,350	9,494,460	554,890	-	14,045,739	43,435	407,878	13,594,425
General	5 - 75	6,775,898	-	6,775,898	-				6,775,898	1,252,920	1,252,920	-	-	5,522,978		65,350	5,457,628
Office Building	5 - 75	16,686,989	35,266	16,722,255	-				16,722,255	4,661,142	4,654,442	6,701	-	12,061,113	705	826,170	11,234,237
Collection and Inpounding	75 - 100	8,214,156	3,388,471	11,602,628	-				11,602,628	1,648,658	1,411,465	237,193	-	9,953,970	67,769	151,944	9,734,256
Small systems	5 - 75	4,390,044	5,105,807	9,495,850	-	400,000			9,895,850	3,747,147	1,607,236	2,139,911	-	6,148,703	143,698	164,116	5,840,889
Aerotech WTP		1,875,813	61,433	1,937,246		1,070,000			3,007,246	857,878	820,044	37,834	-	2,149,368	753	101,020	2,047,595
Other Security		122,000	-	122,000	-	125,000			247,000	20,400	20,400	-	-	226,600		36,900	189,700

Halifax Regional Water Commission Utility Plant in Service-Water  Continuity Schedule/ Depreciation for Utility Plant in Service 2023-24																	
	Useful Life in years	Funded Utility Plant in Service Mar-23	Contributed Utility Plant in Service Mar-23	Total Utility Plant in Service Mar-23	Work in Process approved in Prior Years 2023-24	Utility Plant in Service Additions 2023-24	Contributed Utility Plant in Service Additions 2023-24	Projected Retirements 2023-24	Projected Utility Plant in Service Mar-24	Accumulated Depreciation Mar-23	Accumulated Depreciation on funded assets Mar-23	Accumulated Depreciation on donated assets Mar-23	Projected Retirement of Accumulated Depreciation 2023-24	Projected Net Book Value before Depreciation Mar-24	Depreciation on Donated assets 2023-24	Depreciation expense on funded assets 2023-24	Projected Net Book Value after Depreciation Mar-24
Equipment		-	-	-	-				-	-	-	-	-	-			-
Electrical Pumping	5 - 25	8,993,296	2,058,746	11,052,042	-	200,000			11,252,042	9,681,333	8,769,747	911,586	-	1,570,709	106,591	568,711	895,408
Purification Equipment	5 - 25	30,423,710	35,584	30,459,294	-	6,384,079			36,843,373	22,795,778	22,787,772	8,006	-	14,047,594	1,779	1,562,400	12,483,415
Information Technology	5 - 25	11,369,721	3,342	11,373,063	-				11,373,063	5,982,946	5,962,478	20,468	-	5,390,117	13,360	481,190	4,895,567
Tools and Work Equipment - Ops	5 - 20	2,967,264	-	2,967,264	-				2,967,264	2,886,934	2,886,934	-	-	80,330		44,897	35,432
Tools and Work Equipment - Plants	5 - 20	369,905	-	369,905	-				369,905	315,585	315,585	-	-	54,320		26,142	28,178
Tools and Work Equipment - Other	5 - 20	562,778	-	562,778	-				562,778	415,231	415,231	-	-	147,547		74,435	73,112
Transportation Equipment	5	6,185,978	-	6,185,978	-	435,000		250,000	6,370,978	4,917,426	4,917,426	-	250,000	1,703,552		595,781	1,107,771
Office Furniture and Equipment	5 - 30	2,969,321	-	2,969,321	-				2,969,321	2,940,690	2,940,690	-	-	28,631		20,342	8,289
Computer Equipment and Software	3 - 10	21,695,210	-	21,695,210	-	6,995,000			28,690,210	7,595,720	7,595,720	-	-	21,094,490		2,566,546	18,527,944
Other Equipment		-	-	-	-	-			-	-	-	-	-	-			-
Mains		-	-	-	-				-	-	-	-	-	-			-
Transmission	75 - 100	119,769,064	24,922,384	144,691,448	-	14,993,650	669,350		160,354,448	33,441,668	32,235,952	1,205,715	-	126,912,780	221,277	1,469,429	125,222,075
Distribution	60 - 75	163,313,000	131,529,452	294,842,452	-	7,500,000	6,075,000	50,000	308,367,452	77,068,538	53,265,880	23,802,658	40,000	231,338,914	1,721,722	2,044,386	227,572,805
Meters	20 - 25	18,961,647	23,069	18,984,716	-	287,500	-	50,000	19,222,216	7,345,108	7,322,039	23,069	20,000	11,897,108	-	914,132	10,982,976
Hydrants	50	12,101,796	10,598,353	22,700,149	-	125,000	500,000	50,000	23,275,149	5,862,501	2,975,527	2,886,975	40,000	17,452,647	216,755	150,058	17,085,834
Services	50	27,735,339	18,545,031	46,280,369	-	2,100,000	1,000,000		49,380,369	10,616,414	5,532,741	5,083,673	-	38,763,955	369,064	443,930	37,950,961
Other		-	-	-	-	-	-		-					-			-
TOTAL		589,013,671	207,173,835	796,187,506	-	61,914,770	15,477,730	400,000	873,180,006	237,416,024	199,722,337	37,693,687	350,000	636,113,982	3,008,713	13,888,092	619,217,177



## **Worksheet W-8 Depreciation Functionalization**

Worksheet W-8 allocates the budgeted annual depreciation charge included in the revenue requirement for test year 2023/24 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, and reported as both a dollar and percentage value. These are used in Worksheet W-10 to allocate depreciation to the service characteristics. As noted previously, depreciation for Water transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services.

Halifax Water Water Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2023/24	
	Annual Depreciation
<b>Intangible Plant</b>	
Organization and Working Capital	\$353,752
<b>Tangible Plant</b>	
<b>LAND AND LAND RIGHTS</b>	
Source of Supply Land	\$0
Power and pumping	\$0
Transmission Right of Ways	\$0
Water Rights	\$0
Reservoir Land	\$0
Office Land	\$0
Other Land	\$0
Easements & Rights of Ways	\$0
<b>STRUCTURES AND IMPROVEMENTS</b>	
Source of Supply Structures	\$10,025
Power and Pumping Structures	\$109,534
Purification Structures	\$699,023
Distribution Reservoirs and Standpipes	\$407,878
General	\$65,350
Office Building	\$826,170
Collection and Impounding	\$151,944
Small systems	\$164,116
Aerotech Water Treatment Plant	\$101,020
Other - Security	\$36,900
<b>EQUIPMENT</b>	
Electrical Pumping	\$568,711
Purification Equipment	\$1,562,400
Information Technology	\$481,190
Tools and Work Equipment - Ops	\$44,897
Tools and Work Equipment - Plants	\$26,142
Tools and Work Equipment - Other	\$74,435
Office Furniture and Equipment	\$20,342
Computer Equipment and Software	\$2,566,546
Other Equipment	\$0
<b>MAINS</b>	
Transmission	\$1,469,429
Distribution	\$2,044,386
<b>Meters</b>	
Hydrants	\$150,058
Sprinkler Connections	\$0
<b>Services</b>	
	\$443,930
<b>Other</b>	
	\$0
<b>TOTAL</b>	\$13,292,311

[illegible]

Worksheet W-8

Halifax Water Water Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2023/24	
	Annual Depreciation
Intangible Plant	
Organization and Working Capital	\$353,752
Tangible Plant	
LAND AND LAND RIGHTS	
Source of Supply Land	\$0
Power and pumping	\$0
Transmission Right of Ways	\$0
Water Rights	\$0
Reservoir Land	\$0
Office Land	\$0
Other Land	\$0
Easements & Rights of Ways	\$0
STRUCTURES AND IMPROVEMENTS	
Source of Supply Structures	\$10,025
Power and Pumping Structures	\$109,534
Purification Structures	\$699,023
Distribution Reservoirs and Standpipes	\$407,878
General	\$65,350
Office Building	\$826,170
Collection and Impounding	\$151,944
Small systems	\$164,116
Aerotech Water Treatment Plant	\$101,020
Other - Security	\$36,900
EQUIPMENT	
Electrical Pumping	\$568,711
Purification Equipment	\$1,562,400
Information Technology	\$481,190
Tools and Work Equipment - Ops	\$44,897
Tools and Work Equipment - Plants	\$26,142
Tools and Work Equipment - Other	\$74,435
Office Furniture and Equipment	\$20,342
Computer Equipment and Software	\$2,566,546
Other Equipment	\$0
MAINS	
Transmission	\$1,469,429
Distribution	\$2,044,386
Vetters	
Hydrants	\$914,132
Sprinkler Connections	\$150,058
Services	\$443,930
Other	\$0
TOTAL	\$13,292,311

Halifax Water Water Rate Study																	
Calculation of Depreciation of Tangible Plant at Total Cost Functionalization of Depreciation Expressed in Dollars (\$) 2023/24																	
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
Intangible Plant																	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$353,752	\$353,752
LAND AND LAND RIGHTS																	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
STRUCTURES AND IMPROVEMENTS																	
\$0	\$5,012	\$0	\$5,012	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,024
\$0	\$0	\$0	\$64,767	\$27,384	\$27,384	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$109,535
\$0	\$0	\$0	\$699,023	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$699,023
\$0	\$0	\$0	\$0	\$0	\$0	\$407,878	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$407,878
\$0	\$0	\$0	\$29,408	\$29,408	\$6,535	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$65,351
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$826,170	\$826,170
\$0	\$151,944	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$151,944
\$0	\$0	\$0	\$131,293	\$16,412	\$16,412	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$164,117
\$0	\$0	\$0	\$58,592	\$0	\$15,153	\$16,163	\$0	\$0	\$0	\$0	\$4,041	\$0	\$0	\$0	\$0	\$7,071	\$101,020
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$36,900	\$36,900
EQUIPMENT																	
\$0	\$0	\$0	\$284,355	\$142,178	\$142,178	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$568,711
\$0	\$0	\$0	\$1,562,400	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,562,400
\$0	\$0	\$0	\$240,595	\$120,298	\$120,298	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$481,191
\$0	\$0	\$0	\$4,490	\$13,469	\$17,959	\$0	\$4,490	\$4,490	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$44,898
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$26,142	\$26,142
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$74,435	\$0	\$0	\$0	\$0	\$0	\$74,435
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$20,342	\$20,342
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$641,636	\$0	\$0	\$641,636	\$0	\$0	\$1,283,273	\$2,566,545
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MAINS																	
\$0	\$0	\$0	\$0	\$1,469,429	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,469,429
\$0	\$0	\$0	\$0	\$0	\$2,044,386	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,044,386
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$914,132	\$0	\$0	\$0	\$0	\$0	\$914,132
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$150,058	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$150,058
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$443,930	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$443,930
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$156,956	\$0	\$3,069,935	\$1,818,578	\$2,390,305	\$424,041	\$154,548	\$448,420	\$0	\$641,636	\$992,608	\$0	\$641,636	\$0	\$0	\$2,553,650	\$13,292,313
0.00%	1.18%	0.00%	23.10%	13.68%	17.98%	3.19%	1.16%	1.16%	0.00%	4.83%	7.47%	0.00%	4.83%	0.00%	0.00%	19.21%	100.00%

### **Worksheet W-9 Allocation of Utility Plant in Service**

Worksheet W-9 allocates the budgeted utility plant in service for the test year 2023/24 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, and reported as both a dollar and percentage value. These are used in Worksheet W-10 to allocate debt service costs to the service characteristics.

Worksheet W-9

<div>Halifax Water</div> <div>Water Rate Study</div>					
<div>Allocation of Utility Plant in Service</div> <div>2023/24</div>					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Donated or Contributed Assets	Rate Base (Col F - Col G)
<b>Intangible Plant</b>					
Organization and Working Capital	\$5,210,436	\$3,536,586	\$1,673,850	\$10,479	\$1,663,370
<b>Tangible Plant</b>					
<b>LAND AND LAND RIGHTS</b>					
	\$14,044,234	\$0	\$14,044,234	\$0	\$14,044,234
Power and pumping	\$215,345	\$0	\$215,345	\$0	\$215,345
Transmission Right of Ways	\$1,256,951	\$0	\$1,256,951	\$0	\$1,256,951
Reservoir Land	\$463,258	\$0	\$463,258	\$0	\$463,258
Office Land	\$2,573,529	\$0	\$2,573,529	\$0	\$2,573,529
Other Land	\$218,401	\$0	\$218,401	\$0	\$218,401
Easements & Rights of Ways	\$1,331,175	\$0	\$1,331,175	\$0	\$1,331,175
<b>STRUCTURES AND IMPROVEMENTS</b>					
Source of Supply Structures	\$808,183	\$586,738	\$221,444	\$0	\$221,444
Power and Pumping Structures	\$45,350,505	\$3,659,560	\$41,690,945	\$1,486,988	\$40,203,957
Purification Structures	\$67,363,456	\$16,803,909	\$50,559,547	\$12,553,872	\$38,005,674
Distribution Reservoirs and Standpipes	\$24,095,089	\$10,500,664	\$13,594,425	\$2,573,802	\$11,020,623
General	\$6,775,898	\$1,318,271	\$5,457,628	\$0	\$5,457,628
Office Building	\$16,722,255	\$5,488,017	\$11,234,237	\$27,860	\$11,206,377
Collection and Impounding	\$11,602,628	\$1,868,372	\$9,734,256	\$3,083,509	\$6,650,747
Small systems	\$9,895,850	\$4,054,961	\$5,840,889	\$2,822,198	\$3,018,691
Aerotech Water Treatment Plant	\$3,007,246	\$959,652	\$2,047,595	\$22,846	\$2,024,749
Other - Security	\$247,000	\$57,300	\$189,700	\$0	\$189,700
<b>EQUIPMENT</b>					
Electrical Pumping	\$11,252,042	\$10,356,635	\$895,408	\$1,040,570	\$(145,162)
Purification Equipment	\$36,843,373	\$24,359,957	\$12,483,415	\$25,798	\$12,457,617
Information Technology	\$11,373,063	\$6,477,496	\$4,895,567	\$(30,486)	\$4,926,053
Tools and Work Equipment - Ops	\$2,967,264	\$2,931,831	\$35,432	\$0	\$35,432
Tools and Work Equipment - Plants	\$369,905	\$341,727	\$28,178	\$0	\$28,178
Tools and Work Equipment - Other	\$562,778	\$489,666	\$73,112	\$0	\$73,112
Transportation Equipment	\$6,370,978	\$5,263,207	\$1,107,771	\$0	\$1,107,771
Office Furniture and Equipment	\$2,969,321	\$2,961,032	\$8,289	\$0	\$8,289
Computer Equipment and Software	\$28,690,210	\$10,162,266	\$18,527,944	\$0	\$18,527,944
Other Equipment	\$0	\$0	\$0	\$0	\$0
<b>MAINS</b>					
Transmission	\$160,354,448	\$35,132,373	\$125,222,075	\$24,164,742	\$101,057,333
Distribution	\$308,367,452	\$80,794,647	\$227,572,805	\$112,080,072	\$115,492,733
<b>Meters</b>	\$19,222,216	\$8,239,240	\$10,982,976	\$0	\$10,982,976
<b>Hydrants</b>	\$23,275,149	\$6,189,314	\$17,085,834	\$7,994,623	\$9,091,211
Sprinkler Connections	\$0	\$0	\$0	\$0	\$0
<b>Services</b>	\$49,380,369	\$11,429,408	\$37,950,961	\$14,092,294	\$23,858,668
<b>Other</b>	\$0	\$0	\$0	\$0	\$0
<b>TOTAL</b>	<b>\$873,180,006</b>	<b>\$253,962,829</b>	<b>\$619,217,177</b>	<b>\$181,949,165</b>	<b>\$437,268,012</b>

[illegible]

Worksheet W-9

Halifax Water Water Rate Study					
Allocation of Utility Plant in Service 2023/24					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Donated or Contributed Assets	Rate Base (Col F - Col G)
Intangible Plant					
Organization and Working Capital	\$5,210,436	\$3,536,586	\$1,673,850	\$10,479	\$1,663,370
Tangible Plant LAND AND LAND RIGHTS					
Source of Supply Land	\$14,044,234	\$0	\$14,044,234	\$0	\$14,044,234
Power and pumping	\$215,345	\$0	\$215,345	\$0	\$215,345
Transmission Right of Ways	\$1,256,951	\$0	\$1,256,951	\$0	\$1,256,951
Reservoir Land	\$463,258	\$0	\$463,258	\$0	\$463,258
Office Land	\$2,573,529	\$0	\$2,573,529	\$0	\$2,573,529
Other Land	\$218,401	\$0	\$218,401	\$0	\$218,401
Easements & Rights of Ways	\$1,331,175	\$0	\$1,331,175	\$0	\$1,331,175
STRUCTURES AND IMPROVEMENTS					
Source of Supply Structures	\$808,183	\$586,738	\$221,444	\$0	\$221,444
Power and Pumping Structures	\$45,350,505	\$3,659,560	\$41,690,945	\$1,486,988	\$40,203,957
Purification Structures	\$67,363,456	\$16,803,909	\$50,559,547	\$12,553,872	\$38,005,674
Distribution Reservoirs and Standpipes	\$24,095,089	\$10,500,664	\$13,594,425	\$2,573,802	\$11,020,623
General	\$6,775,898	\$1,318,271	\$5,457,628	\$0	\$5,457,628
Office Building	\$16,722,255	\$5,488,017	\$11,234,237	\$27,860	\$11,206,377
Collection and Impounding	\$11,602,628	\$1,868,372	\$9,734,256	\$3,083,509	\$6,650,747
Small systems	\$9,895,850	\$4,054,961	\$5,840,889	\$2,822,198	\$3,018,691
Aerotech Water Treatment Plant	\$3,007,246	\$959,652	\$2,047,595	\$22,846	\$2,024,749
Other - Security	\$247,000	\$57,300	\$189,700	\$0	\$189,700
EQUIPMENT					
Electrical Pumping	\$11,252,042	\$10,356,635	\$895,408	\$1,040,570	(\$145,162)
Purification Equipment	\$36,843,373	\$24,359,957	\$12,483,415	\$25,798	\$12,457,617
Information Technology	\$11,373,063	\$6,477,496	\$4,895,567	(\$30,486)	\$4,926,053
Tools and Work Equipment - Ops	\$2,967,264	\$2,931,831	\$35,432	\$0	\$35,432
Tools and Work Equipment - Plants	\$369,905	\$341,727	\$28,178	\$0	\$28,178
Tools and Work Equipment - Other	\$562,778	\$489,666	\$73,112	\$0	\$73,112
Transportation Equipment	\$6,370,978	\$5,263,207	\$1,107,771	\$0	\$1,107,771
Office Furniture and Equipment	\$2,969,321	\$2,961,032	\$8,289	\$0	\$8,289
Computer Equipment and Software	\$28,690,210	\$10,162,266	\$18,527,944	\$0	\$18,527,944
Other Equipment	\$0	\$0	\$0	\$0	\$0
MAINS					
Transmission	\$160,354,448	\$35,132,373	\$125,222,075	\$24,164,742	\$101,057,333
Distribution	\$308,367,452	\$80,794,647	\$227,572,805	\$112,080,072	\$115,492,733
Meters	\$19,222,216	\$8,239,240	\$10,982,976	\$0	\$10,982,976
Hydrants	\$23,275,149	\$6,189,314	\$17,085,834	\$7,994,623	\$9,091,211
Sprinkler Connections	\$0	\$0	\$0	\$0	\$0
Services	\$49,380,369	\$11,429,408	\$37,950,961	\$14,092,294	\$23,858,668
Other	\$0	\$0	\$0	\$0	\$0
TOTAL	\$873,180,006	\$253,962,829	\$619,217,177	\$181,949,165	\$437,268,012
	0				0

Halifax Water Water Rate Study																			
Allocation of Utility Plant in Service Functionalization of Rate Base Expressed in Dollars (\$) 2023/24																			
Watershed Management	Dams	Water Quality	Water Treatment	Transmission	Distribution	Water Storage Tanks	Hydrants	Service Laterals	Technical Services	Customer Service	O&M Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total		
Intangible Plant																			
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,663,370	\$1,663,370	
Tangible Plant LAND AND LAND RIGHTS																			
\$13,342,022	\$702,212	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$14,044,234	
\$0	\$0	\$0	\$107,673	\$53,836	\$53,836	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$215,345	
\$0	\$0	\$0	\$0	\$1,256,951	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,256,951	
\$0	\$0	\$0	\$0	\$0	\$0	\$463,258	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$463,258	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,573,529	
\$218,401	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$218,401	
\$665,588	\$0	\$0	\$199,676	\$0	\$465,911	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,331,175	
STRUCTURES AND IMPROVEMENTS																			
\$0	\$110,722	\$0	\$110,722	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$221,444	
\$0	\$0	\$0	\$20,101,979	\$10,050,989	\$10,050,989	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$40,203,957	
\$0	\$0	\$0	\$38,005,674	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$38,005,674	
\$0	\$0	\$0	\$0	\$0	\$0	\$11,020,623	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,020,623	
\$0	\$0	\$0	\$2,455,932	\$2,455,932	\$545,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,457,628	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,206,377	
\$0	\$6,650,747	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,650,747	
\$0	\$0	\$0	\$2,414,953	\$301,869	\$301,869	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,018,691	
\$0	\$0	\$0	\$1,174,354	\$0	\$303,712	\$323,960	\$0	\$0	\$0	\$0	\$80,990	\$0	\$0	\$0	\$0	\$0	\$141,732	\$2,024,748	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$189,700	\$189,700	
EQUIPMENT																			
\$0	\$0	\$0	\$72,581	\$-36,290	\$-36,290	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$145,161	
\$0	\$0	\$0	\$12,457,617	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$12,457,617	
\$0	\$0	\$0	\$2,463,027	\$1,231,513	\$1,231,513	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,926,053	
\$0	\$0	\$0	\$3,543	\$10,630	\$14,173	\$0	\$3,543	\$3,543	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$35,432	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$28,178	\$28,178	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$73,112	\$0	\$0	\$0	\$0	\$0	\$0	\$73,112	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,107,771	\$1,107,771	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,289	\$8,289	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,631,986	\$0	\$0	\$4,631,986	\$0	\$0	\$0	\$9,263,972	\$18,527,944	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
MAINS																			
\$0	\$0	\$0	\$0	\$101,057,333	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$101,057,333	
\$0	\$0	\$0	\$0	\$0	\$115,492,733	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$115,492,733	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,982,976	\$0	\$0	\$0	\$0	\$0	\$0	\$10,982,976	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,091,211	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,091,211	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$23,858,668	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$23,858,668	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
\$14,226,011	\$7,463,681	\$0	\$79,422,569	\$116,382,763	\$128,424,209	\$11,807,841	\$9,094,754	\$23,862,211	\$0	\$4,631,986	\$11,137,078	\$0	\$4,631,986	\$0	\$0	\$0	\$26,182,918	\$437,268,007	
3.25%	1.71%	0.00%	18.16%	26.62%	29.37%	2.70%	2.08%	5.46%	0.00%	1.06%	2.55%	0.00%	1.06%	0.00%	0.00%	0.00%	5.99%	100.01%	

### **Worksheet W-10 Cost Classification**

Worksheet W-10 details the costs as allocated to the system functions from Worksheets W-6, W-8 and W-9 and allocates them to the service characteristics based on the percentages for each characteristic detailed in the Cost-of-Service Manual. The amounts are then totaled for operation and maintenance, and depreciation then used in Worksheet W-11 to calculate the water unit rate and bill calculation. The plant in service function is also totaled and the percentages by service function are used to allocate the net debt servicing costs also appearing in Worksheet W-11.

Worksheet W-10

Halifax Water Water Rate Study																		
Cost Classification - Percents & Amounts 2023/24																		
Cost Classifications																		
		Average Day Demand	Maximum- Day Demand	Maximum- Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect										
		Classification Percentages								Classification Amounts								
O&M Expenses by Function																		
Watershed Management		\$382,377	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$382,377	\$0	\$0	\$0	\$0	\$0	\$0	\$382,377	
Dams		\$16,060	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$16,060	\$0	\$0	\$0	\$0	\$0	\$0	\$16,060	
Water Quality		\$1,050,398	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$1,050,398	\$0	\$0	\$0	\$0	\$0	\$0	\$1,050,398	
Water Treatment		\$10,179,820	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$9,263,636	\$916,184	\$0	\$0	\$0	\$0	\$0	\$10,179,820	
Transmission		\$218,887	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$199,187	\$19,700	\$0	\$0	\$0	\$0	\$0	\$218,887	
Distribution		\$6,662,346	28.00%	16.00%	25.00%	0.00%	0.00%	0.00%	0.00%	\$1,865,457	\$1,065,975	\$1,665,587	\$0	\$0	\$2,065,327	\$0	\$6,662,346	
Water Storage Tanks		\$273,578	52.00%	5.00%	14.00%	0.00%	0.00%	29.00%	0.00%	\$142,261	\$13,679	\$38,301	\$0	\$0	\$79,338	\$0	\$273,579	
Hydrants		\$2,387,000	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$2,387,000	\$0	\$2,387,000	
Service Laterals		\$3,242,296	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$3,242,296	\$0	\$0	\$0	\$3,242,296	
Technical Services		\$1,165,726	25.00%	25.00%	25.00%	0.00%	0.00%	25.00%	0.00%	\$291,432	\$291,432	\$291,432	\$0	\$0	\$291,432	\$0	\$1,165,728	
Customer Service		\$1,674,847	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$1,674,847	\$0	\$0	\$1,674,847	
O&M Meters		\$365,520	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$365,520	\$0	\$0	\$0	\$365,520	
Meter Reading and Billing		\$506,480	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$506,480	\$0	\$0	\$506,480	
Engineering and TS		\$3,630,252	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$3,630,252	\$3,630,252	
Regulatory Services		\$1,511,175	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$1,511,175	\$1,511,175	
Corporate Services		\$1,553,894	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$1,553,894	\$1,553,894	
Administration		\$3,070,875	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$3,070,875	\$3,070,875	
Sub-Total		\$37,891,531								\$13,210,808	\$2,306,970	\$1,995,320	\$3,607,816	\$2,181,327	\$4,823,097	\$9,766,196	\$37,891,534	
Depreciation Expenses by Function		Classification Percentages								Classification Amounts								
Watershed Management		\$0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Dams		\$156,956	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$156,956	\$0	\$0	\$0	\$0	\$0	\$0	\$156,956	
Water Quality		\$0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Water Treatment		\$3,069,935	81.00%	19.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$2,486,647	\$583,288	\$0	\$0	\$0	\$0	\$0	\$3,069,935	
Transmission		\$1,818,578	81.00%	19.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$1,473,048	\$345,530	\$0	\$0	\$0	\$0	\$0	\$1,818,578	
Distribution		\$2,390,305	30.00%	14.00%	27.00%	0.00%	0.00%	29.00%	0.00%	\$717,092	\$334,643	\$645,382	\$0	\$0	\$693,188	\$0	\$2,390,305	
Water Storage Tanks		\$424,041	52.00%	5.00%	14.00%	0.00%	0.00%	29.00%	0.00%	\$220,501	\$21,202	\$59,366	\$0	\$0	\$122,972	\$0	\$424,041	
Hydrants		\$154,548	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$154,548	\$0	\$154,548	
Service Laterals		\$448,420	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$448,420	\$0	\$0	\$0	\$448,420	
Technical Services		\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Customer Service		\$641,636	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$641,636	\$0	\$0	\$641,636	
O&M Meters		\$992,608	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$992,608	\$0	\$0	\$0	\$992,608	
Meter Reading and Billing		\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Engineering and TS		\$641,636	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$641,636	\$641,636	
Regulatory Services		\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Corporate Services		\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Administration		\$2,553,650	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$2,553,650	\$2,553,650	
Sub-Total		\$13,292,313								\$5,054,244	\$1,284,663	\$704,748	\$1,441,028	\$641,636	\$970,708	\$3,195,286	\$13,292,313	



Halifax Water Water Rate Study  Cost Classification - Percents & Amounts 2023/24																
Cost Classifications																
Plant in Service by Function		Average Day Demand	Maximum- Day Demand	Maximum- Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Average Day Demand	Maximum-Day Demand	Maximum-Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Total
		Classification Percentages							Classification Amounts							
		\$14,226,011	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$14,226,011	\$0	\$0	\$0	\$0	\$0	\$0	\$14,226,011
Watershed Management		\$7,463,681	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$7,463,681	\$0	\$0	\$0	\$0	\$0	\$0	\$7,463,681
Dams		\$0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Quality		\$79,422,569	81.00%	19.00%	0.00%	0.00%	0.00%	0.00%	\$64,332,281	\$15,090,288	\$0	\$0	\$0	\$0	\$0	\$79,422,569
Water Treatment		\$116,382,763	81.00%	19.00%	0.00%	0.00%	0.00%	0.00%	\$94,270,038	\$22,112,725	\$0	\$0	\$0	\$0	\$0	\$116,382,763
Transmission		\$128,424,209	30.00%	14.00%	27.00%	0.00%	0.00%	29.00%	\$38,527,263	\$17,979,389	\$34,674,536	\$0	\$0	\$37,243,021	\$0	\$128,424,209
Distribution		\$11,807,841	52.00%	5.00%	14.00%	0.00%	0.00%	29.00%	\$6,140,077	\$590,392	\$1,653,098	\$0	\$0	\$3,424,274	\$0	\$11,807,841
Water Storage Tanks		\$9,094,754	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$9,094,754	\$0	\$9,094,754
Hydrants		\$23,862,211	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$23,862,211	\$0	\$0	\$0	\$23,862,211
Service Laterals		\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Technical Services		\$4,631,986	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$4,631,986	\$0	\$0	\$4,631,986
Customer Service		\$11,137,078	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$11,137,078	\$0	\$0	\$0	\$11,137,078
O&M Meters		\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Meter Reading and Billing		\$4,631,986	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$4,631,986	\$4,631,986
Engineering and TS		\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Regulatory Services		\$0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Corporate Services		\$26,182,918	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$26,182,918	\$26,182,918
Administration		\$437,268,007							\$224,959,351	\$55,772,794	\$36,327,634	\$34,999,289	\$4,631,986	\$49,762,049	\$30,814,904	\$437,268,007
Sub-Total									51.45%	12.75%	8.31%	8.00%	1.06%	11.38%	7.05%	

### **Worksheet W-11 Unit Costs and Returns**

Worksheet W-11 uses the costs from Worksheet W-10 allocated to the system functions to calculate the unit water rates and fire protection charge for 2023/24. The percentage of average day, maximum day, maximum hour, equivalent meters, customer service and fire protection are used to allocate the indirect costs for operation and maintenance expenses, depreciation expense and debt service. The dividend/ grant in lieu of taxes is allocated based on the total allocated revenue requirements. Worksheet W-11 also calculates the return on rate base.

Worksheet W-11

Halifax Regional Water Commission Water Rate Study  Water Unit Rate and Bill Calculations 2023/24								
Unit Cost Calculations								
	Average Day Demand	Maximum-Day Demand	Maximum-Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Total
Revenue Requirements								
O&M Expenses (including Indirects)	\$13,210,808	\$2,306,970	\$1,995,320	\$3,607,816	\$2,181,327	\$4,823,097	\$9,766,196	\$37,891,534
Direct Allocation Percentages	46.97%	8.20%	7.09%	12.83%	7.76%	17.15%		100.00%
O&M Expenses by Service Characteristics	\$17,798,107	\$3,108,038	\$2,688,172	\$4,860,588	\$2,938,767	\$6,497,861		\$37,891,533
Depreciation Expenses	\$5,054,244	\$1,284,663	\$704,748	\$1,441,028	\$641,636	\$970,708	\$3,195,286	\$13,292,313
Direct Allocation Percentages	50.06%	12.72%	6.98%	14.27%	6.35%	9.61%		100.00%
Depreciation Expenses by Service Characteristics	\$6,653,700	\$1,691,205	\$927,771	\$1,897,053	\$844,687	\$1,277,896		\$13,292,312
Plant in Service by Serv Characteristic Percents	51.45%	12.75%	8.31%	8.00%	1.06%	11.38%	7.05%	100.00%
Debt Service (Principal, Interest, Fees)								
\$9,639,638	\$4,959,594	\$1,229,054	\$801,054	\$771,171	\$102,180	\$1,096,991	\$679,594	\$9,639,638
Direct Allocation Percentages	55.35%	13.72%	8.94%	8.61%	1.14%	12.24%		100.00%
Debt Service (Principal, Interest, Fees) by Service Characteristics	\$5,335,765	\$1,322,274	\$861,812	\$829,662	\$109,930	\$1,180,195		\$9,639,638
Total Allocated Revenue Requirements	\$29,787,572	\$6,121,517	\$4,477,755	\$7,587,303	\$3,893,384	\$8,955,952	\$0	\$60,823,483
	48.97%	10.06%	7.36%	12.47%	6.40%	14.72%		100.00%
Add: Dividend/ Grant in lieu of Taxes								
\$5,977,582	\$2,927,449	\$601,608	\$440,063	\$745,661	\$382,632	\$880,169	\$0	\$5,977,582
Less: Non-Rate Revenues and Other Adjustments								
(\$1,050,220)	(\$514,333)	(\$105,698)	(\$77,316)	(\$131,008)	(\$67,226)	(\$154,640)	\$0	(\$1,050,221)
Net Rate Revenue Requirements	\$32,200,688	\$6,617,427	\$4,840,502	\$8,201,956	\$4,208,790	\$9,681,481	\$0	\$65,750,844
Rate Base								
				\$437,268,012	Return on Rate Base		\$14,566,999	
					Calculated Percent Return on Rate Base		3.33%	

Halifax Regional Water Commission Water Rate Study						
Water Unit Rate and Bill Calculations 2023/24						
Unit Cost Calculations						
Billing Determinations			Billable Water Consumption	Meters / Availability	Customers	Fire Protection
			Percent of Total	Annual Equivalents	Annual	
	32,581,863					
Commercial		24.15%	7,868,520			
Industrial		5.99%	1,951,654			
Institutional		13.59%	4,427,875			
			-			
Multi-Family		23.16%	7,545,959			
Single Family Residential		33.12%	10,791,113			
		100.01%	32,585,121	113,544	88,029	
Rate Per Billing Unit			\$1.340	\$72.24	\$47.81	\$9,681,481
Average Per Account / Monthly						
Residential		13	\$17.42	\$6.02	\$3.98	\$27.42

## **Worksheet W-12 Rates, Revenues and Bills**

Worksheet W-12 uses the data from Worksheet W-11 to calculate proposed rates for customer charge, base charge, and volumetric charges for 2023/24. Worksheet W-12 also provides a revenue test based on the budgeted customer connections, equivalent meters and consumption and details the annual fixed charges (base and customer charge) and the annual consumption charge based on the arithmetic average of consumption by meter size.

Worksheet W-12

<div>Halifax Water</div> <div>Water Rate Study</div> <div>Rates, Revenues &amp; Annual Bills by Alternative</div> <div>2023/24</div>		
Proposed Cost of Service Rates and Charges		
Customer Charge	\$/Account	\$47.81
Base Charge	\$/Meter Equivalent	\$72.24
Volumetric Charges	\$ / Billed Cubic Meter	\$1.3398
Revenue Test	Billing Determinant	
Customer Charge Revenues	88,029	\$4,208,790
Number of Services		
Base Charge Revenues	113,544	\$8,201,956
System Equivalents		
Volumetric Charges Revenues	32,581,863	\$43,654,252
Estimated Consumption		
Total User Charge Revenues		\$56,064,998
Fire Protection Charges		\$9,681,481
Total Revenues		\$65,746,479

Proposed Cost of Service Rates and Charges		
Bill Calculations		
Annual Fixed Charges		
(Customer & Base Charges by Meter Size)		
Meter Size	Capacity Ratio	
Unmetered 5/8"	1	\$120.05
Unmetered 3/4"	1.5	\$156.17
Unmetered 1"	2.5	\$228.40
5/8" - 15mm	1	\$120.05
3/4" - 20mm	1.5	\$156.17
1" - 25mm	2.5	\$228.40
1.5" - 40mm	5	\$408.99
2" - 50mm	8	\$625.70
3" - 80mm	16	\$1,203.59
4" - 100mm	25	\$1,853.72
6" - 150mm	50	\$3,659.62
8" - 200mm	90	\$6,549.07
10" - 250mm	150	\$10,883.25
Annual Volumetric Charges		
	Average Annual Consumption	
Meter Size		
Unmetered 5/8"	160	\$214.37
Unmetered 3/4"	516	\$691.35
Unmetered 1"	1,004	\$1,345.19
5/8" - 15MM	160	\$214.37
3/4" - 20MM	516	\$691.35
1" - 25MM	1,004	\$1,345.19
1.5" - 40MM	2,109	\$2,825.71
2" - 50MM	5,324	\$7,133.27
3" - 80MM	12,176	\$16,313.81
4" - 100MM	20,122	\$26,960.12
6" - 150MM	62,473	\$83,703.38
8" - 200MM	67,439	\$90,356.99
10" - 250MM	30,087	\$40,311.55
Total Bill - Average Consumption		
	Average Annual Consumption	
Meter Size		
Unmetered 5/8"	160	\$334.42
Unmetered 3/4"	516	\$847.52
Unmetered 1"	1,004	\$1,573.59
5/8" - 15MM	160	\$334.42
3/4" - 20MM	516	\$847.52
1" - 25MM	1,004	\$1,573.59
1.5" - 40MM	2,109	\$3,234.70
2" - 50MM	5,324	\$7,758.97
3" - 80MM	12,176	\$17,517.40
4" - 100MM	20,122	\$28,813.84
6" - 150MM	62,473	\$87,363.00
8" - 200MM	67,439	\$96,906.06
10" - 250MM	30,087	\$51,194.80

**Worksheet W-13 – Bulk Water Rates**

Worksheet W-13 details the calculation of proposed Bulk Water Rates for water sold through Halifax Water's bulk water depots for the test years 2022/23 and 2023/24 based on the budgeted operating and financial costs (revenue requirements) and budgeted water consumption with a 30% mark-up consistent with previous applications.

**Worksheet W-13**

<b>Halifax Water</b> <b>Water Rate Study</b>  <b>Calculation of Bulk Water Rate</b> <b>Years Ending March 31st</b>						
	<b>2018/19 Actual</b>	<b>2019/20 Actual</b>	<b>2020/21 Actual</b>	<b>2021/22 Budget</b>	<b>Test Year #1 2022/23 Budget</b>	<b>Test Year #2 2023/24 Budget</b>
<b>Cost Base</b>						
Total Operating Expenses (Rev. Req.)	\$40,640,353	\$40,347,503	\$43,857,431	\$48,604,838	\$48,958,120	\$51,183,837
Total Non Operating Expenses (Rev Req)	\$14,189,995	\$11,692,055	\$12,931,079	\$15,275,453	\$14,371,006	\$15,617,220
Total Expenses	\$54,830,348	\$52,039,558	\$56,788,510	\$63,880,291	\$63,329,126	\$66,801,056
<b>Water Consumption in Cubic Meters</b>	<b>32,636,401</b>	<b>32,572,914</b>	<b>32,185,646</b>	<b>32,501,704</b>	<b>32,581,863</b>	<b>32,581,863</b>
<b>Unit Calculations</b>						
Unit cost per cubic metre	1.68	1.60	1.76	1.97	1.94	2.05
Operating cost and profit mark-up	30%	30%	30%	30%	30%	30%
Bulk rate per cubic metre	2.18	2.08	2.29	2.56	2.53	2.67



## **Worksheet Appendix W-1 – Additions to Utility Plant in Service**

Appendix W-1 details the proposed additions to utility plant in service and capital funding for the test year 2023/24.

Additions to utility plant in service for 2023/24 are estimated based on status of capital work in progress (projects approved in prior fiscal years), the projects from the 2023/24 capital budget, and historical levels of contributed utility plant in service.

Halifax Water projects the addition of \$77.4 million in assets to utility plant in service during the 2023/24 fiscal year.

## Appendix W-1

<b>Halifax Water</b> <b>Water Rate Study</b>  <b>Proposed Additions to Utility Plant in Service and Capital Funding</b> <b>2023/24</b>				
	Additions to the Utility Plant in Service	Capital Cost Contribution from Others	Utility Cost of Plant in Service	
<b>Intangible Plant</b>				
Organization and Working Capital	\$0	\$0	\$0	
<b>Tangible Plant</b>				
<b>LAND AND LAND RIGHTS</b>				
Source of Supply Land	\$100,000	\$0	\$100,000	
Power and pumping	\$0	\$0	\$0	
Transmission Right of Ways	\$0	\$0	\$0	
Reservoir Land	\$0	\$0	\$0	
Office Land	\$0	\$0	\$0	
Other Land	\$0	\$0	\$0	
Easements & Right of Ways	\$0	\$0	\$0	
<b>STRUCTURES AND IMPROVEMENTS</b>				
Source of Supply Structures	\$0	\$0	\$0	
Power and Pumping Structures	\$17,609,000	\$47,040	\$17,561,960	
Purification Structures	\$10,823,921	\$7,186,340	\$3,637,581	
Distribution Reservoirs and Standpipes	\$0	\$0	\$0	
General	\$0	\$0	\$0	
Office Building	\$0	\$0	\$0	
Collection and Inpounding	\$0	\$0	\$0	
Small systems	\$400,000	\$0	\$400,000	
Aerotech Water Treatment Plant	\$1,070,000	\$0	\$1,070,000	
Other - Security	\$125,000	\$0	\$125,000	
<b>Equipment</b>				
Electrical Pumping	\$200,000	\$0	\$200,000	
Purification Equipment	\$6,384,079	\$0	\$6,384,079	
Information Technology	\$0	\$0	\$0	
Tools and Work Equipment - Ops	\$0	\$0	\$0	
Tools and Work Equipment - Plants	\$0	\$0	\$0	
Tools and Work Equipment - Other	\$0	\$0	\$0	
Transportation Equipment	\$435,000	\$0	\$435,000	
Office Furniture and Equipment	\$0	\$0	\$0	
Computer Equipment and Software	\$6,995,000	\$0	\$6,995,000	
Other Equipment	\$0	\$0	\$0	
<b>Mains</b>				
Transmission	\$15,663,000	\$669,350	\$14,993,650	
Distribution	\$13,575,000	\$6,075,000	\$7,500,000	
<b>Meters</b>	\$287,500	\$0	\$287,500	
<b>Hydrants</b>	\$625,000	\$500,000	\$125,000	
<b>Services</b>	\$3,100,000	\$1,000,000	\$2,100,000	
<b>Other</b>	\$0	\$0	\$0	
<b>TOTAL</b>	<b>\$77,392,500</b>	<b>\$15,477,730</b>	<b>\$61,914,770</b>	
<b>Sources of Funding</b>				
Capital Cost Contribution	\$0	Depreciation Fund Balance, beginning of year		(\$0)
Regional Development Charge	\$791,400	Add:		
External Funding	\$7,196,340	Interest earned on fund balance		\$0
Contributions - other	\$7,489,990	Depreciation funded in Current year		\$13,292,311
Working Capital	\$2,556,459	Depreciation Fund Balance available		\$13,292,311
Depreciation fund	\$13,292,311	Less:		
Long Term Debt	\$46,066,000	Expenditure in Current Year		(\$13,292,311)
<b>TOTAL</b>	<b>\$77,392,500</b>	Depreciation Fund Balance, end of year		(\$0)

## **Worksheet Appendix W-2 Amortization Schedule for Long Term Debt**

Appendix W-2 details the amortization schedule of the proposed long-term debt associated with 2023/24. The amortization is based on a 30-year blended serial debenture at a rate of 2.5% per annum. Debt servicing costs related to principle and interest will commence in the fiscal year 2024/25.

## Appendix W-2

Halifax Water Water Rate Study								
Amortization Schedule for Projected Long Term Debt 2023/24								
<table><tr><td rowspan="3">Interest Rate Term in years Capital</td><td>2.50%</td></tr><tr><td>30</td></tr><tr><td>\$46,066,000</td></tr></table>					Interest Rate Term in years Capital	2.50%	30	\$46,066,000
Interest Rate Term in years Capital	2.50%							
	30							
	\$46,066,000							
Amortization Schedule								
	Principal	Interest	Total	Balance				
Year								
1	\$1,535,533.33	\$1,151,650.00	\$2,687,183.33	\$44,530,466.67				
2	\$1,535,533.33	\$1,113,261.67	\$2,648,795.00	\$42,994,933.33				
3	\$1,535,533.33	\$1,074,873.33	\$2,610,406.67	\$41,459,400.00				
4	\$1,535,533.33	\$1,036,485.00	\$2,572,018.33	\$39,923,866.67				
5	\$1,535,533.33	\$998,096.67	\$2,533,630.00	\$38,388,333.33				
6	\$1,535,533.33	\$959,708.33	\$2,495,241.67	\$36,852,800.00				
7	\$1,535,533.33	\$921,320.00	\$2,456,853.33	\$35,317,266.67				
8	\$1,535,533.33	\$882,931.67	\$2,418,465.00	\$33,781,733.33				
9	\$1,535,533.33	\$844,543.33	\$2,380,076.67	\$32,246,200.00				
10	\$1,535,533.33	\$806,155.00	\$2,341,688.33	\$30,710,666.67				
11	\$1,535,533.33	\$767,766.67	\$2,303,300.00	\$29,175,133.33				
12	\$1,535,533.33	\$729,378.33	\$2,264,911.67	\$27,639,600.00				
13	\$1,535,533.33	\$690,990.00	\$2,226,523.33	\$26,104,066.67				
14	\$1,535,533.33	\$652,601.67	\$2,188,135.00	\$24,568,533.33				
15	\$1,535,533.33	\$614,213.33	\$2,149,746.67	\$23,033,000.00				
16	\$1,535,533.33	\$575,825.00	\$2,111,358.33	\$21,497,466.67				
17	\$1,535,533.33	\$537,436.67	\$2,072,970.00	\$19,961,933.33				
18	\$1,535,533.33	\$499,048.33	\$2,034,581.67	\$18,426,400.00				
19	\$1,535,533.33	\$460,660.00	\$1,996,193.33	\$16,890,866.67				
20	\$1,535,533.33	\$422,271.67	\$1,957,805.00	\$15,355,333.33				
21	\$1,535,533.33	\$383,883.33	\$1,919,416.67	\$13,819,800.00				
22	\$1,535,533.33	\$345,495.00	\$1,881,028.33	\$12,284,266.67				
23	\$1,535,533.33	\$307,106.67	\$1,842,640.00	\$10,748,733.33				
24	\$1,535,533.33	\$268,718.33	\$1,804,251.67	\$9,213,200.00				
25	\$1,535,533.33	\$230,330.00	\$1,765,863.33	\$7,677,666.67				
26	\$1,535,533.33	\$191,941.67	\$1,727,475.00	\$6,142,133.33				
27	\$1,535,533.33	\$153,553.33	\$1,689,086.67	\$4,606,600.00				
28	\$1,535,533.33	\$115,165.00	\$1,650,698.33	\$3,071,066.67				
29	\$1,535,533.33	\$76,776.67	\$1,612,310.00	\$1,535,533.33				
30	\$1,535,533.33	\$38,388.33	\$1,573,921.67	\$0.00				

**Halifax Regional Water Commission**  
**(“Halifax Water”)**  
**Wastewater Rate Study**  
**2022/23**

Prepared By:

Halifax Water Staff

## **Notes on Worksheet**

### **Worksheet WW-1 System Data**

Worksheet WW-1 provides Wastewater Services related data including:

- Wastewater estimated flow summary for the 2019 calendar year.
- Budgeted service connections and estimated effluent billing consumption for the test year 2022/23.
- Plant Balance by customer class for the 2019 calendar year.
- Average effluent loading for residential and non-residential customers the 2019 calendar.

Assumptions - 2022/23 (Test Year #1):

1. Water consumption (and therefore wastewater discharge) is budgeted to grow at a rate of 1%, based on modest increases recently experienced in water consumption.
2. Customer connections will increase by 680 connections in 2022/23, based on customer growth in recent years.

## Worksheet WW-1

Halifax Water  
Wastewater Rate Study

## User Characteristics and Plant Balance Analysis

## SCENARIO SUMMARY

Date February 24, 2022

Test Years

1

2022/23

2

2023/24

Current Year Budget (Projections)

2021/22

Historical Year

2020/21

Projected Service Connections, Equivalents and Billed Water Consumption  
2022/23

Meter Size	Number of Services	Capacity Ratio	System Equivalents	Estimated Consumption (Cubic Meters)
Unmetered 5/8"	0	1	0	0
Unmetered 3/4"	0	1.5	0	0
Unmetered 1"	0	2.5	0	0
5/8" - 15mm	77,865	1	77,865	12,510,768
3/4" - 20mm	1,036	1.5	1,554	530,886
1" - 25mm	1,576	2.5	3,941	1,561,801
1.5" - 40mm	1,226	5	6,132	2,527,344
2" - 50mm	849	8	6,791	4,300,515
3" - 80mm	322	16	5,155	3,686,866
4" - 100mm	83	25	2,070	1,627,432
6" - 150mm	34	50	1,700	2,009,602
8" - 200mm	24	90	2,160	1,734,174
10" - 250mm	2	150	300	60,645
<b>TOTAL</b>	<b>83,017</b>		<b>107,666</b>	<b>30,550,033</b>

## Flow Summary (ML)

## Customer Class 2019

Residential (Single Family)	12,042
Residential (Multi-family)	7,194
Commercial	5,696
Industrial	1,859
Institutional	4,222
Unmetered	0
<b>Subtotal Customer</b>	<b>31,013</b>

Other Flow	
Infiltration & Inflow	44,310

Stormwater	
<b>Subtotal Other</b>	<b>44,310</b>

<b>Total Estimated</b>	<b>75,322</b>
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Halifax	32,789
Dartmouth	19,948

Other Plants	22,586
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<b>Total Plants</b>	<b>75,322</b>
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Total Other Flow 59%

## Plant Balance

Customer Class	Flow ML	Biochemical Oxygen Demand (BOD)		Total Suspended Solids (TSS)	
		kg	mg/l	kg	mg/l
Residential	19,236	3,270,056	170	3,270,056	170
Non-Residential	11,777	5,563,791	472	7,343,629	624
Overstrength Surcharge	185	468,025	2,533	91,831	497
Hauled Waste	17	4,198	250	2,519	150
<b>Subtotal Customer</b>	<b>31,013</b>	<b>9,306,069</b>		<b>10,708,034</b>	
Other Flow	44,310	1,107,746	25	1,107,746	25
<b>Subtotal Other</b>	<b>44,310</b>	<b>1,107,746</b>	<b>25</b>	<b>1,107,746</b>	<b>25</b>
<b>Total Estimated</b>	<b>75,322</b>	<b>10,413,815</b>	<b>138</b>	<b>11,815,780</b>	<b>157</b>
<b>Total Plants</b>		<b>10,413,815</b>		<b>11,815,780</b>	

## Other User Characteristics

Equivalent Meters Annual Equivalents	Customer Service Annual
77,865	77,865
29,802	5,152

## Dwelling Unit Characteristics

Assume all 5/8" customers are Residential	
Assume 65% of Dwelling Units are single family	
Single family Dwelling Units	77,865
Multi family Dwelling Units	41,927
<b>Total Dwelling Units</b>	<b>119,792</b>

## Average Per Dwelling Unit for Residential and Per Account for Non Residential

	Cubic Meters	KG	KG
Residential	161	27.37	27.37
Non-Residential	2,286	1,079.97	1,425.45

## Worksheet WW-2 Operations

Worksheet WW-2 provides a comparative Statement of Operations for fiscal years ending March 31 as follows:

- Actual results for the fiscal years 2018/19, 2019/20 and 2020/21 for Wastewater Services.
- Approved budgets by Halifax Water's Board of Commissioners for 2021/22 and 2022/23, with 2023 representing Test Year #1 for the purposes of the Rate Study.
- Projections for 2023/24, representing Test Year #2 for the purposes of the Rate Study.

Revenues are budgeted/projected at current rates, and revenue and expenses are segregated between regulated and unregulated services. This worksheet details the budgeted deficits at current rates in Wastewater Services for the two test years.

Wastewater Services had a cumulative surplus of \$7.5 million as at March 31, 2021 however, with budgeted deficits in 2021/22 and 2022/23 of \$1.5 million and \$2.7 million respectively, and a projected deficit of \$5.0 million in 2023/24, the projected accumulated deficit as at March 31, 2024 is estimated at \$1.7 million. Of note, the current forecast for the 2021/22 fiscal year to December 31, 2021 is reporting projected earnings \$1.5 million, an improvement of approximately \$3.0 million compared to the approved budget. Based on this, the projected accumulated surplus as at March 31, 2021 would be \$1.2 million.

Regulated and unregulated revenue and expenses have been identified on Worksheet WW-2 and are excluded in the determination of revenue requirements for rate making purposes. The calculation of revenue requirements is reported on Worksheet WW-3.

Depreciation in Test Year #1 is \$448,000 higher than the 2022/23 operating budget. Both calculations begin with the same data, the 2022/23 capital budget. This is then adjusted to align with projected additions to rate-based assets. For the 2022/23 operating budget, the adjustment is amortized over thirty-seven years, whereas for the test year data the adjustment is prorated between assets classes, therefore spreading the depreciation more evenly amongst the asset classes. In addition, corporate projects are amortized over ten years within the 2022/23 operating budget, whereas for the test year data, projects are reviewed further and more appropriately aligned with an asset class, therefore allocating depreciation into future years.



Worksheet WW-2

<b>Halifax Water</b> <b>Wastewater Rate Study</b> <b>Comparative Statement of Operations</b> Fiscal Years ending March 31st						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating revenues</b>						
Regulated activities						
Wastewater	\$69,900,822	\$70,494,101	\$69,605,064	\$80,618,718	\$81,607,858	\$81,607,858
Overstrength surcharge	\$75,092	\$14,048	\$718	\$15,000	\$0	\$0
Late payment and other connection fees	\$186,476	\$123,286	\$118,346	\$221,000	\$246,700	\$246,700
Miscellaneous	\$185,082	\$140,658	\$162,751	\$246,841	\$252,841	\$252,841
Sub-total	\$70,347,472	\$70,772,093	\$69,886,879	\$81,101,559	\$82,107,399	\$82,107,399
Unregulated activities						
Contract revenue	\$416,464	\$453,367	\$416,026	\$483,799	\$491,062	\$491,062
Septage tipping fees	\$764,445	\$514,196	\$486,225	\$505,000	\$475,000	\$475,000
Airline effluent	\$142,792	\$98,164	\$33,306	\$76,000	\$76,000	\$76,000
Sub-total	\$1,323,701	\$1,065,727	\$935,557	\$1,064,799	\$1,042,062	\$1,042,062
<b>Total</b>	<b>\$71,671,173</b>	<b>\$71,837,820</b>	<b>\$70,822,436</b>	<b>\$82,166,358</b>	<b>\$83,149,461</b>	<b>\$83,149,461</b>
<b>Operating Expenditures</b>						
Regulated activities						
Wastewater collection	\$11,642,832	\$12,330,309	\$12,663,454	\$12,516,128	\$13,014,261	\$13,388,210
Wastewater treatment	\$19,250,471	\$19,892,744	\$20,060,403	\$21,273,583	\$22,633,709	\$23,319,053
Engineering and technology services (TS)	\$3,782,763	\$4,477,998	\$4,186,504	\$4,197,779	\$5,378,043	\$5,519,483
Technical services (SCADA)	\$1,449,682	\$1,608,926	\$1,756,754	\$1,683,650	\$1,730,801	\$1,785,964
Regulatory services	\$1,185,591	\$1,432,311	\$1,384,724	\$1,586,600	\$1,674,027	\$1,727,980
Corporate services	\$0	\$0	\$0	\$1,317,923	\$1,309,527	\$1,343,663
Customer service	\$2,061,287	\$2,277,188	\$2,188,838	\$2,521,849	\$2,170,237	\$2,237,450
Administration	\$3,242,216	\$3,023,641	\$2,964,892	\$2,079,326	\$2,582,056	\$2,655,409
Calculated depreciation - funded assets	\$12,986,456	\$14,038,404	\$15,019,075	\$16,774,620	\$16,541,528	\$17,834,884
Sub-total	\$55,601,298	\$59,081,521	\$60,224,644	\$63,951,458	\$67,034,189	\$69,812,096
Unregulated activities						
Wastewater collection	\$32,284	\$23,948	\$46,346	\$88,163	\$81,581	\$83,840
Wastewater treatment	\$539,807	\$740,629	\$562,874	\$797,910	\$761,547	\$789,425
Sub-total	\$572,091	\$764,577	\$609,220	\$886,073	\$843,128	\$873,265
<b>Total</b>	<b>\$56,173,389</b>	<b>\$59,846,098</b>	<b>\$60,833,864</b>	<b>\$64,837,531</b>	<b>\$67,877,317</b>	<b>\$70,685,361</b>
<b>Earnings from operations</b>	<b>\$15,497,784</b>	<b>\$11,991,722</b>	<b>\$9,988,572</b>	<b>\$17,328,827</b>	<b>\$15,272,144</b>	<b>\$12,464,100</b>
<b>Financial and other revenues</b>						
Regulated activities						
Investment Income	\$520,000	\$191,306	\$54,504	\$46,080	\$21,000	\$21,000
Miscellaneous	\$25,324	\$6,211	\$1,387	\$6,000	\$7,200	\$7,200
Sub-total	\$545,324	\$197,517	\$55,891	\$52,080	\$28,200	\$28,200
Unregulated activities						
Miscellaneous	\$157,272	\$148,374	\$174,491	\$144,463	\$148,067	\$148,067
<b>Total</b>	<b>\$702,596</b>	<b>\$345,891</b>	<b>\$230,382</b>	<b>\$196,543</b>	<b>\$176,267</b>	<b>\$176,267</b>
<b>Financial and other expenditures</b>						
Regulated Activities						
Interest on long term debt	\$4,938,524	\$4,706,350	\$4,404,800	\$4,195,917	\$3,639,116	\$3,015,017
Repayment on long term debt	\$12,014,699	\$12,522,158	\$13,242,064	\$13,864,437	\$13,635,204	\$13,686,061
Amortization of debt discount	\$102,814	\$110,215	\$117,046	\$133,131	\$126,721	\$126,721
Dividend/ grant in lieu of taxes	\$0	\$0	\$386,457	\$819,900	\$736,268	\$743,631
Sub-total	\$17,056,037	\$17,338,723	\$18,150,367	\$19,013,385	\$18,137,309	\$17,571,430
Unregulated activities						
Miscellaneous	\$21,367	\$35,119	\$26,332	\$30,000	\$30,000	\$30,000
<b>Total</b>	<b>\$17,077,404</b>	<b>\$17,373,842</b>	<b>\$18,176,699</b>	<b>\$19,043,385</b>	<b>\$18,167,309</b>	<b>\$17,601,430</b>
<b>Earnings (loss) for the year</b>	<b>(\$877,024)</b>	<b>(\$5,036,229)</b>	<b>(\$7,957,745)</b>	<b>(\$1,518,015)</b>	<b>(\$2,718,898)</b>	<b>(\$4,961,063)</b>
<b>Surplus, beginning of year</b>	<b>\$15,487,608</b>	<b>\$15,487,608</b>	<b>\$15,487,608</b>	<b>\$7,529,863</b>	<b>\$6,011,848</b>	<b>\$3,292,950</b>
<b>Surplus, end of year</b>	<b>\$14,610,584</b>	<b>\$10,451,379</b>	<b>\$7,529,863</b>	<b>\$6,011,848</b>	<b>\$3,292,950</b>	<b>(\$1,668,113)</b>

### **Worksheet WW-3 – Revenue Requirements**

Worksheet WW-3 takes the operating and financial expense information from Worksheet WW-2 to develop revenue requirements for the two test years, 2022/23 and 2023/24.

Financial and other operating revenue are deducted from the expenses to determine the revenue required from customer rates.

## Worksheet WW-3

<b>Halifax Water</b> <b>Wastewater Rate Study</b> <b>Statement of Operating Expenses and Revenue Requirements</b> Fiscal Years ending March 31st						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating expenditures</b>						
Wastewater collection	\$11,642,832	\$12,330,309	\$12,663,454	\$12,516,128	\$13,014,261	\$13,388,210
Wastewater treatment	\$19,250,471	\$19,892,744	\$20,060,403	\$21,273,583	\$22,633,709	\$23,319,053
Engineering and technology services (TS)	\$3,782,763	\$4,477,998	\$4,186,504	\$4,197,779	\$5,378,043	\$5,519,483
Technical services (SCADA)	\$1,449,682	\$1,608,926	\$1,756,754	\$1,683,650	\$1,730,801	\$1,785,964
Regulatory services	\$1,185,591	\$1,432,311	\$1,384,724	\$1,586,600	\$1,674,027	\$1,727,980
Corporate services	\$0	\$0	\$0	\$1,317,923	\$1,309,527	\$1,343,663
Customer service	\$2,061,287	\$2,277,188	\$2,188,838	\$2,521,849	\$2,170,237	\$2,237,450
Administration	\$3,242,216	\$3,023,641	\$2,964,892	\$2,079,326	\$2,582,056	\$2,655,409
Sub-total	\$42,614,842	\$45,043,117	\$45,205,569	\$47,176,838	\$50,492,661	\$51,977,212
Calculated depreciation - funded assets	\$12,986,456	\$14,038,404	\$15,019,075	\$16,774,620	\$16,541,528	\$17,834,884
Calculated depreciation - donated assets	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total</b>	<b>\$55,601,298</b>	<b>\$59,081,521</b>	<b>\$60,224,644</b>	<b>\$63,951,458</b>	<b>\$67,034,189</b>	<b>\$69,812,096</b>
<b>Add: non-operating expenditures</b>						
Interest on long term debt	\$4,938,524	\$4,706,350	\$4,404,800	\$4,195,917	\$3,639,116	\$3,015,017
Repayment on long term debt	\$12,014,699	\$12,522,158	\$13,242,064	\$13,864,437	\$13,635,204	\$13,686,061
Amortization of debt discount	\$102,814	\$110,215	\$117,046	\$133,131	\$126,721	\$126,721
Dividend/ grant in lieu of taxes	\$0	\$0	\$386,457	\$819,900	\$736,268	\$743,631
	\$17,056,037	\$17,338,723	\$18,150,367	\$19,013,385	\$18,137,309	\$17,571,430
Test year #1 - new interest on long term debt						\$57,231
Test year #1 - new repayment of long term debt						\$76,308
<b>Total</b>	<b>\$17,056,037</b>	<b>\$17,338,723</b>	<b>\$18,150,367</b>	<b>\$19,013,385</b>	<b>\$18,137,309</b>	<b>\$17,704,969</b>
<b>Less: other revenues</b>						
Overstrength surcharge	\$75,092	\$14,048	\$718	\$15,000	\$0	\$0
Late payment and other connection fees	\$186,476	\$123,286	\$118,346	\$221,000	\$246,700	\$246,700
Investment Income	\$520,000	\$191,306	\$54,504	\$46,080	\$21,000	\$21,000
Miscellaneous	\$210,406	\$146,869	\$164,138	\$252,841	\$260,041	\$260,041
<b>Total</b>	<b>\$991,974</b>	<b>\$475,509</b>	<b>\$337,706</b>	<b>\$534,921</b>	<b>\$527,741</b>	<b>\$527,741</b>
<b>Less: other adjustments</b>						
Sponsorships and donations	\$17,615	\$15,266	\$15,870	\$13,571	\$14,564	\$14,564
Help to others (H2O) program	\$14,350	\$15,918	\$22,384	\$16,400	\$17,600	\$17,600
Administration				\$45,210	\$52,198	\$52,198
<b>Total</b>	<b>\$31,965</b>	<b>\$31,185</b>	<b>\$38,255</b>	<b>\$75,181</b>	<b>\$84,362</b>	<b>\$84,362</b>
<b>Revenue required from customers</b>	<b>\$71,633,396</b>	<b>\$75,913,550</b>	<b>\$77,999,050</b>	<b>\$82,354,741</b>	<b>\$84,559,396</b>	<b>\$86,904,962</b>

## Worksheet WW-4 Operating Expenditure Analysis

Worksheet W-4 details the operating expenditures by cost element group for each of the functional areas within the Wastewater Services, consisting of the following:

- Wastewater Collections,
- Wastewater Treatment, and

For the following functional areas serving all three services of Halifax Water (Water, Wastewater and Stormwater), a summary has been provided outlining the cost effects as they pertain to Wastewater. Complete details for these functional areas can be found in the Water Rate Studies found in Appendix 1 of this Application.

- Technical Services (SCADA),
- Engineering and Technology Services (TS),
- Regulatory Services,
- Corporate Services, and
- Administration.

Data provided as part of the review and analysis includes:

- Actual results for 2018/19, 2019/20, and 2020/21,
- Approved budgets for 2021/22 and 2022/23 (Test Year # 1), and
- Projected results for 2023/24 (Test Year #2).

For operating expenditures related to 2023/24 (Test Year #2), the key assumptions regarding projected increases are as follows:

- Salaries and benefits: 3.5%
- Chemicals: 5.0%
- Electricity: 3.0%
- Other: 2.0%

On subsequent pages within this section, operating expenditures are reported for the core cost element groups within each functional area. As part of the analysis, variances have been provided with changes expressed as both dollar and percentage values, comparing year-over-year changes for the fiscal years 2019/20 through 2023/24. Commentary is provided for each of the cost elements groups falling within the functional areas, with additional details provided in situations where variances have increased over \$50 thousand.

## **Wastewater Collections**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). It should be noted Wastewater and Stormwater Collections share the same wage pool, and therefore centrally managed. Cost fluctuations within one Service would have the opposite impact on the other. Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. In addition, salaries and benefits for Stormwater Collections reported a decrease, indicating there was more of a focus on Wastewater operations during the period. For 2020/21, the situation was similar, where Wastewater operations reported an increase in salaries and benefits, and Stormwater operations reporting a decrease. Combined the overall increase was high, however, this was due largely to additional personal protective equipment (PPE) required to operate during the pandemic. For 2021/22, focus of operations turned to Stormwater, which reported an increase compared to Wastewater. Collectively the overall increase was high, however, this was again attributed to required PPE and the hiring of a new senior manager for the Collections group. Wastewater operations costs increase in 2022/23 with a corresponding reduction in Stormwater operations. Collectively, the overall increase was modest comparative to prior year's, and is due to a reduction in overtime costs to better reflect current spending levels, and having more time allocated to capital projects.
- Training and Development – Attendance was low at conferences in 2019/20 due to the content of the offerings, and training in any given year is contingent upon certifications for staff and the respective expiry dates. In 2020/21, because of the pandemic, most conferences were cancelled, in-person training was not possible, and virtual offerings not yet established. For 2021/22, there was an expectation conferences and training would become more normal allowing for in-person gatherings, supplemented by virtual conference and/or training opportunities. The budget in 2022/23 was reduced somewhat due to continued uncertainties with respect to conferences and training.
- Contract Services – Costs have shown a decline between 2019/20 and 2021/22 for several reasons. Efforts are underway to perform more work in-house as opposed to place reliance on external contractor, where feasible. Where the Collections group is also responsible for Stormwater Collections, in 2020/21 and 2021/22 during the pandemic period, more focus was placed on stormwater maintenance services. Finally, costs have varied considerable year-over-year due to the variability of receiving billings from the HRM related to pavement impact fees and inspection fees.
- Electricity – Costs are reflective of price and consumption/usage, with the variability in consumption year-over-year directly related to flows to pump stations and combined sewer overflows during rainfall events. For 2022/23, part of the increase projected is associated with new pump station infrastructure coming online.
- Materials Supplies, and Services – Increased costs in both 2019/20 and 2020/21 were due to additional materials and supplies necessary where more work was performed internally versus outsourcing, as noted above. Additionally, there was an increase in purchasing of parts required to perform emergency repairs for pump station replacements. A decrease in costs occurred in 2021/22 due to the capitalization of any non-operational replacements.

- Professional Services – Costs for professional services primary relate to licenses and agreements, specifically land leases for Harbour Solutions Pipe (HSP) and other wastewater infrastructure. These costs remain relatively consistent year-over-year, with variances typically associated with legal services related to insurance claims resulting from sewer backups, etc. Increases respecting 2022/23 was due mainly to a new license agreement with the Department of National Defense (DND) for an expanded area.
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.
- Chemicals – Chemicals are not a major cost related to Wastewater Collections as bioxide is the only chemical used, for the sole purpose of odour control. It is purchased as required therefore, costs can vary year-over-year depending on usage, plus it would be subject to price volatility like market conditions for other chemicals.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Wastewater Collections											
Salaries and benefits	\$5,453,309	\$5,832,055	\$6,687,905	\$6,081,961	\$6,252,376	\$6,471,209	\$378,746 7%	\$855,850 15%	(\$605,944) (9%)	\$170,415 3%	\$218,833 3%
Training and development	\$74,414	\$33,429	\$11,748	\$65,000	\$46,350	\$47,277	(\$40,985) (55%)	(\$21,681) (65%)	\$53,252 453%	(\$18,650) (29%)	\$927 2%
Contract services	\$2,048,793	\$1,962,173	\$1,945,192	\$1,776,400	\$1,878,900	\$1,916,478	(\$86,620) (4%)	(\$16,981) (1%)	(\$168,792) (9%)	\$102,500 6%	\$37,578 2%
Electricity	\$1,688,676	\$1,821,285	\$1,705,204	\$1,883,313	\$1,967,361	\$2,026,382	\$132,609 8%	(\$116,081) (6%)	\$178,109 10%	\$84,048 4%	\$59,021 3%
Materials, supplies and services	\$993,885	\$1,235,629	\$1,406,436	\$1,216,090	\$1,278,966	\$1,304,545	\$241,744 24%	\$170,807 14%	(\$190,346) (14%)	\$62,876 5%	\$25,579 2%
Professional services	\$205,379	\$258,656	\$230,549	\$261,505	\$281,255	\$286,880	\$53,277 26%	(\$28,107) (11%)	\$30,956 13%	\$19,750 8%	\$5,625 2%
Fleet	\$1,449,246	\$1,427,066	\$1,049,962	\$1,455,113	\$1,505,493	\$1,535,603	(\$22,180) (2%)	(\$377,104) (26%)	\$405,151 39%	\$50,380 3%	\$30,110 2%
Chemicals	\$132,713	\$135,555	\$153,576	\$156,435	\$185,636	\$194,918	\$2,842 2%	\$18,021 13%	\$2,859 2%	\$29,201 19%	\$9,282 5%
Applied overheads and other allocations	\$196,354	\$235,949	\$227,503	\$270,286	\$222,687	\$227,141	\$39,595 20%	(\$8,446) (4%)	\$42,783 19%	(\$47,599) (18%)	\$4,454 2%
Allocation to Stormwater Service	(\$599,937)	(\$609,508)	(\$756,601)	(\$649,975)	(\$604,763)	(\$622,223)	(\$9,571) 2%	(\$147,093) 24%	\$106,626 (14%)	\$45,212 (7%)	(\$17,460) 3%
Recoveries	\$0	(\$1,980)	\$1,980	\$0	\$0	\$0	(\$1,980) 0%	\$3,960 (200%)	(\$1,980) (100%)	\$0 0%	\$0 0%
Total Wastewater Collections	\$11,642,832	\$12,330,309	\$12,663,454	\$12,516,128	\$13,014,261	\$13,388,210	\$687,477 6%	\$333,145 3%	(\$147,326) (1%)	\$498,133 4%	\$373,949 3%

## **Wastewater Treatment**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. A full-time equivalent (FTE) was added in each of the 2021/22 and 2022/23 fiscal years. Only a modest increase was reported in 2020/21 due mainly to the effects of COVID-19 which saw a reduction of costs in areas such as overtime.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content of the offering and the expiration of certifications of staff. Costs in 2020/21 were reduced due to COVID-19, where conferences were cancelled, in-person training was not possible, and virtual offerings had yet to be formally established. The expectation for the 2021/22 budget was the conferences and training would return to a more normal level with in-person sessions, or more formalized virtual platforms to allow staff to update and maintain certifications. This expectation carried forward in the formulation of the 2022/23 budget.
- Contract Services – A main cost driver for contract services is the processing and transportation of biosolids. In 2020/21, biosolids costs were lower, particularly at the Aerotech Wastewater Treatment Facility, due to COVID-19 and the reduction of activity at the airport. Procuring outside services was hampered due to restrictions imposed during the pandemic. In 2021/22 and 2022/23, biosolids and transportation costs increase due to optimization at the Dartmouth Wastewater Treatment Facility and capital upgrades. Additionally, in 2021/22 the fuel surcharge for biosolids transportation increased.
- Electricity – Costs are reflective of price and consumption/usage, with the variability in consumption directly related to effluent flows. During the pandemic, flows particularly at the Halifax Water Treatment Facility, were skewed comparative to prior years. Reduced flows resulted in lower consumption. As the effects of the pandemic subside, electricity consumption is expected to return to more normal levels.
- Materials, Supplies, and Services – Costs in this cost element group support Halifax Water's infrastructure and equipment. Costs vary year-over-year, not only for scheduled maintenance, but also to emergency repairs required to an aging infrastructure. Decreased costs were experienced in 2020 and 2021 due to several factors, including access restrictions related to the pandemic, and procurement of materials given strained supply chains.
- Professional Services – Costs have increase since 2018/19 in the following areas. In 2019/20 there was an unexpected cost related to fuel spill investigation at the Aerotech Wastewater Treatment Facility. Additionally, a new membership for Halifax Water in the Canadian Water Network (CWN) totaling \$50 thousand annually. In September 2020, the Natural Sciences and Engineering Research Council of Canada (NSERC) Wastewater Research Program started through a project at Dalhousie University. The cost of the program totals \$200 thousand annually, with a portion being expensed in 2020/21.
- Fleet Services – Costs are assigned to the various treatment facilities based on the types of vehicles and/or equipment required to meet operational needs, including light trucks and forklifts. Costs increased in 2021/22 due to the biosolids tanker trailers being assigned to treatment facilities.

- Chemicals – Costs are reflective of price and consumption/usage. Chemicals costs are extremely volatile from a pricing perspective, and historically Halifax Water procures chemical pricing annually. There was a significant increase in 2019/20, the direct result of alum and polymer used in the Halifax Harbour Water Solutions facilities. With the expiration of the polymer contract in September 2020, there was a significant price increase affecting the 2021/22 budget. For 2022/23, again due to the market volatility, chemical prices have increased significantly, and suppliers are not willing to lock themselves into long-term contracts.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Wastewater Treatment											
Salaries and benefits	\$5,064,261	\$5,179,674	\$5,190,283	\$5,471,878	\$5,808,202	\$6,011,489	\$115,413 2%	\$10,609 0%	\$281,595 5%	\$336,324 6%	\$203,287 3%
Training and development	\$21,205	\$29,620	\$1,912	\$60,463	\$53,825	\$54,902	\$8,415 40%	(\$27,708) (94%)	\$58,551 3062%	(\$6,638) (11%)	\$1,077 2%
Contract services	\$5,305,336	\$5,479,346	\$5,336,262	\$5,449,581	\$5,698,274	\$5,812,239	\$174,010 3%	(\$143,084) (3%)	\$113,319 2%	\$248,693 5%	\$113,965 2%
Electricity	\$2,569,622	\$2,432,357	\$2,711,005	\$2,858,034	\$2,842,390	\$2,927,662	(\$137,265) (5%)	\$278,648 11%	\$147,029 5%	(\$15,644) (1%)	\$85,272 3%
Materials, supplies and services	\$3,672,356	\$3,462,376	\$3,448,264	\$3,590,467	\$3,788,432	\$3,864,201	(\$209,980) (6%)	(\$14,112) (0%)	\$142,203 4%	\$197,965 6%	\$75,769 2%
Professional services	\$66,701	\$110,225	\$206,220	\$300,505	\$308,323	\$314,489	\$43,524 65%	\$95,995 87%	\$94,285 46%	\$7,818 3%	\$6,166 2%
Fleet	\$174,485	\$161,003	\$165,723	\$241,272	\$237,173	\$241,916	(\$13,482) (8%)	\$4,720 3%	\$75,549 46%	(\$4,099) (2%)	\$4,743 2%
Chemicals	\$2,249,298	\$2,989,750	\$2,967,135	\$3,207,408	\$3,865,251	\$4,058,514	\$740,452 33%	(\$22,615) (1%)	\$240,273 8%	\$657,843 21%	\$193,263 5%
Applied overheads and other allocations	\$209,356	\$204,224	\$204,806	\$211,795	\$158,214	\$161,378	(\$5,132) (2%)	\$582 0%	\$6,989 3%	(\$53,581) (25%)	\$3,164 2%
Recoveries/ allocation to unregulated	(\$82,149)	(\$155,831)	(\$171,207)	(\$117,820)	(\$126,375)	(\$127,737)	(\$73,682) 90%	(\$15,376) 10%	\$53,387 (31%)	(\$8,555) 7%	(\$1,362) 1%
Total Wastewater Treatment	\$19,250,471	\$19,892,744	\$20,060,403	\$21,273,583	\$22,633,709	\$23,319,053	\$642,273 3%	\$167,659 1%	\$1,213,180 6%	\$1,360,126 6%	\$685,344 3%



### **Technical Services (SCADA)**

A summary has been provided below for Technical Services (SCADA) outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Technical Services (SCADA) by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Technical Services (SCADA) during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed resulting in a reduction in the percentage of common costs allocated to Wastewater Services, from 70% to 67%. This includes the cost centers for Administration and Overheads (Technical Services), SCADA System, and Regional Technical Services. All other cost center allocations remain unchanged.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Technical Services (SCADA)	\$1,449,682	\$1,608,926	\$1,756,754	\$1,683,650	\$1,730,801	\$1,785,964	\$159,244 11%	\$147,828 9%	(\$73,104) (4%)	\$47,151 3%	\$55,163 3%

### **Engineering and Technology Services (TS)**

A summary has been provided below for Engineering and Technology Services outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Engineering and Technology Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Engineering and Technology Services during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed resulting in an increase in the percentage of common costs allocated to Wastewater Services from 42% to 52%. This includes the cost centers for Administration and Overheads (Engineering and TS), Engineering Information, and Information Services. An increase is also proposed for the Asset Management and Capital Planning cost center, from 48% to 52%. Finally, a decrease is proposed for the Energy and Business Development cost center, from 71% to 39%. All other cost center allocations remain unchanged.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Engineering and Technology Services	\$3,782,763	\$4,477,998	\$4,186,504	\$4,197,779	\$5,378,043	\$5,519,483	\$695,235 18%	(\$291,494) (7%)	\$11,275 0%	\$1,180,264 28%	\$141,440 3%

## Regulatory Services

A summary has been provided below for Regulatory Services outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Regulatory Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Regulatory Services during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed for the cost center Environmental Management System, resulting in a decrease in the percentage of expenditures allocated to Wastewater Services from 55% to 40%. All other cost center allocations remain unchanged.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Regulatory Services	\$1,185,591	\$1,432,311	\$1,384,724	\$1,586,600	\$1,674,027	\$1,727,980	\$246,720 21%	(\$47,587) (3%)	\$201,876 15%	\$87,427 6%	\$53,953 3%

**Customer Service**

A summary has been provided below for Customer Service outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Customer Service by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Customer Service during the period 2018/19 to 2023/24 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Customer Service	\$2,061,287	\$2,277,188	\$2,188,838	\$2,521,849	\$2,170,237	\$2,237,450	\$215,901 10%	(\$88,350) (4%)	\$333,011 15%	(\$351,612) (14%)	\$67,213 3%

## Corporate Services

A summary has been provided below for Corporate Services outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Corporate Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Corporate Services for 2021/22 are consistent with the allocations and the methodology identified in the Cost-of-Service Manual under the former System function “Administration and Pension”. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, costs related to Corporate Services were separated from the former “Administration and Pension” into two separate divisions within the organizational hierarchy. The allocations are consistent with those under the former Administration and Pension function.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Corporate Services	\$0	\$0	\$0	\$1,317,923	\$1,309,527	\$1,343,663	\$0	\$0	\$1,317,923	(\$8,396)	\$34,136
							0%	0%	0%	(1%)	3%

## Administration

A summary has been provided below for Administration outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Administration by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts reported below for Administration during the period 2018/19 to 2021/22 are consistent with the allocations and the methodology identified in the Cost-of-Service Manual under the System function “Administration and Pension”. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, costs related to Administration were separated from the former “Administration and Pension” within the organizational hierarchy. The allocations are consistent with those under the former Administration and Pension function.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Administration	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget

### **Worksheet WW-5 Cost of Service (COS) Structure**

Worksheet WW-5 details the customer classifications, cost functions with allocated percentages, service characteristics and operating and capital cost classifications for Wastewater Services as detailed in the Cost-of-Service Manual.

**Halifax Water  
Wastewater Rate Study**

**Customer Classifications, Cost Functions & Service Characteristics**

SF Residential	Multi-family	Commercial - General	Industrial	Institutional
Unmetered				

[illegible]



**Worksheet WW-6 Operating Expense Functionalization**

Worksheet WW-6 details the Wastewater Services operating expense categories cost elements, by the system functions detailed in the Cost-of-Service Manual. The total of the service functions equals the operating expense category in the revenue requirement in 2022/23, and are reported as both a dollar and percentage value. These are then used in Worksheet WW-10 to allocate the costs to the service characteristics.

Halifax Water Wastewater Rate Study	
Statement of Operating Expenditures 2022/23	
OPERATING EXPENSES	Test Year #1 2022/23 Budget
<b>Wastewater Collection</b>	
Salaries and benefits	\$6,252,376
Training and development	\$46,350
Contract services	\$1,878,900
Electricity	\$1,967,361
Materials, supplies and services	\$1,278,966
Professional services	\$281,255
Fleet	\$1,505,493
Chemicals	\$185,636
Applied overheads and other allocations	\$222,687
Sub-total	\$13,619,024
Allocation to Stormwater Service	(\$604,763)
<b>Total Wastewater Collection</b>	<b>\$13,014,261</b>
<b>Wastewater Treatment</b>	
Salaries and benefits	\$5,808,202
Training and development	\$53,825
Contract services	\$5,698,274
Electricity	\$2,842,390
Materials, supplies and services	\$3,788,432
Professional services	\$308,323
Fleet	\$237,173
Chemicals	\$3,865,251
Applied overheads and other allocations	\$158,214
Sub-total	\$22,760,084
Recoveries/ allocation to unregulated	(\$126,375)
<b>Total Wastewater Treatment</b>	<b>\$22,633,709</b>
<b>Other Operating</b>	
<b>Engineering and TS</b>	\$5,378,043
<b>Technical Services (SCADA)</b>	\$1,730,801
<b>Regulatory Services</b>	\$1,674,027
<b>Corporate Services</b>	\$1,309,527
<b>Customer Service</b>	\$2,170,237
<b>Administration</b>	\$2,582,056
<b>Total Other Operating</b>	<b>\$14,844,691</b>
<b>Total O&amp;M Expense</b>	<b>\$50,492,661</b>

Halifax Water Wastewater Rate Study														
Operating Expense Cost Allocation Allocation of Costs to Functions 2022/23														
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$0	\$0	\$0	\$2,519,895	\$3,256,616	\$475,865	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,252,376
\$0	\$0	\$0	\$16,113	\$26,977	\$3,261	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$46,351
\$0	\$0	\$0	\$963,457	\$650,132	\$265,311	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,878,900
\$0	\$0	\$0	\$13,086	\$1,951,627	\$2,648	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,967,361
\$0	\$0	\$0	\$400,015	\$821,086	\$57,865	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,278,966
\$0	\$0	\$0	\$97,773	\$163,696	\$19,786	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$281,255
\$0	\$0	\$0	\$646,655	\$741,162	\$117,676	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,505,493
\$0	\$0	\$0	\$0	\$185,636	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$185,636
\$0	\$0	\$0	\$77,413	\$129,608	\$15,666	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$222,687
\$0	\$0	\$0	(\$210,235)	(\$351,984)	(\$42,544)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$604,763)
\$0	\$0	\$0	\$4,524,172	\$7,574,556	\$915,534	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,014,262
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$3,394,124	\$1,784,526	\$629,551	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,808,201
\$30,566	\$14,354	\$8,905	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$53,825
\$3,901,810	\$1,596,952	\$199,512	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,698,274
\$1,855,000	\$736,698	\$250,692	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,842,390
\$2,557,494	\$869,250	\$361,689	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,788,433
\$210,375	\$73,488	\$24,460	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$308,323
\$133,515	\$81,547	\$22,111	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$237,173
\$3,239,786	\$332,937	\$292,528	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,865,251
\$107,259	\$38,429	\$12,526	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$158,214
(\$69,306)	(\$53,304)	(\$3,765)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$126,375)
\$15,360,623	\$5,474,877	\$1,798,209	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$22,633,709
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,378,043	\$0	\$0	\$0	\$5,378,043
\$0	\$0	\$0	\$0	\$0	\$0	\$1,730,801	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,730,801
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,674,027	\$0	\$0	\$1,674,027
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,309,527	\$0	\$1,309,527
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,356,077	\$340,213	\$473,947	\$0	\$0	\$0	\$0	\$2,170,237
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,582,056	\$2,582,056
\$0	\$0	\$0	\$0	\$0	\$0	\$1,730,801	\$1,356,077	\$340,213	\$473,947	\$5,378,043	\$1,674,027	\$1,309,527	\$2,582,056	\$14,844,691
\$15,360,623	\$5,474,877	\$1,798,209	\$4,524,172	\$7,574,556	\$915,534	\$1,730,801	\$1,356,077	\$340,213	\$473,947	\$5,378,043	\$1,674,027	\$1,309,527	\$2,582,056	\$50,492,662

[illegible]

## **Worksheet WW-7 Continuity Schedule Utility Plant in Service**

Worksheet W-7 provides additional detail on the following:

- Funded utility plant in service,
- Contributed assets,
- Projected utility plant in service additions, net of projected retirements,
- Accumulated depreciation, net of projected retirements,
- Calculated depreciation, and
- Projected net book value.

The spreadsheet is broken down by asset class and asset. For the purposes of the revenue requirement, depreciation for Wastewater transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services.

Halifax Regional Water Commission Utility Plant in Service-Wastewater  Continuity Schedule/ Depreciation for Utility Plant in Service 2022-23																	
	Useful Life in years	Funded Utility Plant in Service	Contributed Utility Plant in Service	Total Utility Plant in Service	Work in Process approved in Prior Years	Utility Plant in Service Additions	Contributed Utility Plant in Service Additions	Projected Retirements	Projected Utility Plant in Service	Accumulated Depreciation	Accumulated Depreciation on funded assets	Accumulated Depreciation on donated assets	Projected Retirement of Accumulated Depreciation	Projected Net Book Value before Depreciation	Depreciation expense on funded assets	Depreciation expense on Regulatory Asset	Projected Net Book Value after Depreciation
		Mar-22	Mar-22	Mar-22	2022-23	2022-23	2022-23	2022-23	Mar-23	Mar-22	Mar-22	Mar-22	2022-23	Mar-23	2022-23	2022-23	Mar-23
Intangible Plant	10	15,351,883	3,898,513	19,250,396					19,250,396	10,328,556	6,549,765	3,778,791		8,921,840	1,391,209	-	7,475,060
		-	-							-	-	-			-	-	-
Tangible Assets		-	-							-	-	-			-	-	-
Land		-	-							-	-	-			-	-	-
Collection Land & Land Rights	N/A	-	870,257	870,257					870,257	-	-	-		870,257	-	-	870,257
Treatment Plant Land	N/A	2,703,421	1,351,711	4,055,132					4,055,132	-	-	-		4,055,132	-	-	4,055,132
Pumping Station Land	N/A	57,902	90,726	148,629					148,629	-	-	-		148,629	-	-	148,629
Office Land	N/A	2,009,646	-	2,009,646					2,009,646	-	-	-		2,009,646	-	-	2,009,646
Other Land & Easements	N/A	4,284,241	915,577	5,199,818					5,199,818	-	-	-		5,199,818	-	-	5,199,818
Structures		-	-	-						-	-	-		-	-	-	-
Structures Other	40	3,448,681	1,588,879	5,037,559					5,037,559	1,136,180	663,470	472,710		3,901,379	79,421	858	3,781,224
Treatment Plants	5 - 75	57,199,454	62,167,253	119,366,708		1,869,423	2,199,900	100,000	123,336,031	36,474,451	11,713,551	24,760,900	75,000	86,936,580	1,153,799	9,037	84,783,595
Pumping Stations	20 - 30	24,134,522	44,930,030	69,064,552		8,113,610	-	50,000	77,128,163	33,449,877	6,954,117	26,495,760	25,000	43,703,286	983,423	11,668	41,731,473
Office Buildings	5	8,354,723	8,155	8,362,878		180,000			8,542,878	1,685,398	1,683,848	1,549		6,857,481	31,000	-	6,826,318
Airport-Aerotech	5 - 75	958,993	2,851,723	3,810,716		282,983			4,093,699	1,558,462	527,688	1,030,774		2,535,237	37,926	-	2,432,272
Treatment & Pump Equipment		-	-	-					-	-	-	-		-	-	-	-
Treatment Equipment	20	121,876,494	56,190,088	178,066,582		2,741,929			180,808,511	90,191,087	61,722,044	28,469,043		90,617,424	6,427,270	161,312	81,401,435
Information Systems - SCADA	20	14,051,065	1,903,765	15,954,830					15,954,830	5,146,122	4,672,519	473,603		10,808,708	819,047	-	9,903,629
Pumping Equipment	5 - 20	9,830,194	13,443,629	23,273,822					23,273,822	10,759,421	2,819,322	7,940,099		12,514,401	498,716	-	11,577,699
Mains		-	-	-					-	-	-	-		-	-	-	-
Trunk Sewers	100	5,797,296	38,706,056	44,503,353		-	-		44,503,353	2,881,926	779,501	2,102,425		41,621,426	78,988	-	41,222,405
Force Mains	75	2,297,422	77,511	2,374,933		223,000	315,000		2,912,933	89,524	85,753	3,771		2,823,409	38,960	-	2,783,146
Sewer Mains	75	64,698,263	189,317,386	254,015,649		3,884,875	5,516,300		263,416,824	69,718,328	9,084,597	60,633,731		193,698,496	954,464	4,915	190,312,406
Sewer Laterals	50	25,394,834	7,800,035	33,194,870		1,549,826	520,000		35,264,695	4,231,678	2,866,545	1,365,133		31,033,017	531,816	-	30,355,554
- Combined Sewers Portion	75 - 100	10,434,237	12,088,641	22,522,878					22,522,878	2,983,737	1,476,457	1,507,280		19,539,141	132,089	1,036	19,261,652
Outfalls	75	13,486,429	6,015,431	19,501,859		-			19,501,859	2,918,203	1,953,078	965,125		16,583,656	188,755	1,104	16,314,784
Manholes	50	2,447,317	7,164,619	9,611,936			280,000		9,891,936	1,293,011	275,707	1,017,304		8,598,925	54,885	-	8,405,440
Equipment		-	-	-					-	-	-	-		-	-	-	-
Transportation Equipment	5	7,856,854	111,303	7,968,157		920,000		250,000	8,638,157	6,642,362	6,531,059	111,303	250,000	2,245,795	703,017	-	1,542,777
Tools & Equipment for Ops	5	1,216,324	366,007	1,582,331		254,692			1,837,023	1,227,656	861,649	366,007		609,367	90,669	-	518,698
Tools & Equipment for Plant	5	121,325	-	121,325					121,325	105,532	105,532	-		15,793	1,965	-	13,828
Office Equipment & Furniture	5	873,449	-	873,449					873,449	858,368	858,368	-		15,081	10,054	-	5,027
Computer Equipment and Software	3 - 5	16,400,594	-	16,400,594		4,439,214			20,839,808	5,341,929	5,341,929	-		15,497,879	2,226,950	-	13,270,929
Meters		8,875,933	-	8,875,933		174,397			9,050,329	1,404,673	1,404,673	-		7,645,657	449,143	-	7,196,514
Small Systems		-	-	-					-	-	-	-		-	-	-	-
Fall River	20	329,342	48,428	377,769					377,769	131,165	103,628	27,537		246,605	17,919	-	226,303
Springfield Lake	5 - 20	161,898	517,610	679,508					679,508	438,537	80,480	358,057		240,971	10,666	-	219,425
Middle Musquodoboit	50	143,333	250,000	393,333					393,333	218,143	39,810	178,333		175,190	5,609	-	164,580
North Preston	10 - 50	692,554	3,293,239	3,985,793					3,985,793	1,747,387	444,125	1,303,262		2,238,406	24,033	-	2,108,678
Wellington	10 - 50	2,194,412	120,160	2,314,572					2,314,572	834,948	777,872	57,076		1,479,624	81,960	-	1,391,656
Other Small Systems	20 - 75	662,332	826,600	1,488,932		427,765			1,916,697	284,650	128,524	156,127		1,632,047	30,863	-	1,589,619
TOTAL		428,345,368	456,913,331	885,258,699	-	25,061,712	8,831,200	400,000	918,751,611	294,081,309	130,505,609	163,575,700	350,000	625,020,303	17,054,617	189,929	599,099,607

## **Worksheet WW-8 Depreciation Functionalization**

Worksheet WW-8 allocates the budgeted annual depreciation charge included in the revenue requirement for 2022/23 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, and reported as both a dollar and percentage value. These are then used in Worksheet WW-10 to allocate depreciation to the service characteristics. As noted previously, depreciation for Water transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services.

## Worksheet WW-8

Halifax Water Wastewater Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2022/23	
	Annual Depreciation
INTANGIBLE PLANT	
Intangible Plant	\$1,391,209
TANGIBLE PLANT	
LAND	
WW Collection Land & Land Rights	\$0
WW Treatment Plant Land	\$0
WW Pumping Station Land	\$0
WW Office Land	\$0
WW Other Land	\$0
STRUCTURES	
WW Structures Miscellaneous	\$80,280
WW Treatment Plants	\$1,162,836
WW Pumping Stations	\$995,091
WW Office Buildings	\$31,000
Aerotech/ Airport WW System	\$37,926
TREATMENT & PUMP EQUIPMENT	
WW Treatment Equipment	\$6,588,582
WW Information Systems - SCADA	\$819,047
WW Pumping Equipment	\$498,716
MAINS	
WW Trunk Sewers	\$78,988
WW Force Mains	\$38,960
WW Sewer Mains	\$959,379
WW Sewer Laterals	\$531,816
WW - Combined Sewers WW Portion	\$133,125
WW Outfalls	\$189,858
WW Manholes	\$54,885
EQUIPMENT	
WW Tools & Work Equipment	\$90,669
WW Tools & Equipment for Plant	\$1,965
WW Office Equipment & Furniture	\$10,054
WW Computer Equipment	\$2,226,950
WW Meters	\$449,143
SMALL SYSTEMS	
WW Fall River	\$17,919
WW Springfield Lake	\$10,666
WW Middle Musquodoboit	\$5,609
WW North Preston	\$24,033
WW Wellington	\$81,960
Other Small Systems	\$30,863
Total	\$16,541,528

Halifax Water Wastewater Rate Study													
Calculation of Depreciation of Tangible Plant at Total Cost Functionalization of Depreciation Expressed as a Percentage (%) 2022/23													
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
INTANGIBLE PLANT													
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
LAND													
90%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
STRUCTURES													
80%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
70%	20%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TREATMENT & PUMP EQUIPMENT													
70%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MAINS													
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
80%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EQUIPMENT													
0%	0%	0%	50%	25%	25%	0%	0%	0%	0%	0%	0%	0%	0%
40%	40%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	25%	25%	0%	25%
0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	25%	25%	0%	25%
0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
SMALL SYSTEMS													
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%

Halifax Water Wastewater Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2022/23	
	Annual Depreciation
INTANGIBLE PLANT	
Intangible Plant	\$1,391,209
TANGIBLE PLANT	
LAND	
WW Collection Land & Land Rights	\$0
WW Treatment Plant Land	\$0
WW Pumping Station Land	\$0
WW Office Land	\$0
WW Other Land	\$0
STRUCTURES	
WW Structures Miscellaneous	\$80,280
WW Treatment Plants	\$1,162,836
WW Pumping Stations	\$995,091
WW Office Buildings	\$31,000
Aerotech/ Airport WW System	\$37,926
TREATMENT & PUMP EQUIPMENT	
WW Treatment Equipment	\$6,588,582
WW Information Systems - SCADA	\$819,047
WW Pumping Equipment	\$498,716
MAINS	
WW Trunk Sewers	\$78,988
WW Force Mains	\$38,960
WW Sewer Mains	\$959,379
WW Sewer Laterals	\$531,816
WW - Combined Sewers WW Portion	\$133,125
WW Outfalls	\$189,858
WW Manholes	\$54,885
EQUIPMENT	
WW Tools & Work Equipment	\$90,669
WW Tools & Equipment for Plant	\$1,965
WW Office Equipment & Furniture	\$10,054
WW Computer Equipment	\$2,226,950
WW Meters	\$449,143
SMALL SYSTEMS	
WW Fall River	\$17,919
WW Springfield Lake	\$10,666
WW Middle Musquodoboit	\$5,609
WW North Preston	\$24,033
WW Wellington	\$81,960
Other Small Systems	\$30,863
Total	\$16,541,528
0	

Halifax Water Wastewater Rate Study														
Calculation of Depreciation of Tangible Plant at Total Cost Functionalization of Depreciation Expressed in Dollars (\$) 2022/23														
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
INTANGIBLE PLANT														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,391,209	\$1,391,209
LAND														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
STRUCTURES														
\$64,224	\$0	\$0	\$16,056	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$80,280
\$813,985	\$232,567	\$116,284	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,162,836
\$0	\$0	\$0	\$0	\$995,091	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$995,091
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$31,000	\$31,000
\$0	\$0	\$37,926	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$37,926
TREATMENT & PUMP EQUIPMENT														
\$4,612,008	\$1,976,575	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,588,583
\$0	\$0	\$0	\$0	\$819,047	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$819,047
\$0	\$0	\$0	\$0	\$498,716	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$498,716
MAINS														
\$0	\$0	\$0	\$78,988	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$78,988
\$0	\$0	\$0	\$19,480	\$19,480	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$38,960
\$0	\$0	\$0	\$959,379	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$959,379
\$0	\$0	\$0	\$0	\$0	\$531,816	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$531,816
\$0	\$0	\$0	\$133,125	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$133,125
\$151,887	\$37,972	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$189,859
\$0	\$0	\$0	\$54,885	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$54,885
EQUIPMENT														
\$0	\$0	\$0	\$45,334	\$22,667	\$22,667	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$90,668
\$786	\$786	\$393	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,965
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,513	\$0	\$0	\$2,513	\$2,513	\$0	\$2,513	\$10,052
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$556,737	\$0	\$0	\$556,737	\$556,737	\$0	\$556,737	\$2,226,948
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$449,143	\$0	\$0	\$0	\$0	\$0	\$449,143
SMALL SYSTEMS														
\$0	\$0	\$14,335	\$1,792	\$0	\$1,792	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$17,919
\$0	\$8,533	\$0	\$1,067	\$0	\$1,067	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,667
\$0	\$4,488	\$0	\$561	\$0	\$561	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,610
\$0	\$0	\$19,227	\$2,403	\$0	\$2,403	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$24,033
\$0	\$65,568	\$0	\$8,196	\$0	\$8,196	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$81,960
\$0	\$0	\$24,691	\$3,086	\$0	\$3,086	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$30,863
\$5,642,890	\$2,326,489	\$212,856	\$1,324,352	\$2,355,001	\$571,588	\$0	\$559,250	\$449,143	\$0	\$559,250	\$559,250	\$0	\$1,981,459	\$16,541,528
34.11%	14.06%	1.29%	8.01%	14.24%	3.46%	0.00%	3.38%	2.72%	0.00%	3.38%	3.38%	0.00%	11.98%	100.01%



## **Worksheet WW-9 Allocation of Utility Plant in Service**

Worksheet WW-9 allocates the budgeted utility plant in service for 2022/23 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, and reported as both a dollar and percentage value. These are then used in Worksheet WW-10 to allocate debt servicing costs to the service characteristics.

Worksheet WW-9

[illegible]

Halifax Water Wastewater Rate Study					
Allocation of Utility Plant in Service 2022/23					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Contributed Plant, excluded from Rate Base	Rate Base
INTANGIBLE PLANT					
Intangible Plant	\$19,250,396	\$11,775,336	\$7,475,060	\$64,150	\$7,410,910
TANGIBLE PLANT					
LAND					
WW Collection Land & Land Rights	\$870,257	\$0	\$870,257	\$870,257	\$0
WW Treatment Plant Land	\$4,055,132	\$0	\$4,055,132	\$1,351,711	\$2,703,421
WW Pumping Station Land	\$148,629	\$0	\$148,629	\$90,726	\$57,902
WW Office Land	\$2,009,646	\$0	\$2,009,646	\$0	\$2,009,646
WW Other Land	\$5,199,818	\$0	\$5,199,818	\$915,577	\$4,284,241
STRUCTURES					
WW Structures Miscellaneous	\$5,037,559	\$1,256,336	\$3,781,224	\$1,075,434	\$2,705,789
WW Treatment Plants	\$123,336,031	\$38,552,436	\$84,783,595	\$38,607,067	\$46,176,528
WW Pumping Stations	\$77,128,163	\$35,396,689	\$41,731,473	\$17,445,881	\$24,285,592
WW Office Buildings	\$8,542,878	\$1,716,561	\$6,826,318	\$6,442	\$6,819,875
Aerotech/ Airport WW System	\$4,093,699	\$1,661,427	\$2,432,272	\$1,755,909	\$676,362
TREATMENT & PUMP EQUIPMENT					
WW Treatment Equipment	\$180,808,511	\$99,407,076	\$81,401,435	\$24,932,325	\$56,469,110
WW Information Systems - SCADA	\$15,954,830	\$6,051,200	\$9,903,629	\$1,344,130	\$8,559,499
WW Pumping Equipment	\$23,273,822	\$11,696,123	\$11,577,699	\$5,065,543	\$6,512,156
MAINS					
WW Trunk Sewers	\$44,503,353	\$3,280,947	\$41,222,405	\$36,283,599	\$4,938,807
WW Force Mains	\$2,912,933	\$129,787	\$2,783,146	\$387,436	\$2,395,710
WW Sewer Mains	\$263,416,824	\$73,104,418	\$190,312,406	\$131,768,330	\$58,544,076
WW Sewer Laterals	\$35,264,695	\$4,909,142	\$30,355,554	\$6,809,255	\$23,546,299
WW - Combined Sewers WW Portion	\$22,522,878	\$3,261,226	\$19,261,652	\$10,435,961	\$8,825,691
WW Outfalls	\$19,501,859	\$3,187,075	\$16,314,784	\$4,970,188	\$11,344,596
WW Manholes	\$9,891,936	\$1,486,495	\$8,405,440	\$6,288,715	\$2,116,725
EQUIPMENT					
WW Transportation Equipment	\$8,638,157	\$7,095,379	\$1,542,777	\$0	\$1,542,777
WW Tools & Work Equipment	\$1,837,023	\$1,318,325	\$518,698	\$0	\$518,698
WW Tools & Equipment for Plant	\$121,325	\$107,497	\$13,828	\$0	\$13,828
WW Office Equipment & Furniture	\$873,449	\$868,422	\$5,027	\$0	\$5,027
WW Computer Equipment	\$20,839,808	\$7,568,879	\$13,270,929	\$0	\$13,270,929
WW Meters	\$9,050,329	\$1,853,815	\$7,196,514	\$0	\$7,196,514
SMALL SYSTEMS					
WW Fall River	\$377,769	\$151,467	\$226,303	\$18,508	\$207,795
WW Springfield Lake	\$679,508	\$460,083	\$219,425	\$148,673	\$70,752
WW Middle Musquodoboit	\$393,333	\$228,753	\$164,580	\$66,667	\$97,913
WW North Preston	\$3,985,793	\$1,877,115	\$2,108,678	\$1,884,283	\$224,395
WW Wellington	\$2,314,572	\$922,916	\$1,391,656	\$57,076	\$1,334,580
Other Small Systems	\$1,916,697	\$327,078	\$1,589,619	\$658,909	\$930,710
Total	\$918,751,611	\$319,652,004	\$599,099,607	\$293,302,752	\$305,796,855

Halifax Water Wastewater Rate Study														
Allocation of Utility Plant in Service Functionalization of Rate Base Expressed in Dollars (\$) 2022/23														
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
INTANGIBLE PLANT														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,410,910	\$7,410,910
LAND														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$2,703,421	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,703,421
\$0	\$0	\$0	\$0	\$57,902	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$57,902
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,009,646	\$2,009,646
\$0	\$0	\$0	\$4,284,241	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,284,241
STRUCTURES														
\$2,164,632	\$0	\$0	\$541,158	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,705,790
\$32,323,570	\$9,235,306	\$4,617,653	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$46,176,529
\$0	\$0	\$0	\$0	\$24,285,592	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$24,285,592
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,819,875	\$6,819,875
\$0	\$0	\$676,362	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$676,362
TREATMENT & PUMP EQUIPMENT														
\$39,528,377	\$16,940,733	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$56,469,110
\$0	\$0	\$0	\$0	\$8,559,499	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,559,499
\$0	\$0	\$0	\$0	\$6,512,156	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,512,156
MAINS														
\$0	\$0	\$0	\$4,938,807	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,938,807
\$0	\$0	\$0	\$1,197,855	\$1,197,855	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,395,710
\$0	\$0	\$0	\$58,544,076	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$58,544,076
\$0	\$0	\$0	\$0	\$0	\$23,546,299	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$23,546,299
\$0	\$0	\$0	\$8,825,691	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,825,691
\$9,075,677	\$2,268,919	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,344,596
\$0	\$0	\$0	\$2,116,725	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,116,725
EQUIPMENT														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,542,777	\$1,542,777
\$0	\$0	\$0	\$259,349	\$129,675	\$129,675	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$518,698
\$5,531	\$5,531	\$2,766	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,828
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,257	\$0	\$0	\$1,257	\$1,257	\$0	\$1,257	\$5,027
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,317,732	\$0	\$0	\$3,317,732	\$3,317,732	\$0	\$3,317,732	\$13,270,928
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,196,514	\$0	\$0	\$0	\$0	\$0	\$7,196,514
SMALL SYSTEMS														
\$0	\$0	\$166,236	\$20,779	\$0	\$20,779	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$207,794
\$0	\$56,601	\$0	\$7,075	\$0	\$7,075	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$70,751
\$0	\$78,331	\$0	\$9,791	\$0	\$9,791	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$97,913
\$0	\$0	\$179,516	\$22,440	\$0	\$22,440	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$224,396
\$0	\$1,067,664	\$0	\$133,458	\$0	\$133,458	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,334,580
\$0	\$0	\$744,568	\$93,071	\$0	\$93,071	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$930,710
\$85,801,208	\$29,653,065	\$6,387,101	\$80,994,516	\$40,742,679	\$23,962,588	\$0	\$3,318,989	\$7,196,514	\$0	\$3,318,989	\$3,318,989	\$0	\$21,102,197	\$305,796,855
28.06%	9.70%	2.09%	26.49%	13.32%	7.84%	0.00%	1.09%	2.35%	0.00%	1.09%	1.09%	0.00%	6.90%	100.00%

## **Worksheet WW-10 Cost Classification**

Worksheet WW-10 details the costs as allocated to the system functions in Worksheet WW-6, WW-8 and WW-9 and allocates them to the service characteristics based on the percentages for each characteristic detailed in the Cost-of-Service Manual. The amounts are then totaled by operation and maintenance, depreciation and are used in Worksheet WW-11 to calculate the wastewater unit rate and bill calculation. The utility plant in service functions are also totaled and the percentage by service function is used to allocate the net debt servicing costs also in Worksheet WW-11.



Halifax Water Wastewater Rate Study																
Wastewater Cost Classification & Unit Rate Calculations 2022/23																
Cost Classifications																
	Dry Weather Flow	Wet Weather Flow	Biochemical Oxygen Demand (BOD)	Total Suspended Solids (TSS)	Equivalent Meters	Customer Service	Indirect		Dry Weather Flow	Wet Weather Flow	Biochemical Oxygen Demand (BOD)	Total Suspended Solids (TSS)	Equivalent Meters	Customer Service	Indirect	Total
Depreciation Expense by Function																
Advanced Primary Treatment	\$5,642,890	37.50%	12.50%	25.00%	25.00%	0.00%	0.00%	0.00%	\$2,116,084	\$705,361	\$1,410,723	\$1,410,723	\$0	\$0	\$0	\$5,642,891
Secondary Treatment	\$2,326,489	29.00%	21.00%	25.00%	25.00%	0.00%	0.00%	0.00%	\$674,682	\$488,563	\$581,622	\$581,622	\$0	\$0	\$0	\$2,326,489
Tertiary Treatment	\$212,856	25.00%	15.00%	30.00%	30.00%	0.00%	0.00%	0.00%	\$53,214	\$31,928	\$63,857	\$63,857	\$0	\$0	\$0	\$212,856
Mains	\$1,324,352	75.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$993,264	\$331,088	\$0	\$0	\$0	\$0	\$0	\$1,324,352
Pump Stations	\$2,355,001	75.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$1,766,251	\$588,750	\$0	\$0	\$0	\$0	\$0	\$2,355,001
Service Laterals	\$571,588	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$571,588	\$0	\$0	\$571,588
Customer Service	\$559,250	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$559,250	\$0	\$559,250
Meters	\$449,143	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$449,143	\$0	\$0	\$449,143
Engineering and TS	\$559,250	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$559,250	\$559,250
Regulatory Services	\$559,250	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$559,250	\$559,250
Corporate Services	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Administration	\$1,981,459	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$1,981,459	\$1,981,459
Sub-Total	\$16,541,528								\$5,603,495	\$2,145,690	\$2,056,202	\$2,056,202	\$1,020,731	\$559,250	\$3,099,959	\$16,541,529
Rate Base by Function																
Advanced Primary Treatment	\$85,801,208	37.50%	12.50%	25.00%	25.00%	0.00%	0.00%	0.00%	\$32,175,453	\$10,725,151	\$21,450,302	\$21,450,302	\$0	\$0	\$0	\$85,801,208
Secondary Treatment	\$29,653,085	29.00%	21.00%	25.00%	25.00%	0.00%	0.00%	0.00%	\$8,599,395	\$6,227,148	\$7,413,271	\$7,413,271	\$0	\$0	\$0	\$29,653,085
Tertiary Treatment	\$6,387,101	25.00%	15.00%	30.00%	30.00%	0.00%	0.00%	0.00%	\$1,596,775	\$958,065	\$1,916,130	\$1,916,130	\$0	\$0	\$0	\$6,387,100
Mains	\$80,994,516	75.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$60,745,887	\$20,248,629	\$0	\$0	\$0	\$0	\$0	\$80,994,516
Pump Stations	\$40,742,679	75.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$30,557,009	\$10,185,670	\$0	\$0	\$0	\$0	\$0	\$40,742,679
Service Laterals	\$23,962,588	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$23,962,588	\$0	\$0	\$23,962,588
Customer Service	\$3,318,989	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$3,318,989	\$0	\$3,318,989
Meters	\$7,196,514	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$7,196,514	\$0	\$0	\$7,196,514
Engineering and TS	\$3,318,989	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$3,318,989	\$3,318,989
Regulatory Services	\$3,318,989	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$3,318,989	\$3,318,989
Corporate Services	\$0	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Administration	\$21,102,197	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$21,102,197	\$21,102,197
Sub-Total	\$305,796,855								\$133,674,519	\$48,344,663	\$30,779,703	\$30,779,703	\$31,159,102	\$3,318,989	\$27,740,175	\$305,796,854
									43.71%	15.81%	10.07%	10.07%	10.19%	1.09%	9.07%	100.00%

## **Worksheet WW-11 Unit Costs and Returns**

Worksheet WW-11 uses the costs from Worksheet WW-10 allocated to the system functions to calculate the unit wastewater rates for 2022/23 using the billing determinates. The percentage of dry weather flow, wet weather flow, biochemical oxygen demand (BOD), total suspended solids (TSS), equivalent meters and customer service is used to allocate the indirect costs for operation and maintenance expenses, depreciation expense and debt service. The dividend/grant in lieu of taxes is allocated based on the total allocated revenue requirements. Worksheet W-11 also calculates the return on rate base.

Worksheet WW-11

Halifax Water  
Wastewater Rate Study

Wastewater Unit Rate and Bill Calculations  
2022/23

Unit Cost Calculations

	Dry Weather Flow	Wet Weather Flow	Biochemical Oxygen Demand (BOD)	Total Suspended Solids (TSS)	Equivalent Meters	Customer Service	Indirect	Total
Revenue Requirements								
O&M Expenses								
Wastewater Collection	\$11,115,063	\$983,665	\$0	\$0	\$915,534	\$0	\$0	\$13,014,262
Wastewater Treatment	\$8,515,657	\$4,040,030	\$4,799,240	\$5,278,783	\$0	\$0	\$0	\$22,633,710
Other Operating	\$1,419,257	\$311,544	\$0	\$0	\$340,213	\$1,830,024	\$10,943,653	\$14,844,691
Sub-Total	\$21,049,977	\$5,335,239	\$4,799,240	\$5,278,783	\$1,255,747	\$1,830,024	\$10,943,653	\$50,492,663
Direct Allocation Percentages	53.23%	13.49%	12.13%	13.35%	3.18%	4.63%		100.00%
O&M Expenses By Service Characteristic	\$26,874,741	\$6,811,559	\$6,127,243	\$6,739,481	\$1,603,226	\$2,336,412		\$50,492,662
Depreciation Expenses								
#REF!	\$5,603,495	\$2,145,690	\$2,056,202	\$2,056,202	\$1,020,731	\$559,250	\$3,099,959	\$16,541,529
Direct Allocation Percentages	41.69%	15.96%	15.30%	15.30%	7.59%	4.16%		100.00%
Depreciation Expenses By Service Characteristic	\$6,895,800	\$2,640,539	\$2,530,413	\$2,530,413	\$1,256,137	\$688,227	\$0	\$16,541,529
Return Components								
Plant in Service by Serv Char Percents	43.71%	15.81%	10.07%	10.07%	10.19%	1.09%	9.07%	100.00%
Debt Service (Principal, Interest, Fees)								
\$17,401,041	\$7,606,605	\$2,751,001	\$1,751,486	\$1,751,486	\$1,773,075	\$188,863	\$1,578,525	\$17,401,041
Direct Allocation Percentages	48.07%	17.39%	11.07%	11.07%	11.21%	1.19%		100.00%
Debt Service (Principal, Interest, Fees) By Service Characteristic (Net)	\$8,365,474	\$3,025,453	\$1,926,222	\$1,926,222	\$1,949,965	\$207,705		\$17,401,041
Total Allocated Revenue Requirements	\$42,136,015 49.90%	\$12,477,551 14.78%	\$10,583,878 12.53%	\$11,196,116 13.26%	\$4,809,328 5.70%	\$3,232,344 3.83%		\$84,435,232 100.00%
Add: Dividend/ Grant in lieu of Taxes								
\$736,268	\$367,422	\$108,803	\$92,291	\$97,629	\$41,937	\$28,186		\$736,268
Less: Non-rate revenues and other adjustments								
(\$612,103)	(\$305,460)	(\$90,454)	(\$76,726)	(\$81,165)	(\$34,865)	(\$23,432)		(\$612,103)
Rate Base								
			\$ 305,796,855	Return on Rate Base			\$	16,788,938
				Calculated Percent Return on Rate Base				5.49%



Halifax Water Wastewater Rate Study  Wastewater Unit Rate and Bill Calculations 2022/23									
Unit Cost Calculations									
	Dry Weather Flow	Wet Weather Flow	Biochemical Oxygen Demand (BOD)	Total Suspended Solids (TSS)	Equivalent Meters	Customer Service	Indirect	Total	
Net Rate Revenue Requirements	\$42,197,977	\$12,495,900	\$10,599,443	\$11,212,580	\$4,816,400	\$3,237,098		\$84,559,397	
Alternative I&I Allocations	I & I to Flow				I & I to Meter Equivalents	I & I to Customers			
	10%				45%	45%			
	\$43,447,567		\$10,599,443	\$11,212,580	\$10,439,555	\$8,860,253		\$84,559,398	
	I & I to Flow				I & I to Meter Equivalents	I & I to Customers			
	0%				50%	50%			
	42,197,977		\$ 10,599,443	\$ 11,212,580	\$ 11,064,350	\$ 9,485,048		\$ 84,559,398	
Billing Determinations			Biochemical Oxygen Demand (BOD)	Total Suspended Solids (TSS)	Equivalent Meters	Customer Service			
		Flow ML	kg	kg	Annual Equivalents	Annual			
	Residential	19,236	3,270,056	3,270,056	77,865	77864.53125			
	Non-Residential	11,777	4,441,051	6,812,919	29,802	5152.46875			
	Overstrength Surcharge	185	468,025	91,831	0	0			
	Hauled Waste	17	4,198	2,519	0	0			
	Total	31,214	-	8,183,329	10,177,324	107,666	83,017		
		Billed Water Usage	30,550						Blended Rate - Flow & Strength Costs / Cubic Meter
	I & I to Flow 0.1								
	Rate Per Billing Unit	\$1.4222		\$1.2952	\$1.1017	\$96.96	\$106.73		\$2.1362
Annual Residential	\$229		\$35	\$30	\$96.96	\$106.73	\$498.27		

**Worksheet WW-12 Rates, Revenues and Bills**

Worksheet WW-12 uses the data from worksheet WW-11 to calculate proposed rates for customer charge, base charge, and volumetric charges (effluent charge) for 2022/23. Worksheet WW-12 also provides a revenue test based on the budgeted customer connections, equivalent meters and consumption and details the annual fixed charges (base and customer charge) and the annual effluent charge based on the arithmetic average of consumption by meter size.

**Worksheet WW-12**

<b>Halifax Water</b> <b>Wastewater Rate Study</b>  <b>Rates, Revenues &amp; Annual Bills by Alternative</b> <b>2022/23</b>		
<b>Proposed Cost of Service Rates and Charges</b>		<b>I&amp;I Allocation Flow / Sys Eq. / Customer at: 0.1 / 0.45 / 0.45</b>
Customer Charge	\$/Account	\$106.73
Base Charge	\$/Meter Equivalent	\$96.96
Volumetric Charges	\$ / Billed Cubic Meter	\$2.1362
<b>Revenue Test</b>	Billing Determinant	
Customer Charge Revenues	83,017	\$8,860,253
Number of Services		
Base Charge Revenues	107,666	\$10,439,579
System Equivalents		
Volumetric Charges Revenues	30,550,033	\$65,259,590
Estimated Consumption		
Total Revenues		\$84,559,422

<b>Halifax Water</b> <b>Wastewater Rate Study</b>  <b>Rates, Revenues &amp; Annual Bills by Alternative</b> <b>2022/23</b>		
<b>Bill Calculations</b>		<b>I&amp;I Allocation Flow / Sys Eq. / Customer at: 0.1 / 0.45 / 0.45</b>
<b>Annual Fixed Charges</b> (Customer & Base Charges by Meter Size)		
<b>Meter Size</b>	<b>Capacity Ratio</b>	
Unmetered 5/8"	1	\$203.69
Unmetered 3/4"	1.5	\$252.17
Unmetered 1"	2.5	\$349.13
5/8" - 15mm	1	\$203.69
3/4" - 20mm	1.5	\$252.17
1" - 25mm	2.5	\$349.13
1.5" - 40mm	5	\$591.54
2" - 50mm	8	\$882.43
3" - 80mm	16	\$1,658.13
4" - 100mm	25	\$2,530.79
6" - 150mm	50	\$4,954.85
8" - 200mm	90	\$8,833.35
10" - 250mm	150	\$14,651.09
<b>Annual Effluent Charges</b>		
	<b>Average Annual Consumption</b>	<b>I&amp;I Allocation Flow / Sys Eq. / Customer at: 0.1 / 0.45 / 0.45</b>
<b>Meter Size</b>		
Unmetered 5/8"	160.67	\$343.22
Unmetered 3/4"	512.48	\$1,094.75
Unmetered 1"	990.74	\$2,116.36
5/8" - 15MM	160.67	\$343.22
3/4" - 20MM	512.48	\$1,094.75
1" - 25MM	990.74	\$2,116.36
1.5" - 40MM	2,060.93	\$4,402.46
2" - 50MM	5,065.95	\$10,821.65
3" - 80MM	11,444.34	\$24,446.88
4" - 100MM	19,659.43	\$41,995.58
6" - 150MM	59,105.94	\$126,259.41
8" - 200MM	72,257.24	\$154,352.63
10" - 250MM	30,322.42	\$64,773.38
<b>Total Bill - Average Consumption</b>		
	<b>Average Annual Consumption</b>	<b>I&amp;I Allocation Flow / Sys Eq. / Customer at: 0.1 / 0.45 / 0.45</b>
<b>Meter Size</b>		
Unmetered 5/8"	160.67	\$546.91
Unmetered 3/4"	512.48	\$1,346.92
Unmetered 1"	990.74	\$2,465.49
5/8" - 15MM	160.67	\$546.91
3/4" - 20MM	512.48	\$1,346.92
1" - 25MM	990.74	\$2,465.49
1.5" - 40MM	2,060.93	\$4,994.00
2" - 50MM	5,065.95	\$11,704.08
3" - 80MM	11,444.34	\$26,105.01
4" - 100MM	19,659.43	\$44,526.37
6" - 150MM	59,105.94	\$131,214.26
8" - 200MM	72,257.24	\$163,185.98
10" - 250MM	30,322.42	\$79,424.47

## **Worksheet Appendix WW-1 – Additions to Utility Plant in Service**

Appendix WW-1 details the proposed additions to utility plant in service and capital funding for the test year 2022/23.

Additions to utility plant in service for 2022/23 are estimated based on status of capital work in progress (projects approved in prior fiscal years), the projects from the 2022/23 capital budget, and historical levels of contributed utility plant in service.

Halifax Water projects addition of \$33.9 million in assets to utility plant in service during the 2022/23 fiscal year.

## Appendix WW-1

<b>Halifax Water</b> <b>Wastewater Rate Study</b> <b>Proposed Additions to Utility Plant in Service and Capital Funding</b> <b>2022/23</b>				
	Additions to the Utility Plant in Service	Capital Cost Contribution from Others	Utility Cost of Plant in Service	
<b>INTANGIBLE PLANT</b>				
Intangible Plant	\$0	\$0	\$0	
<b>TANGIBLE PLANT</b>				
<b>LAND</b>				
WW Collection Land & Land Rights	\$0	\$0	\$0	
WW Treatment Plant Land	\$0	\$0	\$0	
WW Pumping Station Land	\$0	\$0	\$0	
WW Office Land	\$0	\$0	\$0	
WW Other Land	\$0	\$0	\$0	
<b>STRUCTURES</b>				
WW Structures Miscellaneous	\$0	\$0	\$0	
WW Treatment Plants	\$4,069,323	\$2,199,900	\$1,869,423	
WW Pumping Stations	\$8,113,610	\$0	\$8,113,610	
WW Office Buildings	\$180,000	\$0	\$180,000	
Aerotech/ Airport WW System	\$282,983	\$0	\$282,983	
<b>TREATMENT &amp; PUMP EQUIPMENT</b>				
WW Treatment Equipment	\$2,741,929	\$0	\$2,741,929	
WW Information Systems - SCADA	\$0	\$0	\$0	
WW Pumping Equipment	\$0	\$0	\$0	
<b>MAINS</b>				
WW Trunk Sewers	\$0	\$0	\$0	
WW Force Mains	\$538,000	\$315,000	\$223,000	
WW Sewer Mains	\$9,401,175	\$5,516,300	\$3,884,875	
WW Sewer Laterals	\$2,069,826	\$520,000	\$1,549,826	
WW - Combined Sewers WW Portion	\$0	\$0	\$0	
WSW Outfalls	\$0	\$0	\$0	
WW Manholes	\$280,000	\$280,000	\$0	
<b>EQUIPMENT</b>				
WW Transportation Equipment	\$920,000	\$0	\$920,000	
WW Tools & Work Equipment	\$254,692	\$0	\$254,692	
WW Tools & Work Equipment for Plant	\$0	\$0	\$0	
WW Office Equipment & Furniture	\$0	\$0	\$0	
WW Computer Equipment	\$4,439,214	\$0	\$4,439,214	
WW Meters	\$174,397	\$0	\$174,397	
<b>SMALL SYSTEMS</b>				
WW Fall River	\$0	\$0	\$0	
WW Springfield Lake	\$0	\$0	\$0	
WW Middle Musquodoboit	\$0	\$0	\$0	
WW North Preston	\$0	\$0	\$0	
WW Wellington	\$0	\$0	\$0	
Other Small Systems	\$427,765	\$0	\$427,765	
<b>TOTAL</b>	<b>\$33,892,912</b>	<b>\$8,831,200</b>	<b>\$25,061,712</b>	
<b>Sources of Funding</b>				
Capital Cost Contributions	\$315,000	Depreciation Fund Balance, beginning of year	\$0	
Regional Development Charges	\$2,237,050	Add:		
External Funding	\$2,289,100	Interest earned on fund balance	\$0	
Contributions - other	\$3,990,050	Depreciation funded in Current year	\$16,541,528	
Working Capital	\$3,941,701	Depreciation Fund Balance available	\$16,541,528	
Depreciation fund	\$16,541,528	Less:		
Long Term Debt	\$4,578,483	Expenditure in Current Year	(\$16,541,528)	
<b>TOTAL</b>	<b>\$33,892,912</b>	Depreciation Fund Balance, end of year	\$0	

## **Worksheet Appendix WW-2 Amortization Schedule for Long Term Debt**

Appendix WW-2 details the amortization schedule of the proposed long-term debt associated with 2022/23. The amortization is based on a 30-year blended serial debenture at a rate of 2.5%. Debt servicing costs related to principle and interest will commence in test year 2023/24.

## Appendix WW-2

## Halifax Water Wastewater Rate Study

### Amortization Schedule for Projected Long Term Debt 2022/23

Interest Rate	2.50%
Term in years	30
Capital	\$4,578,483

## Amortization Schedule

Year	Principal	Interest	Total	Balance
1	\$152,616.11	\$114,462.08	\$267,078.19	\$4,425,867.19
2	\$152,616.11	\$110,646.68	\$263,262.79	\$4,273,251.08
3	\$152,616.11	\$106,831.28	\$259,447.39	\$4,120,634.97
4	\$152,616.11	\$103,015.87	\$255,631.98	\$3,968,018.86
5	\$152,616.11	\$99,200.47	\$251,816.58	\$3,815,402.75
6	\$152,616.11	\$95,385.07	\$248,001.18	\$3,662,786.64
7	\$152,616.11	\$91,569.67	\$244,185.78	\$3,510,170.53
8	\$152,616.11	\$87,754.26	\$240,370.37	\$3,357,554.42
9	\$152,616.11	\$83,938.86	\$236,554.97	\$3,204,938.31
10	\$152,616.11	\$80,123.46	\$232,739.57	\$3,052,322.20
11	\$152,616.11	\$76,308.05	\$228,924.17	\$2,899,706.09
12	\$152,616.11	\$72,492.65	\$225,108.76	\$2,747,089.98
13	\$152,616.11	\$68,677.25	\$221,293.36	\$2,594,473.87
14	\$152,616.11	\$64,861.85	\$217,477.96	\$2,441,857.76
15	\$152,616.11	\$61,046.44	\$213,662.55	\$2,289,241.65
16	\$152,616.11	\$57,231.04	\$209,847.15	\$2,136,625.54
17	\$152,616.11	\$53,415.64	\$206,031.75	\$1,984,009.43
18	\$152,616.11	\$49,600.24	\$202,216.35	\$1,831,393.32
19	\$152,616.11	\$45,784.83	\$198,400.94	\$1,678,777.21
20	\$152,616.11	\$41,969.43	\$194,585.54	\$1,526,161.10
21	\$152,616.11	\$38,154.03	\$190,770.14	\$1,373,544.99
22	\$152,616.11	\$34,338.62	\$186,954.73	\$1,220,928.88
23	\$152,616.11	\$30,523.22	\$183,139.33	\$1,068,312.77
24	\$152,616.11	\$26,707.82	\$179,323.93	\$915,696.66
25	\$152,616.11	\$22,892.42	\$175,508.53	\$763,080.55
26	\$152,616.11	\$19,077.01	\$171,693.12	\$610,464.44
27	\$152,616.11	\$15,261.61	\$167,877.72	\$457,848.33
28	\$152,616.11	\$11,446.21	\$164,062.32	\$305,232.22
29	\$152,616.11	\$7,630.81	\$160,246.92	\$152,616.11
30	\$152,616.11	\$3,815.40	\$156,431.51	\$0.00

**Halifax Regional Water Commission**  
**(“Halifax Water”)**  
**Wastewater Rate Study**  
**2023/24**

Prepared By:

Halifax Water Staff



## **Notes on Worksheet**

### **Worksheet WW-1 System Data**

Worksheet WW-1 provides Wastewater Services related data including:

- Wastewater estimated flow summary for the 2019 calendar year.
- Budgeted service connections and estimated effluent billing consumption for the test year 2023/24.
- Plant Balance by customer class for the 2019 calendar year.
- Average effluent loading for residential and non-residential customers the 2019 calendar.

Assumptions - 2023/24 (Test Year #2):

1. Water consumption (and therefore wastewater discharge) is budgeted to grow at a rate of 1%, based on modest increases recently experienced in water consumption. For Test Year #2 consumption levels are expected to stabilize, thus Halifax Water is projecting no change in total consumption in 2023/24 compared to 2022/23.
2. Customer connections will increase by 680 connections in 2023/24, based on customer growth in recent years.

## Worksheet WW-1

**Halifax Water  
Wastewater Rate Study**

**User Characteristics and Plant Balance Analysis**

SCENARIO SUMMARY				
Date		February 24, 2022		
Test Years				
1	2022/23			
2	2023/24			
Current Year Budget (Projections)		2021/22		
Historical Year		2020/21		
Projected Service Connections, Equivalents and Billed Water Consumption				
2023/24				
Meter Size	Number of Services	Capacity Ratio	System Equivalents	Estimated Consumption (Cubic Meters)
Unmetered 5/8"	0	1	0	0
Unmetered 3/4"	0	1.5	0	0
Unmetered 1"	0	2.5	0	0
5/8" - 15mm	78,454	1	78,454	12,510,768
3/4" - 20mm	1,052	1.5	1,578	530,886
1" - 25mm	1,592	2.5	3,981	1,561,801
1.5" - 40mm	1,258	5	6,291	2,527,344
2" - 50mm	865	8	6,919	4,300,515
3" - 80mm	330	16	5,274	3,686,866
4" - 100mm	86	25	2,149	1,627,432
6" - 150mm	34	50	1,700	2,009,602
8" - 200mm	24	90	2,160	1,734,174
10" - 250mm	2	150	300	60,645
TOTAL	83,697		108,805	30,550,033

Flow Summary (ML)	
Customer Class	2019
Residential (Single Family)	12,042
Residential (Multi-family)	7,194
Commercial	5,696
Industrial	1,859
Institutional	4,222
Unmetered	0
Subtotal Customer	31,013
Other Flow	
Infiltration & Inflow	44,310
Stormwater	
Subtotal Other	44,310
<b>Total Estimated</b>	<b>75,322</b>
Halifax	32,789
Dartmouth	19,948
Other Plants	22,586
<b>Total Plants</b>	<b>75,322</b>
Total Other Flow	59%

Plant Balance						Other User Characteristics	
Customer Class	Flow ML	Biochemical Oxygen Demand (BOD)		Total Suspended Solids (TSS)		Equivalent Meters Annual Equivalents	Customer Service Annual
		kg	mg/l	kg	mg/l		
Residential	19,236	3,270,056	170	3,270,056	170	78,454	78,454
Non-Residential	11,777	5,563,791	472	7,343,629	624	30,351	5,243
Overstrength Surcharge	185	468,025	2,533	91,831	497		
Hauled Waste	17	4,198	250	2,519	150		
Subtotal Customer	31,013	9,306,069		10,708,034			
Other Flow	44,310	1,107,746	25	1,107,746	25		
Subtotal Other	44,310	1,107,746	25	1,107,746	25		
<b>Total Estimated</b>	<b>75,322</b>	<b>10,413,815</b>	<b>138</b>	<b>11,815,780</b>	<b>157</b>		
<b>Total Plants</b>		<b>10,413,815</b>		<b>11,815,780</b>			
Average Per Dwelling Unit for Residential and Per Account for Non Residential							
Residential	Cubic Meters	159	KG	27.03	KG		
Non-Residential		2,246		1,061.07			

**Dwelling Unit Characteristics**  
 Assume all 5/8" customers are Residential  
 Assume 65% of Dwelling Units are single family  
 Single family Dwelling Units 78,454  
 Multi family Dwelling Units 42,245  
**Total Dwelling Units 120,699**

## Worksheet WW-2 Operations

Worksheet WW-2 provides a comparative Statement of Operations for fiscal years ending March 31 as follows:

- Actual results for the fiscal years 2018/19, 2019/20 and 2020/21 for Wastewater Services.
- Approved budgets by Halifax Water's Board of Commissioners for 2021/22 and 2022/23, with 2022/23 representing Test Year #1 for the purposes of the Rate Study.
- Projections for 2023/24, representing Test Year #2 for the purposes of the Rate Study.

Revenues are budgeted/projected at current rates, and revenue and expenses are segregated between regulated and unregulated services. This worksheet details the budgeted deficits at current rates in Wastewater Services for the two test years.

Wastewater Services had a cumulative surplus of \$7.5 million as at March 31, 2021 however, with budgeted deficits in 2021/22 and 2022/23 of \$1.5 million and \$2.7 million respectively, and a projected deficit of \$5.0 million in 2023/24, the projected accumulated deficit as at March 31, 2024 is estimated at \$1.7 million. Of note, the current forecast for the 2021/22 fiscal year to December 31, 2021 is reporting projected earnings \$1.5 million, an improvement of approximately \$3.0 million compared to the approved budget. Based on this, the projected accumulated surplus as at March 31, 2021 would be \$1.2 million.

Regulated and unregulated revenue and expenses have been identified on Worksheet WW-2 and are excluded in the determination of revenue requirements for rate making purposes. The calculation of revenue requirements is reported on Worksheet WW-3.

Depreciation in Test Year #2 has been calculated the same way as Test Year #1, there is no approved operating budget to compare against. The calculation begins with the same data, the 2023/24 capital budget. This is then adjusted to align with projected additions to rate-based assets. For an operating budget, the adjustment is amortized over thirty-seven years, whereas for the test year data the adjustment is prorated between assets classes, therefore spreading the depreciation more evenly amongst the asset classes. In addition, corporate projects are amortized over ten years within an operating budget, whereas for the test year data, projects are reviewed further and more appropriately aligned with an asset class, therefore allocating depreciation into future years.

## Worksheet WW-2

<b>Halifax Water</b> <b>Wastewater Rate Study</b> <b>Comparative Statement of Operations</b> Fiscal Years ending March 31st						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating revenues</b>						
Regulated activities						
Wastewater	\$69,900,822	\$70,494,101	\$69,605,064	\$80,618,718	\$81,607,858	\$81,607,858
Overstrength surcharge	\$75,092	\$14,048	\$718	\$15,000	\$0	\$0
Late payment and other connection fees	\$186,476	\$123,286	\$118,346	\$221,000	\$246,700	\$246,700
Miscellaneous	\$185,082	\$140,658	\$162,751	\$246,841	\$252,841	\$252,841
Sub-total	\$70,347,472	\$70,772,093	\$69,886,879	\$81,101,559	\$82,107,399	\$82,107,399
Unregulated activities						
Contract revenue	\$416,464	\$453,367	\$416,026	\$483,799	\$491,062	\$491,062
Septage tipping fees	\$764,445	\$514,196	\$486,225	\$505,000	\$475,000	\$475,000
Airline effluent	\$142,792	\$98,164	\$33,306	\$76,000	\$76,000	\$76,000
Sub-total	\$1,323,701	\$1,065,727	\$935,557	\$1,064,799	\$1,042,062	\$1,042,062
<b>Total</b>	<b>\$71,671,173</b>	<b>\$71,837,820</b>	<b>\$70,822,436</b>	<b>\$82,166,358</b>	<b>\$83,149,461</b>	<b>\$83,149,461</b>
<b>Operating Expenditures</b>						
Regulated activities						
Wastewater collection	\$11,642,832	\$12,330,309	\$12,663,454	\$12,516,128	\$13,014,261	\$13,388,210
Wastewater treatment	\$19,250,471	\$19,892,744	\$20,060,403	\$21,273,583	\$22,633,709	\$23,319,053
Engineering and technology services (TS)	\$3,782,763	\$4,477,998	\$4,186,504	\$4,197,779	\$5,378,043	\$5,519,483
Technical services (SCADA)	\$1,449,682	\$1,608,926	\$1,756,754	\$1,683,650	\$1,730,801	\$1,785,964
Regulatory services	\$1,185,591	\$1,432,311	\$1,384,724	\$1,586,600	\$1,674,027	\$1,727,980
Corporate services	\$0	\$0	\$0	\$1,317,923	\$1,309,527	\$1,343,663
Customer service	\$2,061,287	\$2,277,188	\$2,188,838	\$2,521,849	\$2,170,237	\$2,237,450
Administration	\$3,242,216	\$3,023,641	\$2,964,892	\$2,079,326	\$2,582,056	\$2,655,409
Calculated depreciation - funded assets	\$12,986,456	\$14,038,404	\$15,019,075	\$16,774,620	\$16,541,528	\$17,834,884
Sub-total	\$55,601,298	\$59,081,521	\$60,224,644	\$63,951,458	\$67,034,189	\$69,812,096
Unregulated activities						
Wastewater collection	\$32,284	\$23,948	\$46,346	\$88,163	\$81,581	\$83,840
Wastewater treatment	\$539,807	\$740,629	\$562,874	\$797,910	\$761,547	\$789,425
Sub-total	\$572,091	\$764,577	\$609,220	\$886,073	\$843,128	\$873,265
<b>Total</b>	<b>\$56,173,389</b>	<b>\$59,846,098</b>	<b>\$60,833,864</b>	<b>\$64,837,531</b>	<b>\$67,877,317</b>	<b>\$70,685,361</b>
<b>Earnings from operations</b>	<b>\$15,497,784</b>	<b>\$11,991,722</b>	<b>\$9,988,572</b>	<b>\$17,328,827</b>	<b>\$15,272,144</b>	<b>\$12,464,100</b>
<b>Financial and other revenues</b>						
Regulated activities						
Investment Income	\$520,000	\$191,306	\$54,504	\$46,080	\$21,000	\$21,000
Miscellaneous	\$25,324	\$6,211	\$1,387	\$6,000	\$7,200	\$7,200
Sub-total	\$545,324	\$197,517	\$55,891	\$52,080	\$28,200	\$28,200
Unregulated activities						
Miscellaneous	\$157,272	\$148,374	\$174,491	\$144,463	\$148,067	\$148,067
<b>Total</b>	<b>\$702,596</b>	<b>\$345,891</b>	<b>\$230,382</b>	<b>\$196,543</b>	<b>\$176,267</b>	<b>\$176,267</b>
<b>Financial and other expenditures</b>						
Regulated Activities						
Interest on long term debt	\$4,938,524	\$4,706,350	\$4,404,800	\$4,195,917	\$3,639,116	\$3,015,017
Repayment on long term debt	\$12,014,699	\$12,522,158	\$13,242,064	\$13,864,437	\$13,635,204	\$13,686,061
Amortization of debt discount	\$102,814	\$110,215	\$117,046	\$133,131	\$126,721	\$126,721
Dividend/ grant in lieu of taxes	\$0	\$0	\$386,457	\$819,900	\$736,268	\$743,631
Sub-total	\$17,056,037	\$17,338,723	\$18,150,367	\$19,013,385	\$18,137,309	\$17,571,430
Unregulated activities						
Miscellaneous	\$21,367	\$35,119	\$26,332	\$30,000	\$30,000	\$30,000
<b>Total</b>	<b>\$17,077,404</b>	<b>\$17,373,842</b>	<b>\$18,176,699</b>	<b>\$19,043,385</b>	<b>\$18,167,309</b>	<b>\$17,601,430</b>
<b>Earnings (loss) for the year</b>	<b>(\$877,024)</b>	<b>(\$5,036,229)</b>	<b>(\$7,957,745)</b>	<b>(\$1,518,015)</b>	<b>(\$2,718,898)</b>	<b>(\$4,961,063)</b>
<b>Surplus, beginning of year</b>	<b>\$15,487,608</b>	<b>\$15,487,608</b>	<b>\$15,487,608</b>	<b>\$7,529,863</b>	<b>\$6,011,848</b>	<b>\$3,292,950</b>
<b>Surplus, end of year</b>	<b>\$14,610,584</b>	<b>\$10,451,379</b>	<b>\$7,529,863</b>	<b>\$6,011,848</b>	<b>\$3,292,950</b>	<b>(\$1,668,113)</b>

### **Worksheet WW-3 – Revenue Requirements**

Worksheet WW-3 takes the operating and financial expense information from Worksheet WW-2 to develop revenue requirements for the two test years, 2022/23 and 2023/24.

Financial and other operating revenue are deducted from the expenses to determine the revenue required from customer rates.

## Worksheet WW-3

<b>Halifax Water</b> <b>Wastewater Rate Study</b> <b>Statement of Operating Expenses and Revenue Requirements</b> Fiscal Years ending March 31st						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating expenditures</b>						
Wastewater collection	\$11,642,832	\$12,330,309	\$12,663,454	\$12,516,128	\$13,014,261	\$13,388,210
Wastewater treatment	\$19,250,471	\$19,892,744	\$20,060,403	\$21,273,583	\$22,633,709	\$23,319,053
Engineering and technology services (TS)	\$3,782,763	\$4,477,998	\$4,186,504	\$4,197,779	\$5,378,043	\$5,519,483
Technical services (SCADA)	\$1,449,682	\$1,608,926	\$1,756,754	\$1,683,650	\$1,730,801	\$1,785,964
Regulatory services	\$1,185,591	\$1,432,311	\$1,384,724	\$1,586,600	\$1,674,027	\$1,727,980
Corporate services	\$0	\$0	\$0	\$1,317,923	\$1,309,527	\$1,343,663
Customer service	\$2,061,287	\$2,277,188	\$2,188,838	\$2,521,849	\$2,170,237	\$2,237,450
Administration	\$3,242,216	\$3,023,641	\$2,964,892	\$2,079,326	\$2,582,056	\$2,655,409
Sub-total	\$42,614,842	\$45,043,117	\$45,205,569	\$47,176,838	\$50,492,661	\$51,977,212
Calculated depreciation - funded assets	\$12,986,456	\$14,038,404	\$15,019,075	\$16,774,620	\$16,541,528	\$17,834,884
Calculated depreciation - donated assets	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total</b>	<b>\$55,601,298</b>	<b>\$59,081,521</b>	<b>\$60,224,644</b>	<b>\$63,951,458</b>	<b>\$67,034,189</b>	<b>\$69,812,096</b>
<b>Add: non-operating expenditures</b>						
Interest on long term debt	\$4,938,524	\$4,706,350	\$4,404,800	\$4,195,917	\$3,639,116	\$3,015,017
Repayment on long term debt	\$12,014,699	\$12,522,158	\$13,242,064	\$13,864,437	\$13,635,204	\$13,686,061
Amortization of debt discount	\$102,814	\$110,215	\$117,046	\$133,131	\$126,721	\$126,721
Dividend/ grant in lieu of taxes	\$0	\$0	\$386,457	\$819,900	\$736,268	\$743,631
	\$17,056,037	\$17,338,723	\$18,150,367	\$19,013,385	\$18,137,309	\$17,571,430
Test year #1 - new interest on long term debt						\$57,231
Test year #1 - new repayment of long term debt						\$76,308
<b>Total</b>	<b>\$17,056,037</b>	<b>\$17,338,723</b>	<b>\$18,150,367</b>	<b>\$19,013,385</b>	<b>\$18,137,309</b>	<b>\$17,704,969</b>
<b>Less: other revenues</b>						
Overstrength surcharge	\$75,092	\$14,048	\$718	\$15,000	\$0	\$0
Late payment and other connection fees	\$186,476	\$123,286	\$118,346	\$221,000	\$246,700	\$246,700
Investment Income	\$520,000	\$191,306	\$54,504	\$46,080	\$21,000	\$21,000
Miscellaneous	\$210,406	\$146,869	\$164,138	\$252,841	\$260,041	\$260,041
<b>Total</b>	<b>\$991,974</b>	<b>\$475,509</b>	<b>\$337,706</b>	<b>\$534,921</b>	<b>\$527,741</b>	<b>\$527,741</b>
<b>Less: other adjustments</b>						
Sponsorships and donations	\$17,615	\$15,266	\$15,870	\$13,571	\$14,564	\$14,564
Help to others (H2O) program	\$14,350	\$15,918	\$22,384	\$16,400	\$17,600	\$17,600
Administration				\$45,210	\$52,198	\$52,198
<b>Total</b>	<b>\$31,965</b>	<b>\$31,185</b>	<b>\$38,255</b>	<b>\$75,181</b>	<b>\$84,362</b>	<b>\$84,362</b>
<b>Revenue required from customers</b>	<b>\$71,633,396</b>	<b>\$75,913,550</b>	<b>\$77,999,050</b>	<b>\$82,354,741</b>	<b>\$84,559,396</b>	<b>\$86,904,962</b>

## Worksheet WW-4 Operating Expenditure Analysis

Worksheet W-4 details the operating expenditures by cost element group for each of the functional areas within the Wastewater Services, consisting of the following:

- Wastewater Collections,
- Wastewater Treatment, and

For the following functional areas serving all three services of Halifax Water (Water, Wastewater and Stormwater), a summary has been provided outlining the cost effects as they pertain to Wastewater. Complete details for these functional areas can be found in the Water Rate Studies found in Appendix 1 of this Application.

- Technical Services (SCADA),
- Engineering and Technology Services (TS),
- Regulatory Services,
- Corporate Services, and
- Administration.

Data provided as part of the review and analysis includes:

- Actual results for 2018/19, 2019/20, and 2020/21,
- Approved budgets for 2021/22 and 2022/23 (Test Year # 1), and
- Projected results for 2023/24 (Test Year #2).

For operating expenditures related to 2023/24 (Test Year #2), the key assumptions regarding projected increases are as follows:

- Salaries and benefits: 3.5%
- Chemicals: 5.0%
- Electricity: 3.0%
- Other: 2.0%

On subsequent pages within this section, operating expenditures are reported for the core cost element groups within each functional area. As part of the analysis, variances have been provided with changes expressed as both dollar and percentage values, comparing year-over-year changes for the fiscal years 2019/20 through 2023/24. Commentary is provided for each of the cost elements groups falling within the functional areas, with additional details provided in situations where variances have increased over \$50 thousand.

## **Wastewater Collections**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). It should be noted Wastewater and Stormwater Collections share the same wage pool, and therefore centrally managed. Cost fluctuations within one Service would have the opposite impact on the other. Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. In addition, salaries and benefits for Stormwater Collections reported a decrease, indicating there was more of a focus on Wastewater operations during the period. For 2020/21, the situation was similar, where Wastewater operations reported an increase in salaries and benefits, and Stormwater operations reporting a decrease. Combined the overall increase was high, however, this was due largely to additional personal protective equipment (PPE) required to operate during the pandemic. For 2021/22, focus of operations turned to Stormwater, which reported an increase compared to Wastewater. Collectively the overall increase was high, however, this was again attributed to required PPE and the hiring of a new senior manager for the Collections group. Wastewater operations costs increase in 2022/23 with a corresponding reduction in Stormwater operations. Collectively, the overall increase was modest comparative to prior year's, and is due to a reduction in overtime costs to better reflect current spending levels, and having more time allocated to capital projects.
- Training and Development – Attendance was low at conferences in 2019/20 due to the content of the offerings, and training in any given year is contingent upon certifications for staff and the respective expiry dates. In 2020/21, because of the pandemic, most conferences were cancelled, in-person training was not possible, and virtual offerings not yet established. For 2021/22, there was an expectation conferences and training would become more normal allowing for in-person gatherings, supplemented by virtual conference and/or training opportunities. The budget in 2022/23 was reduced somewhat due to continued uncertainties with respect to conferences and training.
- Contract Services – Costs have shown a decline between 2019/20 and 2021/22 for several reasons. Efforts are underway to perform more work in-house as opposed to place reliance on external contractor, where feasible. Where the Collections group is also responsible for Stormwater Collections, in 2020/21 and 2021/22 during the pandemic period, more focus was placed on stormwater maintenance services. Finally, costs have varied considerable year-over-year due to the variability of receiving billings from the HRM related to pavement impact fees and inspection fees.
- Electricity – Costs are reflective of price and consumption/usage, with the variability in consumption year-over-year directly related to flows to pump stations and combined sewer overflows during rainfall events. For 2022/23, part of the increase projected is associated with new pump station infrastructure coming online.
- Materials Supplies, and Services – Increased costs in both 2019/20 and 2020/21 were due to additional materials and supplies necessary where more work was performed internally versus outsourcing, as noted above. Additionally, there was an increase in purchasing of parts required to perform emergency repairs for pump station replacements. A decrease in costs occurred in 2021/22 due to the capitalization of any non-operational replacements.



- Professional Services – Costs for professional services primary relate to licenses and agreements, specifically land leases for Harbour Solutions Pipe (HSP) and other wastewater infrastructure. These costs remain relatively consistent year-over-year, with variances typically associated with legal services related to insurance claims resulting from sewer backups, etc. Increases respecting 2022/23 was due mainly to a new license agreement with the Department of National Defense (DND) for an expanded area.
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.
- Chemicals – Chemicals are not a major cost related to Wastewater Collections as bioxide is the only chemical used, for the sole purpose of odour control. It is purchased as required therefore, costs can vary year-over-year depending on usage, plus it would be subject to price volatility like market conditions for other chemicals.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Wastewater Collections											
Salaries and benefits	\$5,453,309	\$5,832,055	\$6,687,905	\$6,081,961	\$6,252,376	\$6,471,209	\$378,746 7%	\$855,850 15%	(\$605,944) (9%)	\$170,415 3%	\$218,833 3%
Training and development	\$74,414	\$33,429	\$11,748	\$65,000	\$46,350	\$47,277	(\$40,985) (55%)	(\$21,681) (65%)	\$53,252 453%	(\$18,650) (29%)	\$927 2%
Contract services	\$2,048,793	\$1,962,173	\$1,945,192	\$1,776,400	\$1,878,900	\$1,916,478	(\$86,620) (4%)	(\$16,981) (1%)	(\$168,792) (9%)	\$102,500 6%	\$37,578 2%
Electricity	\$1,688,676	\$1,821,285	\$1,705,204	\$1,883,313	\$1,967,361	\$2,026,382	\$132,609 8%	(\$116,081) (6%)	\$178,109 10%	\$84,048 4%	\$59,021 3%
Materials, supplies and services	\$993,885	\$1,235,629	\$1,406,436	\$1,216,090	\$1,278,966	\$1,304,545	\$241,744 24%	\$170,807 14%	(\$190,346) (14%)	\$62,876 5%	\$25,579 2%
Professional services	\$205,379	\$258,656	\$230,549	\$261,505	\$281,255	\$286,880	\$53,277 26%	(\$28,107) (11%)	\$30,956 13%	\$19,750 8%	\$5,625 2%
Fleet	\$1,449,246	\$1,427,066	\$1,049,962	\$1,455,113	\$1,505,493	\$1,535,603	(\$22,180) (26%)	(\$377,104) (26%)	\$405,151 39%	\$50,380 3%	\$30,110 2%
Chemicals	\$132,713	\$135,555	\$153,576	\$156,435	\$185,636	\$194,918	\$2,842 2%	\$18,021 13%	\$2,859 2%	\$29,201 19%	\$9,282 5%
Applied overheads and other allocations	\$196,354	\$235,949	\$227,503	\$270,286	\$222,687	\$227,141	\$39,595 20%	(\$8,446) (4%)	\$42,783 19%	(\$47,599) (18%)	\$4,454 2%
Allocation to Stormwater Service	(\$599,937)	(\$609,508)	(\$756,601)	(\$649,975)	(\$604,763)	(\$622,223)	(\$9,571) 2%	(\$147,093) 24%	\$106,626 (14%)	\$45,212 (7%)	(\$17,460) 3%
Recoveries	\$0	(\$1,980)	\$1,980	\$0	\$0	\$0	(\$1,980) 0%	\$3,960 (200%)	(\$1,980) (100%)	\$0 0%	\$0 0%
Total Wastewater Collections	\$11,642,832	\$12,330,309	\$12,663,454	\$12,516,128	\$13,014,261	\$13,388,210	\$687,477 6%	\$333,145 3%	(\$147,326) (1%)	\$498,133 4%	\$373,949 3%

## **Wastewater Treatment**

- Salaries and Benefits – Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. A full-time equivalent (FTE) was added in each of the 2021/22 and 2022/23 fiscal years. Only a modest increase was reported in 2020/21 due mainly to the effects of COVID-19 which saw a reduction of costs in areas such as overtime.
- Training and Development – Planning and attendance for conferences and training are typically impacted by the content of the offering and the expiration of certifications of staff. Costs in 2020/21 were reduced due to COVID-19, where conferences were cancelled, in-person training was not possible, and virtual offerings had yet to be formally established. The expectation for the 2021/22 budget was the conferences and training would return to a more normal level with in-person sessions, or more formalized virtual platforms to allow staff to update and maintain certifications. This expectation carried forward in the formulation of the 2022/23 budget.
- Contract Services – A main cost driver for contract services is the processing and transportation of biosolids. In 2020/21, biosolids costs were lower, particularly at the Aerotech Wastewater Treatment Facility, due to COVID-19 and the reduction of activity at the airport. Procuring outside services was hampered due to restrictions imposed during the pandemic. In 2021/22 and 2022/23, biosolids and transportation costs increase due to optimization at the Dartmouth Wastewater Treatment Facility and capital upgrades. Additionally, in 2021/22 the fuel surcharge for biosolids transportation increased.
- Electricity – Costs are reflective of price and consumption/usage, with the variability in consumption directly related to effluent flows. During the pandemic, flows particularly at the Halifax Water Treatment Facility, were skewed comparative to prior years. Reduced flows resulted in lower consumption. As the effects of the pandemic subside, electricity consumption is expected to return to more normal levels.
- Materials, Supplies, and Services – Costs in this cost element group support Halifax Water's infrastructure and equipment. Costs vary year-over-year, not only for scheduled maintenance, but also to emergency repairs required to an aging infrastructure. Decreased costs were experienced in 2020 and 2021 due to several factors, including access restrictions related to the pandemic, and procurement of materials given strained supply chains.
- Professional Services – Costs have increase since 2018/19 in the following areas. In 2019/20 there was an unexpected cost related to fuel spill investigation at the Aerotech Wastewater Treatment Facility. Additionally, a new membership for Halifax Water in the Canadian Water Network (CWN) totaling \$50 thousand annually. In September 2020, the Natural Sciences and Engineering Research Council of Canada (NSERC) Wastewater Research Program started through a project at Dalhousie University. The cost of the program totals \$200 thousand annually, with a portion being expensed in 2020/21.

- **Fleet Services** – Costs are assigned to the various treatment facilities based on the types of vehicles and/or equipment required to meet operational needs, including light trucks and forklifts. Costs increased in 2021/22 due to the biosolids tanker trailers being assigned to treatment facilities.
- **Chemicals** – Costs are reflective of price and consumption/usage. Chemicals costs are extremely volatile from a pricing perspective, and historically Halifax Water procures chemical pricing annually. There was a significant increase in 2019/20, the direct result of alum and polymer used in the Halifax Harbour Water Solutions facilities. With the expiration of the polymer contract in September 2020, there was a significant price increase affecting the 2021/22 budget. For 2022/23, again due to the market volatility, chemical prices have increased significantly, and suppliers are not willing to lock themselves into long-term contracts.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Wastewater Treatment	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Salaries and benefits	\$5,064,261	\$5,179,674	\$5,190,283	\$5,471,878	\$5,808,202	\$6,011,489	\$115,413 2%	\$10,609 0%	\$281,595 5%	\$336,324 6%	\$203,287 3%
Training and development	\$21,205	\$29,620	\$1,912	\$60,463	\$53,825	\$54,902	\$8,415 40%	(\$27,708) (94%)	\$58,551 3062%	(\$6,638) (11%)	\$1,077 2%
Contract services	\$5,305,336	\$5,479,346	\$5,336,262	\$5,449,581	\$5,698,274	\$5,812,239	\$174,010 3%	(\$143,084) (3%)	\$113,319 2%	\$248,693 5%	\$113,965 2%
Electricity	\$2,569,622	\$2,432,357	\$2,711,005	\$2,858,034	\$2,842,390	\$2,927,662	(\$137,265) (5%)	\$278,648 11%	\$147,029 5%	(\$15,644) (1%)	\$85,272 3%
Materials, supplies and services	\$3,672,356	\$3,462,376	\$3,448,264	\$3,590,467	\$3,788,432	\$3,864,201	(\$209,980) (6%)	(\$14,112) (0%)	\$142,203 4%	\$197,965 6%	\$75,769 2%
Professional services	\$66,701	\$110,225	\$206,220	\$300,505	\$308,323	\$314,489	\$43,524 65%	\$95,995 87%	\$94,285 46%	\$7,818 3%	\$6,166 2%
Fleet	\$174,485	\$161,003	\$165,723	\$241,272	\$237,173	\$241,916	(\$13,482) (8%)	\$4,720 3%	\$75,549 46%	(\$4,099) (2%)	\$4,743 2%
Chemicals	\$2,249,298	\$2,989,750	\$2,967,135	\$3,207,408	\$3,865,251	\$4,058,514	\$740,452 33%	(\$22,615) (1%)	\$240,273 8%	\$657,843 21%	\$193,263 5%
Applied overheads and other allocations	\$209,356	\$204,224	\$204,806	\$211,795	\$158,214	\$161,378	(\$5,132) (2%)	\$582 0%	\$6,989 3%	(\$53,581) (25%)	\$3,164 2%
Recoveries/ allocation to unregulated	(\$82,149)	(\$155,831)	(\$171,207)	(\$117,820)	(\$126,375)	(\$127,737)	(\$73,682) 90%	(\$15,376) 10%	\$53,387 (31%)	(\$8,555) 7%	(\$1,362) 1%
Total Wastewater Treatment	\$19,250,471	\$19,892,744	\$20,060,403	\$21,273,583	\$22,633,709	\$23,319,053	\$642,273 3%	\$167,659 1%	\$1,213,180 6%	\$1,360,126 6%	\$685,344 3%

### Technical Services (SCADA)

A summary has been provided below for Technical Services (SCADA) outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Technical Services (SCADA) by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Technical Services (SCADA) during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed resulting in a reduction in the percentage of common costs allocated to Wastewater Services, from 70% to 67%. This includes the cost centers for Administration and Overheads (Technical Services), SCADA System, and Regional Technical Services. All other cost center allocations remain unchanged.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Technical Services (SCADA)	\$1,449,682	\$1,608,926	\$1,756,754	\$1,683,650	\$1,730,801	\$1,785,964	\$159,244 11%	\$147,828 9%	(\$73,104) (4%)	\$47,151 3%	\$55,163 3%

### Engineering and Technology Services (TS)

A summary has been provided below for Engineering and Technology Services outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Engineering and Technology Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Engineering and Technology Services during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed resulting in an increase in the percentage of common costs allocated to Wastewater Services from 42% to 52%. This includes the cost centers for Administration and Overheads (Engineering and TS), Engineering Information, and Information Services. An increase is also proposed for the Asset Management and Capital Planning cost center, from 48% to 52%. Finally, a decrease is proposed for the Energy and Business Development cost center, from 71% to 39%. All other cost center allocations remain unchanged.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Engineering and Technology Services	\$3,782,763	\$4,477,998	\$4,186,504	\$4,197,779	\$5,378,043	\$5,519,483	\$695,235 18%	(\$291,494) (7%)	\$11,275 0%	\$1,180,264 28%	\$141,440 3%

## Regulatory Services

A summary has been provided below for Regulatory Services outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Regulatory Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Regulatory Services during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed for the cost center Environmental Management System, resulting in a decrease in the percentage of expenditures allocated to Wastewater Services from 55% to 40%. All other cost center allocations remain unchanged.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Regulatory Services	\$1,185,591	\$1,432,311	\$1,384,724	\$1,586,600	\$1,674,027	\$1,727,980	\$246,720 21%	(\$47,587) (3%)	\$201,876 15%	\$87,427 6%	\$53,953 3%

## Customer Service

A summary has been provided below for Customer Service outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Customer Service by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Customer Service during the period 2018/19 to 2023/24 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Customer Service	\$2,061,287	\$2,277,188	\$2,188,838	\$2,521,849	\$2,170,237	\$2,237,450	\$215,901 10%	(\$88,350) (4%)	\$333,011 15%	(\$351,612) (14%)	\$67,213 3%

## Corporate Services

A summary has been provided below for Corporate Services outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Corporate Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Corporate Services for 2021/22 are consistent with the allocations and the methodology identified in the Cost-of-Service Manual under the former System function “Administration and Pension”. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, costs related to Corporate Services were separated from the former “Administration and Pension” into two separate divisions within the organizational hierarchy. The allocations are consistent with those under the former Administration and Pension function.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19	2019/20	2020/21	2021/22	Test Year #1	Test Year #2	2019/20	2020/21	2021/22	Test Year #1	Test Year #2
	Actual	Actual	Actual	Budget	Budget	Budget	Actual	Actual	Budget	Budget	Budget
Corporate Services	\$0	\$0	\$0	\$1,317,923	\$1,309,527	\$1,343,663	\$0	\$0	\$1,317,923	(\$8,396)	\$34,136
							0%	0%	0%	(1%)	3%



## Administration

A summary has been provided below for Administration outlining the cost impacts of this function relative to Wastewater Services. Complete details relating to operating expenditures for Administration by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts reported below for Administration during the period 2018/19 to 2021/22 are consistent with the allocations and the methodology identified in the Cost-of-Service Manual under the System function “Administration and Pension”. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, costs related to Administration were separated from the former “Administration and Pension” within the organizational hierarchy. The allocations are consistent with those under the former Administration and Pension function.

Halifax Regional Water Commission Wastewater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Administration	\$3,242,216	\$3,023,641	\$2,964,892	\$2,079,326	\$2,582,056	\$2,655,409	(\$218,575) (7%)	(\$58,749) (2%)	(\$885,566) (30%)	\$502,730 24%	\$73,353 3%

## **Worksheet WW-5 Cost of Service (COS) Structure**

Worksheet WW-5 details the customer classifications, cost functions with allocated percentages, service characteristics and operating and capital cost classifications for Wastewater Services as detailed in the Cost-of-Service Manual.

## Worksheet WW-5

[illegible]

**Worksheet WW-6 Operating Expense Functionalization**

Worksheet WW-6 details the Wastewater Services operating expense categories cost elements, by the system functions detailed in the Cost-of-Service Manual. The total of the service functions equals the operating expense category in the revenue requirement in 2023/24, and are reported as both a dollar and percentage value. These are then used in Worksheet WW-10 to allocate the costs to the service characteristics.

Worksheet WW-6

Halifax Water Wastewater Rate Study		Halifax Water Wastewater Rate Study														
Statement of Operating Expenditures 2023/24		Operating Expense Cost Allocation Allocation of Costs to Functions 2023/24														
OPERATING EXPENSES	Test Year #2 2023/24 Budget	Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
Wastewater Collection																
Salaries and benefits	\$6,471,209	\$0	\$0	\$0	\$2,608,092	\$3,370,598	\$492,520	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,471,210
Training and development	\$47,277	\$0	\$0	\$0	\$16,435	\$27,516	\$3,326	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$47,277
Contract services	\$1,916,478	\$0	\$0	\$0	\$982,726	\$663,135	\$270,617	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,916,478
Electricity	\$2,026,382	\$0	\$0	\$0	\$13,479	\$2,010,175	\$2,728	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,026,382
Materials, supplies and services	\$1,304,545	\$0	\$0	\$0	\$408,015	\$837,508	\$59,022	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,304,545
Professional services	\$286,880	\$0	\$0	\$0	\$99,729	\$166,970	\$20,182	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$286,881
Fleet	\$1,535,603	\$0	\$0	\$0	\$659,588	\$755,985	\$120,030	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,535,603
Chemicals	\$194,918	\$0	\$0	\$0	\$0	\$194,918	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$194,918
Applied overheads and other allocations	\$227,141	\$0	\$0	\$0	\$78,961	\$132,200	\$15,979	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$227,140
Sub-total	\$14,010,433															
Allocation to Stormwater Service	(\$622,223)	\$0	\$0	\$0	(\$216,151)	(\$362,353)	(\$43,719)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$622,223)
Total Wastewater Collection	\$13,388,210	\$0	\$0	\$0	\$4,650,874	\$7,796,652	\$940,685	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,388,211
Wastewater Treatment																
Salaries and benefits	\$6,011,489	\$3,512,919	\$1,846,985	\$651,585	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,011,489
Training and development	\$54,902	\$31,177	\$14,641	\$9,083	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$54,901
Contract services	\$5,812,239	\$3,979,847	\$1,628,891	\$203,502	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,812,240
Electricity	\$2,927,662	\$1,910,650	\$758,799	\$258,213	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,927,662
Materials, supplies and services	\$3,864,201	\$2,608,644	\$886,635	\$368,922	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,864,201
Professional services	\$314,489	\$214,582	\$74,958	\$24,949	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$314,489
Fleet	\$241,916	\$136,185	\$83,178	\$22,553	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$241,916
Chemicals	\$4,058,514	\$3,401,775	\$349,584	\$307,154	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,058,513
Recoveries/ allocation to unregulated	\$161,378	\$109,404	\$39,198	\$12,777	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$161,379
Sub-total	\$23,446,790															
Recoveries	(\$127,737)	(\$70,230)	(\$53,633)	(\$3,873)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$127,736)
Total Wastewater Treatment	\$23,319,053	\$15,834,953	\$5,629,236	\$1,854,865	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$23,319,054
Other Operating																
Engineering and TS	\$5,519,483	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,519,483	\$0	\$0	\$0	\$0	\$5,519,483
Technical Services (SCADA)	\$1,785,964	\$0	\$0	\$0	\$0	\$0	\$0	\$1,785,964	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,785,964
Regulatory Services	\$1,727,980	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,727,980	\$0	\$0	\$1,727,980
Corporate Services	\$1,343,663	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,343,663	\$0	\$1,343,663
Customer Service	\$2,237,450	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,399,647	\$351,185	\$486,618	\$0	\$0	\$0	\$0	\$2,237,450
Administration	\$2,655,409	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,655,409	\$2,655,409
Total Other Operating	\$15,269,949	\$0	\$0	\$0	\$0	\$0	\$0	\$1,785,964	\$1,399,647	\$351,185	\$486,618	\$5,519,483	\$1,727,980	\$1,343,663	\$2,655,409	\$15,269,949
Total O&M Expense	\$51,977,212	\$15,834,953	\$5,629,236	\$1,854,865	\$4,650,874	\$7,796,652	\$940,685	\$1,785,964	\$1,399,647	\$351,185	\$486,618	\$5,519,483	\$1,727,980	\$1,343,663	\$2,655,409	\$51,977,214

[illegible]

## **Worksheet WW-7 Continuity Schedule Utility Plant in Service**

Worksheet W-7 provides additional detail on the following:

- Funded utility plant in service,
- Contributed assets,
- Projected utility plant in service additions, net of projected retirements,
- Accumulated depreciation, net of projected retirements,
- Calculated depreciation, and
- Projected net book value.

The spreadsheet is broken down by asset class and asset. For the purposes of the revenue requirement, depreciation for Wastewater transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services.

Halifax Regional Water Commission  
Utility Plant in Service-Wastewater  
  
Continuity Schedule/ Depreciation for Utility Plant in Service  
2023-24

	Useful Life in years	Funded Utility Plant in Service	Contributed Utility Plant in Service	Total Utility Plant in Service	Work in Process approved in Prior Years	Utility Plant in Service Additions	Contributed Utility Plant in Service Additions	Projected Retirements	Projected Utility Plant in Service	Accumulated Depreciation	Accumulated Depreciation on funded assets	Accumulated Depreciation on donated assets	Projected Retirement of Accumulated Depreciation	Projected Net Book Value before Depreciation	Depreciation expense on funded assets	Depreciation expense on Regulatory Asset	Projected Net Book Value after Depreciation
		Mar-23	Mar-23	Mar-23	2023-24	2023-24	2023-24	2023-24	Mar-24	Mar-23	Mar-23	Mar-23	2023-24	Mar-24	2023-24	2023-24	Mar-24
Intangible Plant	10	15,351,883	3,898,513	19,250,396					19,250,396	11,775,336	7,940,974	3,834,363		7,475,060	1,324,670	-	6,135,725
		-	-							-	-	-			-	-	-
Tangible Assets		-	-							-	-	-			-	-	-
Land		-	-							-	-	-			-	-	-
Collection Land & Land Rights	N/A	-	870,257	870,257					870,257	-	-	-		870,257	-	-	870,257
Treatment Plant Land	N/A	2,703,421	1,351,711	4,055,132					4,055,132	-	-	-		4,055,132	-	-	4,055,132
Pumping Station Land	N/A	57,902	90,726	148,629					148,629	-	-	-		148,629	-	-	148,629
Office Land	N/A	2,009,646	-	2,009,646					2,009,646	-	-	-		2,009,646	-	-	2,009,646
Other Land & Easements	N/A	4,284,241	915,577	5,199,818					5,199,818	-	-	-		5,199,818	-	-	5,199,818
Structures		-	-	-					-	-	-	-		-	-	-	-
Structures Other	40	3,448,681	1,588,879	5,037,559					5,037,559	1,256,336	742,891	513,444		3,781,224	79,421	858	3,663,093
Treatment Plants	5 - 75	58,968,878	64,367,153	123,336,031		6,115,549	13,341,290	100,000	142,692,869	38,552,436	12,792,350	25,760,086	75,000	104,215,433	1,217,059	9,037	102,073,616
Pumping Stations	20 - 30	32,198,132	44,930,030	77,128,163		18,133,100	65,100	50,000	95,276,363	35,396,689	7,912,540	27,484,149	25,000	59,904,673	1,240,808	11,668	57,680,446
Office Buildings	5	8,534,723	8,155	8,542,878		275,000			8,817,878	1,716,561	1,714,848	1,713		7,101,318	76,500	-	7,024,655
Airport-Aerotech	5 - 75	1,241,976	2,851,723	4,093,699		300,000			4,393,699	1,661,427	565,614	1,095,813		2,732,272	45,527	-	2,621,706
Treatment & Pump Equipment		-	-	-					-	-	-	-		-	-	-	-
Treatment Equipment	20	124,618,423	56,190,088	180,808,511		10,243,162			191,051,673	99,407,076	68,149,314	31,257,763		91,644,596	6,645,066	161,312	82,210,812
Information Systems - SCADA	20	14,051,065	1,903,765	15,954,830					15,954,830	6,051,200	5,491,565	559,635		9,903,629	804,986	-	9,012,611
Pumping Equipment	5 - 20	9,830,194	13,443,629	23,273,822					23,273,822	11,696,123	3,318,038	8,378,085		11,577,699	488,537	-	10,651,176
Mains		-	-	-					-	-	-	-		-	-	-	-
Trunk Sewers	100	5,797,296	38,706,056	44,503,353		-	-		44,503,353	3,280,947	858,489	2,422,458		41,222,405	78,988	-	40,823,384
Force Mains	75	2,520,422	392,511	2,912,933		4,180,000	4,125,000		11,217,933	129,787	124,713	5,075		11,088,146	68,313	-	11,018,529
Sewer Mains	75	68,583,137	194,833,686	263,416,824		9,482,070	19,373,930		292,272,824	73,104,418	10,039,061	63,065,356		219,168,406	1,043,577	4,915	215,695,818
Sewer Laterals	50	26,944,660	8,320,035	35,264,695		2,405,000	1,000,000		38,669,695	4,909,142	3,398,361	1,510,781		33,760,554	571,364	-	33,043,542
- Combined Sewers Portion	75 - 100	10,434,237	12,088,641	22,522,878					22,522,878	3,261,226	1,608,546	1,652,680		19,261,652	132,089	1,036	18,984,163
Outfalls	75	13,486,429	6,015,431	19,501,859		-			19,501,859	3,187,075	2,141,833	1,045,243		16,314,784	188,755	1,104	16,045,911
Manholes	50	2,447,317	7,444,619	9,891,936			500,000		10,391,936	1,486,495	330,592	1,155,903		8,905,440	54,885	-	8,711,956
Equipment		-	-	-					-	-	-	-		-	-	-	-
Transportation Equipment	5	8,526,854	111,303	8,638,157		1,392,000		250,000	9,780,157	7,095,379	6,984,076	111,303	250,000	2,934,777	744,692	-	2,190,085
Tools & Equipment for Ops	5	1,471,016	366,007	1,837,023		295,000			2,132,023	1,318,325	952,318	366,007		813,698	79,742	-	733,956
Tools & Equipment for Plant	5	121,325	-	121,325					121,325	107,497	107,497	-		13,828	1,965	-	11,864
Office Equipment & Furniture	5	873,449	-	873,449					873,449	868,422	868,422	-		5,027	5,027	-	0
Computer Equipment and Software	3 - 5	20,839,808	-	20,839,808		8,336,000			29,175,808	7,568,879	7,568,879	-		21,606,929	2,854,054	-	18,752,875
Meters		9,050,329	-	9,050,329		287,500			9,337,829	1,853,815	1,853,815	-		7,484,014	460,690	-	7,023,324
Small Systems		-	-	-					-	-	-	-		-	-	-	-
Fall River	20	329,342	48,428	377,769					377,769	151,467	121,547	29,920		226,303	16,545	-	207,375
Springfield Lake	5 - 20	161,898	517,610	679,508					679,508	460,083	91,146	368,937		219,425	10,666	-	197,879
Middle Musquodoboit	50	143,333	250,000	393,333					393,333	228,753	45,420	183,333		164,580	5,609	-	153,971
North Preston	10 - 50	692,554	3,293,239	3,985,793					3,985,793	1,877,115	468,158	1,408,956		2,108,678	24,033	-	1,978,950
Wellington	10 - 50	2,194,412	120,160	2,314,572					2,314,572	922,916	859,832	63,084		1,391,656	81,960	-	1,303,688
Other Small Systems	20 - 75	1,090,097	826,600	1,916,697		235,000			2,151,697	327,078	159,387	167,692		1,824,619	44,119	-	1,768,936
TOTAL		453,007,081	465,744,531	918,751,611	-	61,679,380	38,405,320	400,000	1,018,436,311	319,652,004	147,210,225	172,441,779	350,000	699,134,307	18,389,647	189,929	672,003,527



## **Worksheet WW-8 Depreciation Functionalization**

Worksheet WW-8 allocates the budgeted annual depreciation charge included in the revenue requirement for 2023/24 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, and reported as both a dollar and percentage value. These are then used in Worksheet WW-10 to allocate depreciation to the service characteristics. As noted previously, depreciation for Water transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services.

Worksheet WW-8

Halifax Water Wastewater Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2023/24	
	Annual Depreciation
INTANGIBLE PLANT	
Intangible Plant	\$1,324,670
TANGIBLE PLANT	
LAND	
WW Collection Land & Land Rights	\$0
WW Treatment Plant Land	\$0
WW Pumping Station Land	\$0
WW Office Land	\$0
WW Other Land	\$0
STRUCTURES	
WW Structures Miscellaneous	\$80,280
WW Treatment Plants	\$1,226,095
WW Pumping Stations	\$1,252,476
WW Office Buildings	\$76,500
Aerotech/ Airport WW System	\$45,527
TREATMENT & PUMP EQUIPMENT	
WW Treatment Equipment	\$6,806,378
WW Information Systems - SCADA	\$804,986
WW Pumping Equipment	\$488,537
MAINS	
WW Trunk Sewers	\$78,988
WW Force Mains	\$68,313
WW Sewer Mains	\$1,048,492
WW Sewer Laterals	\$571,364
WW - Combined Sewers WW Portion	\$133,125
WW Outfalls	\$189,858
WW Manholes	\$54,885
EQUIPMENT	
WW Tools & Work Equipment	\$79,742
WW Tools & Equipment for Plant	\$1,965
WW Office Equipment & Furniture	\$5,027
WW Computer Equipment	\$2,854,054
WW Meters	\$460,690
SMALL SYSTEMS	
WW Fall River	\$16,545
WW Springfield Lake	\$10,666
WW Middle Musquodoboit	\$5,609
WW North Preston	\$24,033
WW Wellington	\$81,960
Other Small Systems	\$44,119
Total	\$17,834,884

Halifax Water Wastewater Rate Study													
Calculation of Depreciation of Tangible Plant at Total Cost Functionalization of Depreciation Expressed as a Percentage (%) 2023/24													
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
INTANGIBLE PLANT													
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
LAND													
90%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
STRUCTURES													
80%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
70%	20%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TREATMENT & PUMP EQUIPMENT													
70%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MAINS													
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
80%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EQUIPMENT													
0%	0%	0%	50%	25%	25%	0%	0%	0%	0%	0%	0%	0%	0%
40%	40%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	25%	25%	0%	25%
0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	25%	25%	0%	25%
0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
SMALL SYSTEMS													
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%

Halifax Water Wastewater Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2023/24	
	Annual Depreciation
INTANGIBLE PLANT	
Intangible Plant	\$1,324,670
TANGIBLE PLANT	
LAND	
WW Collection Land & Land Rights	\$0
WW Treatment Plant Land	\$0
WW Pumping Station Land	\$0
WW Office Land	\$0
WW Other Land	\$0
STRUCTURES	
WW Structures Miscellaneous	\$80,280
WW Treatment Plants	\$1,226,095
WW Pumping Stations	\$1,252,476
WW Office Buildings	\$76,500
Aerotech/ Airport WW System	\$45,527
TREATMENT & PUMP EQUIPMENT	
WW Treatment Equipment	\$6,806,378
WW Information Systems - SCADA	\$804,986
WW Pumping Equipment	\$488,537
MAINS	
WW Trunk Sewers	\$78,988
WW Force Mains	\$68,313
WW Sewer Mains	\$1,048,492
WW Sewer Laterals	\$571,364
WW - Combined Sewers WW Portion	\$133,125
WW Outfalls	\$189,858
WW Manholes	\$54,885
EQUIPMENT	
WW Tools & Work Equipment	\$79,742
WW Tools & Equipment for Plant	\$1,965
WW Office Equipment & Furniture	\$5,027
WW Computer Equipment	\$2,854,054
WW Meters	\$460,690
SMALL SYSTEMS	
WW Fall River	\$16,545
WW Springfield Lake	\$10,666
WW Middle Musquodoboit	\$5,609
WW North Preston	\$24,033
WW Wellington	\$81,960
Other Small Systems	\$44,119
Total	\$17,834,884
0	

Halifax Water Wastewater Rate Study														
Calculation of Depreciation of Tangible Plant at Total Cost Functionalization of Depreciation Expressed in Dollars (\$) 2023/24														
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
INTANGIBLE PLANT														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,324,670	\$1,324,670
LAND														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
STRUCTURES														
\$64,224	\$0	\$0	\$16,056	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$80,280
\$858,267	\$245,219	\$122,610	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,226,096
\$0	\$0	\$0	\$0	\$1,252,476	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,252,476
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$76,500	\$76,500
\$0	\$0	\$45,527	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$45,527
TREATMENT & PUMP EQUIPMENT														
\$4,764,465	\$2,041,913	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,806,378
\$0	\$0	\$0	\$0	\$804,986	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$804,986
\$0	\$0	\$0	\$0	\$488,537	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$488,537
MAINS														
\$0	\$0	\$0	\$78,988	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$78,988
\$0	\$0	\$0	\$34,156	\$34,156	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$68,312
\$0	\$0	\$0	\$1,048,492	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,048,492
\$0	\$0	\$0	\$0	\$0	\$571,364	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$571,364
\$0	\$0	\$0	\$133,125	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$133,125
\$151,887	\$37,972	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$189,859
\$0	\$0	\$0	\$54,885	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$54,885
EQUIPMENT														
\$0	\$0	\$0	\$39,871	\$19,936	\$19,936	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$79,743
\$786	\$786	\$393	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,965
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,257	\$0	\$0	\$1,257	\$1,257	\$0	\$1,257	\$5,028
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$713,513	\$0	\$0	\$713,513	\$713,513	\$0	\$713,513	\$2,854,052
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$460,690	\$0	\$0	\$0	\$0	\$0	\$460,690
SMALL SYSTEMS														
\$0	\$0	\$13,236	\$1,655	\$0	\$1,655	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,546
\$0	\$8,533	\$0	\$1,067	\$0	\$1,067	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,667
\$0	\$4,488	\$0	\$561	\$0	\$561	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,610
\$0	\$0	\$19,227	\$2,403	\$0	\$2,403	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$24,033
\$0	\$65,568	\$0	\$8,196	\$0	\$8,196	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$81,960
\$0	\$0	\$35,295	\$4,412	\$0	\$4,412	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$44,119
\$5,839,629	\$2,404,479	\$236,288	\$1,423,867	\$2,600,091	\$609,594	\$0	\$714,770	\$460,690	\$0	\$714,770	\$714,770	\$0	\$2,115,940	\$17,834,888
32.74%	13.48%	1.32%	7.98%	14.58%	3.42%	0.00%	4.01%	2.58%	0.00%	4.01%	4.01%	0.00%	11.86%	99.99%

## **Worksheet WW-9 Allocation of Utility Plant in Service**

Worksheet WW-9 allocates the budgeted utility plant in service for 2023/24 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, and reported as both a dollar and percentage value. These are then used in Worksheet WW-10 to allocate debt servicing costs to the service characteristics

Worksheet WW-9

Halifax Water Wastewater Rate Study					
Allocation of Utility Plant in Service 2023/24					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Contributed Plant, excluded from Rate Base	Rate Base
INTANGIBLE PLANT					
Intangible Plant	\$19,250,396	\$13,114,671	\$6,135,725	\$49,486	\$6,086,240
TANGIBLE PLANT					
LAND					
WW Collection Land & Land Rights	\$870,257	\$0	\$870,257	\$870,257	\$0
WW Treatment Plant Land	\$4,055,132	\$0	\$4,055,132	\$1,351,711	\$2,703,421
WW Pumping Station Land	\$148,629	\$0	\$148,629	\$90,726	\$57,902
WW Office Land	\$2,009,646	\$0	\$2,009,646	\$0	\$2,009,646
WW Other Land	\$5,199,818	\$0	\$5,199,818	\$915,577	\$4,284,241
STRUCTURES					
WW Structures Miscellaneous	\$5,037,559	\$1,374,467	\$3,663,093	\$1,036,725	\$2,626,368
WW Treatment Plants	\$142,692,869	\$40,619,253	\$102,073,616	\$51,023,598	\$51,050,018
WW Pumping Stations	\$95,276,363	\$37,595,917	\$57,680,446	\$16,527,562	\$41,152,884
WW Office Buildings	\$8,817,878	\$1,793,224	\$7,024,655	\$6,279	\$7,018,375
Aerotech/ Airport WW System	\$4,393,699	\$1,771,993	\$2,621,706	\$1,690,870	\$930,836
TREATMENT & PUMP EQUIPMENT					
WW Treatment Equipment	\$191,051,673	\$108,840,861	\$82,210,812	\$22,143,606	\$60,067,206
WW Information Systems - SCADA	\$15,954,830	\$6,942,218	\$9,012,611	\$1,258,098	\$7,754,514
WW Pumping Equipment	\$23,273,822	\$12,622,647	\$10,651,176	\$4,627,557	\$6,023,619
MAINS					
WW Trunk Sewers	\$44,503,353	\$3,679,968	\$40,823,384	\$35,963,566	\$4,859,818
WW Force Mains	\$11,217,933	\$199,404	\$11,018,529	\$4,511,132	\$6,507,397
WW Sewer Mains	\$292,272,824	\$76,577,005	\$215,695,818	\$148,713,249	\$66,982,569
WW Sewer Laterals	\$38,669,695	\$5,626,154	\$33,043,542	\$7,663,607	\$25,379,935
WW - Combined Sewers WW Portion	\$22,522,878	\$3,538,715	\$18,984,163	\$10,290,561	\$8,693,602
WW Outfalls	\$19,501,859	\$3,455,948	\$16,045,911	\$4,890,070	\$11,155,841
WW Manholes	\$10,391,936	\$1,679,980	\$8,711,956	\$6,650,116	\$2,061,840
EQUIPMENT					
WW Transportation Equipment	\$9,780,157	\$7,590,071	\$2,190,085	\$0	\$2,190,085
WW Tools & Work Equipment	\$2,132,023	\$1,398,067	\$733,956	\$0	\$733,956
WW Tools & Equipment for Plant	\$121,325	\$109,462	\$11,864	\$0	\$11,864
WW Office Equipment & Furniture	\$873,449	\$873,449	\$0	\$0	\$0
WW Computer Equipment	\$29,175,808	\$10,422,933	\$18,752,875	\$0	\$18,752,875
WW Meters	\$9,337,829	\$2,314,506	\$7,023,324	\$0	\$7,023,324
SMALL SYSTEMS					
WW Fall River	\$377,769	\$170,395	\$207,375	\$16,125	\$191,249
WW Springfield Lake	\$679,508	\$481,630	\$197,879	\$137,793	\$60,086
WW Middle Musquodoboit	\$393,333	\$239,362	\$153,971	\$61,667	\$92,304
WW North Preston	\$3,985,793	\$2,006,842	\$1,978,950	\$1,778,589	\$200,362
WW Wellington	\$2,314,572	\$1,010,884	\$1,303,688	\$51,068	\$1,252,620
Other Small Systems	\$2,151,697	\$382,762	\$1,768,936	\$647,344	\$1,121,592
Total	\$1,018,436,311	\$346,432,785	\$672,003,527	\$322,966,938	\$349,036,589

Halifax Water Wastewater Rate Study													
Allocation of Utility Plant in Service Functionalization of the Rate Base Expressed as a Percentage (%) 2023/24													
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration
INTANGIBLE PLANT													
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
LAND													
90%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
STRUCTURES													
80%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
70%	20%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TREATMENT & PUMP EQUIPMENT													
70%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MAINS													
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
80%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EQUIPMENT													
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	50%	25%	25%	0%	0%	0%	0%	0%	0%	0%	0%
40%	40%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	25%	25%	0%	25%
0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	25%	25%	0%	25%
0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
SMALL SYSTEMS													
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	80%	0%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	80%	10%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%

Halifax Water Wastewater Rate Study					
Allocation of Utility Plant in Service 2023/24					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Contributed Plant, excluded from Rate Base	Rate Base
INTANGIBLE PLANT					
Intangible Plant	\$19,250,396	\$13,114,671	\$6,135,725	\$49,486	\$6,086,240
TANGIBLE PLANT					
LAND					
WW Collection Land & Land Rights	\$870,257	\$0	\$870,257	\$870,257	\$0
WW Treatment Plant Land	\$4,055,132	\$0	\$4,055,132	\$1,351,711	\$2,703,421
WW Pumping Station Land	\$148,629	\$0	\$148,629	\$90,726	\$57,902
WW Office Land	\$2,009,646	\$0	\$2,009,646	\$0	\$2,009,646
WW Other Land	\$5,199,818	\$0	\$5,199,818	\$915,577	\$4,284,241
STRUCTURES					
WW Structures Miscellaneous	\$5,037,559	\$1,374,467	\$3,663,093	\$1,036,725	\$2,626,368
WW Treatment Plants	\$142,692,869	\$40,619,253	\$102,073,616	\$51,023,598	\$51,050,018
WW Pumping Stations	\$95,276,363	\$37,595,917	\$57,680,446	\$16,527,562	\$41,152,884
WW Office Buildings	\$8,817,878	\$1,793,224	\$7,024,655	\$6,279	\$7,018,375
Aerotech/ Airport WW System	\$4,393,699	\$1,771,993	\$2,621,706	\$1,690,870	\$930,836
TREATMENT & PUMP EQUIPMENT					
WW Treatment Equipment	\$191,051,673	\$108,840,861	\$82,210,812	\$22,143,606	\$60,067,206
WW Information Systems - SCADA	\$15,954,830	\$6,942,218	\$9,012,611	\$1,258,098	\$7,754,514
WW Pumping Equipment	\$23,273,822	\$12,622,647	\$10,651,176	\$4,627,557	\$6,023,619
MAINS					
WW Trunk Sewers	\$44,503,353	\$3,679,968	\$40,823,384	\$35,963,566	\$4,859,818
WW Force Mains	\$11,217,933	\$199,404	\$11,018,529	\$4,511,132	\$6,507,397
WW Sewer Mains	\$292,272,824	\$76,577,005	\$215,695,818	\$148,713,249	\$66,982,569
WW Sewer Laterals	\$38,669,695	\$5,626,154	\$33,043,542	\$7,663,607	\$25,379,935
WW - Combined Sewers WW Portion	\$22,522,878	\$3,538,715	\$18,984,163	\$10,290,561	\$8,693,602
WW Outfalls	\$19,501,859	\$3,455,948	\$16,045,911	\$4,890,070	\$11,155,841
WW Manholes	\$10,391,936	\$1,679,980	\$8,711,956	\$6,650,116	\$2,061,840
EQUIPMENT					
WW Transportation Equipment	\$9,780,157	\$7,590,071	\$2,190,085	\$0	\$2,190,085
WW Tools & Work Equipment	\$2,132,023	\$1,398,067	\$733,956	\$0	\$733,956
WW Tools & Equipment for Plant	\$121,325	\$109,462	\$11,864	\$0	\$11,864
WW Office Equipment & Furniture	\$873,449	\$873,449	\$0	\$0	\$0
WW Computer Equipment	\$29,175,808	\$10,422,933	\$18,752,875	\$0	\$18,752,875
WW Meters	\$9,337,829	\$2,314,506	\$7,023,324	\$0	\$7,023,324
SMALL SYSTEMS					
WW Fall River	\$377,769	\$170,395	\$207,375	\$16,125	\$191,249
WW Springfield Lake	\$679,508	\$481,630	\$197,879	\$137,793	\$60,087
WW Middle Musquodoboit	\$393,333	\$239,362	\$153,971	\$61,667	\$92,304
WW North Preston	\$3,985,793	\$2,006,842	\$1,978,950	\$1,778,589	\$200,362
WW Wellington	\$2,314,572	\$1,010,884	\$1,303,688	\$51,068	\$1,252,620
Other Small Systems	\$2,151,697	\$382,762	\$1,768,936	\$647,344	\$1,121,592
Total	\$1,018,436,311	\$346,432,785	\$672,003,527	\$322,966,938	\$349,036,590

Halifax Water Wastewater Rate Study														
Allocation of Utility Plant in Service Functionalization of Rate Base Expressed in Dollars (\$) 2023/24														
Advanced Primary Treatment	Secondary Treatment	Tertiary Treatment	Mains	Pump Stations	Service Laterals	Technical Services (SCADA)	Customer Service	Meters	Meter Reading and Billing	Engineering and TS	Regulatory Services	Corporate Services	Administration	Total
INTANGIBLE PLANT														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,086,240	\$6,086,240
LAND														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$2,703,421	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,703,421
\$0	\$0	\$0	\$0	\$57,902	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$57,902
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,009,646	\$2,009,646
\$0	\$0	\$0	\$4,284,241	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,284,241
STRUCTURES														
\$2,101,095	\$0	\$0	\$525,274	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,626,368
\$35,735,012	\$10,210,004	\$5,105,002	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$51,050,018
\$0	\$0	\$0	\$0	\$41,152,884	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$41,152,884
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,018,375	\$7,018,375
\$0	\$0	\$930,836	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$930,836
TREATMENT & PUMP EQUIPMENT														
\$42,047,044	\$18,020,162	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$60,067,206
\$0	\$0	\$0	\$0	\$7,754,514	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,754,514
\$0	\$0	\$0	\$0	\$6,023,619	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,023,619
MAINS														
\$0	\$0	\$0	\$4,859,818	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,859,818
\$0	\$0	\$0	\$3,253,698	\$3,253,698	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,507,396
\$0	\$0	\$0	\$66,982,569	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$66,982,569
\$0	\$0	\$0	\$0	\$25,379,935	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$25,379,935
\$0	\$0	\$0	\$8,693,602	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,693,602
\$8,924,673	\$2,231,168	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,155,841
\$0	\$0	\$0	\$2,061,840	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,061,840
EQUIPMENT														
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,190,085	\$2,190,085
\$0	\$0	\$0	\$366,978	\$183,489	\$183,489	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$733,956
\$4,745	\$4,745	\$2,373	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,863
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,688,219	\$0	\$0	\$4,688,219	\$4,688,219	\$0	\$4,688,219	\$18,752,876
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,023,324	\$0	\$0	\$0	\$0	\$0	\$7,023,324
SMALL SYSTEMS														
\$0	\$0	\$153,000	\$19,125	\$0	\$19,125	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$191,250
\$0	\$48,069	\$0	\$6,009	\$0	\$6,009	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$60,087
\$0	\$73,843	\$0	\$9,230	\$0	\$9,230	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$92,303
\$0	\$0	\$160,290	\$20,036	\$0	\$20,036	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$200,362
\$0	\$1,002,096	\$0	\$125,262	\$0	\$125,262	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,252,620
\$0	\$0	\$897,274	\$112,159	\$0	\$112,159	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,121,592
\$91,515,990	\$31,590,087	\$7,248,775	\$91,319,841	\$58,426,106	\$25,855,245	\$0	\$4,688,219	\$7,023,324	\$0	\$4,688,219	\$4,688,219	\$0	\$21,992,565	\$349,036,590
26.22%	9.05%	2.08%	26.16%	16.74%	7.41%	0.00%	1.34%	2.01%	0.00%	1.34%	1.34%	0.00%	6.30%	100.00%

## **Worksheet WW-10 Cost Classification**

Worksheet WW-10 details the costs as allocated to the system functions in Worksheet WW-6, WW-8 and WW-9 and allocates them to the service characteristics based on the percentages for each characteristic detailed in the Cost-of-Service Manual. The amounts are then totaled by operation and maintenance, depreciation and are used in Worksheet WW-11 to calculate the wastewater unit rate and bill calculation. The utility plant in service functions are also totaled and the percentage by service function is used to allocate the net debt servicing costs also in Worksheet WW-11.





[illegible]

## **Worksheet WW-11 Unit Costs and Returns**

Worksheet WW-11 uses the costs from Worksheet WW-10 allocated to the system functions to calculate the unit wastewater rates for 2023/24 using the billing determinates. The percentage of dry weather flow, wet weather flow, biochemical oxygen demand (BOD), total suspended solids (TSS), equivalent meters and customer service is used to allocate the indirect costs for operation and maintenance expenses, depreciation expense and debt service. The dividend/grant in lieu of taxes is allocated based on the total allocated revenue requirements. Worksheet W-11 also calculates the return on rate base.

Worksheet WW-11

Halifax Water Wastewater Rate Study								
Wastewater Unit Rate and Bill Calculations 2023/24								
Unit Cost Calculations								
	Dry Weather Flow	Wet Weather Flow	Biochemical Oxygen Demand (BOD)	Total Suspended Solids (TSS)	Equivalent Meters	Customer Service	Indirect	Total
Revenue Requirements								
O&M Expenses								
Wastewater Collection	\$11,435,317	\$1,012,209	\$0	\$0	\$940,685	\$0	\$0	\$13,388,211
Wastewater Treatment	\$8,771,186	\$4,162,577	\$4,945,863	\$5,439,426	\$0	\$0	\$0	\$23,319,052
Other Operating	\$1,464,490	\$321,474	\$0	\$0	\$351,185	\$1,886,265	\$11,246,535	\$15,269,949
Sub-Total	\$21,670,993	\$5,496,260	\$4,945,863	\$5,439,426	\$1,291,870	\$1,886,265	\$11,246,535	\$51,977,212
Direct Allocation Percentages	53.21%	13.49%	12.14%	13.35%	3.17%	4.63%		100.00%
O&M Expenses By Service Characteristic	\$27,654,777	\$7,013,885	\$6,311,512	\$6,941,358	\$1,648,581	\$2,407,100		\$51,977,213
Depreciation Expenses								
#REF!	\$5,964,200	\$2,276,328	\$2,131,913	\$2,131,913	\$1,070,284	\$714,770	\$3,545,480	\$17,834,888
Direct Allocation Percentages	41.74%	15.93%	14.92%	14.92%	7.49%	5.00%		100.00%
Depreciation Expenses By Service Characteristic	\$7,444,034	\$2,841,129	\$2,660,882	\$2,660,882	\$1,335,842	\$892,118	\$0	\$17,834,887
Return Components								
Plant in Service by Serv Char Percents	45.15%	16.22%	9.44%	9.44%	9.42%	1.34%	8.99%	100.00%
Debt Service (Principal, Interest, Fees)								
\$16,961,338	\$7,658,591	\$2,750,326	\$1,601,252	\$1,601,252	\$1,597,725	\$227,823	\$1,524,368	\$16,961,337
Direct Allocation Percentages	49.61%	17.82%	10.37%	10.37%	10.35%	1.48%		100.00%
Debt Service (Principal, Interest, Fees) By Service Characteristic (Net)	\$8,414,861	\$3,021,915	\$1,759,372	\$1,759,372	\$1,755,497	\$250,320		\$16,961,338
Total Allocated Revenue Requirements								
	\$43,513,672	\$12,876,929	\$10,731,766	\$11,361,612	\$4,739,920	\$3,549,538		\$86,773,438
	50.15%	14.84%	12.37%	13.09%	5.46%	4.09%		100.00%
Add: Dividend/ Grant in lieu of Taxes								
\$743,631	\$372,903	\$110,353	\$91,969	\$97,367	\$40,620	\$30,419		\$743,631
Less: Non-rate revenues and other adjustments								
(\$612,103)	(\$306,947)	(\$90,834)	(\$75,702)	(\$80,145)	(\$33,436)	(\$25,039)		(\$612,103)
Rate Base								
	\$ 349,036,589		Return on Rate Base				\$	16,349,235
			Calculated Percent Return on Rate Base					4.68%

# Halifax Water Wastewater Rate Study

## Wastewater Unit Rate and Bill Calculations 2023/24

## Worksheet WW-12 Rates, Revenues and Bills

Worksheet WW-12 uses the data from worksheet WW-11 to calculate proposed rates for customer charge, base charge, and volumetric charges (effluent charge) for 2023/24. Worksheet WW-12 also provides a revenue test based on the budgeted customer connections, equivalent meters and consumption and details the annual fixed charges (base and customer charge) and the annual effluent charge based on the arithmetic average of consumption by meter size.

### Worksheet WW-12

<b>Halifax Water Wastewater Rate Study</b>  <b>Rates, Revenues &amp; Annual Bills by Alternative 2023/24</b>		
<b>Proposed Cost of Service Rates and Charges</b>		<b>I&amp;I Allocation Flow / Sys Eq. / Customer at: 0.1 / 0.45 / 0.45</b>
Customer Charge	\$/Account	\$111.81
Base Charge	\$/Meter Equivalent	\$96.97
Volumetric Charges	\$ / Billed Cubic Meter	\$2.1930
<b>Revenue Test</b>	<b>Billing Determinant</b>	
Customer Charge Revenues	83,697	\$9,358,320
Number of Services		
Base Charge Revenues	108,805	\$10,550,530
System Equivalents		
Volumetric Charges Revenues	30,550,033	\$66,996,141
Estimated Consumption		
Total Revenues		\$86,904,991

Halifax Water Wastewater Rate Study		
Rates, Revenues & Annual Bills by Alternative 2023/24		
Bill Calculations		I&I Allocation Flow / Sys Eq. / Customer at: 0.1 / 0.45 / 0.45
	Annual Fixed Charges (Customer & Base Charges by Meter Size)	
Meter Size	Capacity Ratio	
Unmetered 5/8"	1	\$208.78
Unmetered 3/4"	1.5	\$257.26
Unmetered 1"	2.5	\$354.23
5/8" - 15mm	1	\$208.78
3/4" - 20mm	1.5	\$257.26
1" - 25mm	2.5	\$354.23
1.5" - 40mm	5	\$596.65
2" - 50mm	8	\$887.55
3" - 80mm	16	\$1,663.29
4" - 100mm	25	\$2,535.99
6" - 150mm	50	\$4,960.17
8" - 200mm	90	\$8,838.85
10" - 250mm	150	\$14,656.88
Annual Effluent Charges		
	Average Annual Consumption	I&I Allocation Flow / Sys Eq. / Customer at: 0.1 / 0.45 / 0.45
Meter Size		
Unmetered 5/8"	159.47	\$349.71
Unmetered 3/4"	504.72	\$1,106.85
Unmetered 1"	980.82	\$2,150.93
5/8" - 15MM	159.47	\$349.71
3/4" - 20MM	504.72	\$1,106.85
1" - 25MM	980.82	\$2,150.93
1.5" - 40MM	2,008.72	\$4,405.11
2" - 50MM	4,972.59	\$10,904.88
3" - 80MM	11,186.09	\$24,531.07
4" - 100MM	18,930.51	\$41,514.55
6" - 150MM	59,105.94	\$129,619.16
8" - 200MM	72,257.24	\$158,459.94
10" - 250MM	30,322.42	\$66,497.00
Total Bill - Average Consumption		
	Average Annual Consumption	I&I Allocation Flow / Sys Eq. / Customer at: 0.1 / 0.45 / 0.45
Meter Size		
Unmetered 5/8"	159.47	\$558.49
Unmetered 3/4"	504.72	\$1,364.11
Unmetered 1"	980.82	\$2,505.16
5/8" - 15MM	159.47	\$558.49
3/4" - 20MM	504.72	\$1,364.11
1" - 25MM	980.82	\$2,505.16
1.5" - 40MM	2,008.72	\$5,001.76
2" - 50MM	4,972.59	\$11,792.43
3" - 80MM	11,186.09	\$26,194.36
4" - 100MM	18,930.51	\$44,050.54
6" - 150MM	59,105.94	\$134,579.33
8" - 200MM	72,257.24	\$167,298.79
10" - 250MM	30,322.42	\$81,153.88

## **Worksheet Appendix WW-1 – Additions to Utility Plant in Service**

Appendix WW-1 details the proposed additions to utility plant in service and capital funding for the test year 2023/24.

Additions to utility plant in service for 2023/24 are estimated based on status of capital work in progress (projects approved in prior fiscal years), the projects from the 2023/24 capital budget, and historical levels of contributed utility plant in service.

Halifax Water projects addition of \$100.1 million in assets to utility plant in service during the 2023/24 fiscal year.

Appendix WW-1

<b>Halifax Water</b> <b>Wastewater Rate Study</b> <b>Proposed Additions to Utility Plant in Service and Capital Funding</b> <b>2023/24</b>				
	Additions to the Utility Plant in Service	Capital Cost Contribution from Others	Utility Cost of Plant in Service	
<b>INTANGIBLE PLANT</b>				
Intangible Plant	\$0	\$0	\$0	
<b>TANGIBLE PLANT</b>				
<b>LAND</b>				
WW Collection Land & Land Rights	\$0	\$0	\$0	
WW Treatment Plant Land	\$0	\$0	\$0	
WW Pumping Station Land	\$0	\$0	\$0	
WW Office Land	\$0	\$0	\$0	
WW Other Land	\$0	\$0	\$0	
<b>STRUCTURES</b>				
WW Structures Miscellaneous	\$0	\$0	\$0	
WW Treatment Plants	\$19,456,839	\$13,341,290	\$6,115,549	
WW Pumping Stations	\$18,198,200	\$65,100	\$18,133,100	
WW Office Buildings	\$275,000	\$0	\$275,000	
Aerotech/ Airport WW System	\$300,000	\$0	\$300,000	
<b>TREATMENT &amp; PUMP EQUIPMENT</b>				
WW Treatment Equipment	\$10,243,162	\$0	\$10,243,162	
WW Information Systems - SCADA	\$0	\$0	\$0	
WW Pumping Equipment	\$0	\$0	\$0	
<b>MAINS</b>				
WW Trunk Sewers	\$0	\$0	\$0	
WW Force Mains	\$8,305,000	\$4,125,000	\$4,180,000	
WW Sewer Mains	\$28,856,000	\$19,373,930	\$9,482,070	
WW Sewer Laterals	\$3,405,000	\$1,000,000	\$2,405,000	
WW - Combined Sewers WW Portion	\$0	\$0	\$0	
WSW Outfalls	\$0	\$0	\$0	
WW Manholes	\$500,000	\$500,000	\$0	
<b>EQUIPMENT</b>				
WW Transportation Equipment	\$1,392,000	\$0	\$1,392,000	
WW Tools & Work Equipment	\$295,000	\$0	\$295,000	
WW Tools & Work Equipment for Plant	\$0	\$0	\$0	
WW Office Equipment & Furniture	\$0	\$0	\$0	
WW Computer Equipment	\$8,336,000	\$0	\$8,336,000	
WW Meters	\$287,500	\$0	\$287,500	
<b>SMALL SYSTEMS</b>				
WW Fall River	\$0	\$0	\$0	
WW Springfield Lake	\$0	\$0	\$0	
WW Middle Musquodoboit	\$0	\$0	\$0	
WW North Preston	\$0	\$0	\$0	
WW Wellington	\$0	\$0	\$0	
Other Small Systems	\$235,000	\$0	\$235,000	
<b>TOTAL</b>	<b>\$100,084,700</b>	<b>\$38,405,320</b>	<b>\$61,679,380</b>	
<b>Sources of Funding</b>				
Capital Cost Contribution	\$4,125,000	Depreciation Fund Balance, beginning of year		\$0
Regional Development Charge	\$17,617,900	Add:		
External Funding	\$9,172,413	Interest earned on fund balance		\$0
Contributions - other	\$7,490,007	Depreciation funded in Current year		\$17,834,884
Working Capital	\$11,211,496	Depreciation Fund Balance available		\$17,834,884
Depreciation fund	\$17,834,884	Less:		
Long Term Debt	\$32,633,000	Expenditure in Current Year		(\$17,834,884)
<b>TOTAL</b>	<b>\$100,084,700</b>	Depreciation Fund Balance, end of year		\$0



## **Worksheet Appendix WW-2 Amortization Schedule for Long Term Debt**

Appendix WW-2 details the amortization schedule of the proposed long-term debt associated with 2023/24. The amortization is based on a 30-year blended serial debenture at a rate of 2.5%. Debt servicing costs related to principle and interest will commence in test year 2024/25.

## Appendix WW-2

## Halifax Water Wastewater Rate Study

### Amortization Schedule for Projected Long Term Debt 2023/24

Interest Rate	2.50%
Term in years	30
Capital	\$32,633,000

## Amortization Schedule

Year	Principal	Interest	Total	Balance
1	\$1,087,766.67	\$815,825.00	\$1,903,591.67	\$31,545,233.33
2	\$1,087,766.67	\$788,630.83	\$1,876,397.50	\$30,457,466.67
3	\$1,087,766.67	\$761,436.67	\$1,849,203.33	\$29,369,700.00
4	\$1,087,766.67	\$734,242.50	\$1,822,009.17	\$28,281,933.33
5	\$1,087,766.67	\$707,048.33	\$1,794,815.00	\$27,194,166.67
6	\$1,087,766.67	\$679,854.17	\$1,767,620.83	\$26,106,400.00
7	\$1,087,766.67	\$652,660.00	\$1,740,426.67	\$25,018,633.33
8	\$1,087,766.67	\$625,465.83	\$1,713,232.50	\$23,930,866.67
9	\$1,087,766.67	\$598,271.67	\$1,686,038.33	\$22,843,100.00
10	\$1,087,766.67	\$571,077.50	\$1,658,844.17	\$21,755,333.33
11	\$1,087,766.67	\$543,883.33	\$1,631,650.00	\$20,667,566.67
12	\$1,087,766.67	\$516,689.17	\$1,604,455.83	\$19,579,800.00
13	\$1,087,766.67	\$489,495.00	\$1,577,261.67	\$18,492,033.33
14	\$1,087,766.67	\$462,300.83	\$1,550,067.50	\$17,404,266.67
15	\$1,087,766.67	\$435,106.67	\$1,522,873.33	\$16,316,500.00
16	\$1,087,766.67	\$407,912.50	\$1,495,679.17	\$15,228,733.33
17	\$1,087,766.67	\$380,718.33	\$1,468,485.00	\$14,140,966.67
18	\$1,087,766.67	\$353,524.17	\$1,441,290.83	\$13,053,200.00
19	\$1,087,766.67	\$326,330.00	\$1,414,096.67	\$11,965,433.33
20	\$1,087,766.67	\$299,135.83	\$1,386,902.50	\$10,877,666.67
21	\$1,087,766.67	\$271,941.67	\$1,359,708.33	\$9,789,900.00
22	\$1,087,766.67	\$244,747.50	\$1,332,514.17	\$8,702,133.33
23	\$1,087,766.67	\$217,553.33	\$1,305,320.00	\$7,614,366.67
24	\$1,087,766.67	\$190,359.17	\$1,278,125.83	\$6,526,600.00
25	\$1,087,766.67	\$163,165.00	\$1,250,931.67	\$5,438,833.33
26	\$1,087,766.67	\$135,970.83	\$1,223,737.50	\$4,351,066.67
27	\$1,087,766.67	\$108,776.67	\$1,196,543.33	\$3,263,300.00
28	\$1,087,766.67	\$81,582.50	\$1,169,349.17	\$2,175,533.33
29	\$1,087,766.67	\$54,388.33	\$1,142,155.00	\$1,087,766.67
30	\$1,087,766.67	\$27,194.17	\$1,114,960.83	\$0.00

**Halifax Regional Water Commission**  
**(“Halifax Water”)**  
**Stormwater Rate Study**  
**2022/23**

Prepared By:

Halifax Water Staff

## **Notes on Worksheet**

### **Worksheet SW-1: Comparative Statement of Operations**

Worksheet SW-1 provides a comparative Statement of Operations for Stormwater Services for fiscal years ending March 31 as follows:

- Actual results for the fiscal years 2018/19, 2019/20 and 2020/21 for Stormwater Services.
- Approved budgets by Halifax Water's Board of Commissioners for 2021/22 and 2022/23, with 2022/23 representing Test Year #1 for the purposes of the Rate Study.
- Projections for 2023/24, representing Test Year #2 for the purposes of the Rate Study.

Revenues are budgeted/projected based on current rates. This worksheet details the budgeted deficits at current rates in Stormwater Services for the two test years.

Stormwater Services had a cumulative surplus of \$3.5 million as at March 31, 2021 however, with budgeted deficits in 2021/22 and 2022/23 of \$4.9 million and \$4.2 million respectively, and a projected deficit of \$5.1 million in 2023/24, the projected accumulated deficit as at March 31, 2024 is estimated at \$10.7 million. Of note, the current forecast for the 2021/22 fiscal year to December 31, 2021 is reporting a projected loss of \$3.6 million, an improvement of approximately \$1.3 million compared to the approved budget. Based on this, the projected accumulated surplus as at March 31, 2021 would be \$9.6 million.

The calculation of the Revenue Requirement is shown on Worksheet SW-2.

Depreciation in Test Year #1 is \$255,000 lower than the 2022/23 operating budget. Both calculations begin with the same data, the 2022/23 capital budget. This is then adjusted to align with projected additions to rate-based assets. For the 2022/23 operating budget, the adjustment is amortized over forty years, whereas for the test year data the adjustment is prorated between assets classes, therefore spreading the depreciation more evenly amongst the asset classes. In addition, corporate projects are amortized over ten years within the 2022/23 operating budget, whereas for the test year data, projects are reviewed further and more appropriately aligned with an asset class, therefore allocating depreciation into future years. In addition,, the depreciation on donated assets within the operating budget is more refined as it is based on individual assets

instead of the overall depreciation.

**Worksheet SW-1**

<p style="text-align: center;"><b>Halifax Water</b>  <b>Stormwater Rate Study</b>  <b>Comparative Statement of Operations</b>  Fiscal Years ending March 31st</p>						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating revenues</b>						
Stormwater site related service	\$5,906,018	\$5,361,448	\$5,126,740	\$6,050,674	\$6,789,818	\$6,789,818
Stormwater right-of-way service	\$3,835,012	\$3,835,012	\$3,835,012	\$3,835,012	\$3,995,662	\$3,995,662
Late payment and other connection fees	\$118,476	\$81,129	\$37,696	\$104,400	\$103,700	\$103,700
Miscellaneous	\$120,294	\$93,731	\$101,894	\$97,337	\$97,337	\$97,337
<b>Total</b>	<b>\$9,979,800</b>	<b>\$9,371,320</b>	<b>\$9,101,342</b>	<b>\$10,087,423</b>	<b>\$10,986,517</b>	<b>\$10,986,517</b>
<b>Operating expenditures</b>						
Stormwater collection	\$4,901,148	\$4,752,846	\$4,700,418	\$5,885,469	\$5,281,085	\$5,425,260
Engineering and technology services	\$624,122	\$728,070	\$440,214	\$1,352,233	\$2,149,987	\$2,209,917
Technical services (SCADA)	\$49,147	\$55,548	\$61,691	\$43,887	\$15,317	\$15,788
Regulatory services	\$1,287,289	\$1,490,202	\$1,505,483	\$1,683,720	\$1,727,454	\$1,784,899
Customer service	\$334,590	\$370,354	\$277,705	\$341,031	\$203,273	\$209,519
Corporate services	\$0	\$0	\$0	\$214,342	\$145,503	\$149,296
Administration	\$521,581	\$484,119	\$482,143	\$338,174	\$286,895	\$295,045
Calculated Depreciation - Funded Assets	\$974,338	\$1,221,847	\$1,512,398	\$2,045,883	\$1,848,487	\$2,087,436
Calculated Depreciation - Donated Assets	\$0	\$0	\$0	\$0	\$484,586	\$484,586
<b>Total</b>	<b>\$8,692,215</b>	<b>\$9,102,986</b>	<b>\$8,980,052</b>	<b>\$11,904,739</b>	<b>\$12,142,587</b>	<b>\$12,661,746</b>
<b>Earnings from operations</b>	<b>\$1,287,585</b>	<b>\$268,334</b>	<b>\$121,290</b>	<b>(\$1,817,316)</b>	<b>(\$1,156,070)</b>	<b>(\$1,675,229)</b>
<b>Financial and other revenues</b>						
Investment Income	\$115,556	\$99,003	\$33,439	\$30,720	\$12,000	\$12,000
<b>Total</b>	<b>\$115,556</b>	<b>\$99,003</b>	<b>\$33,439</b>	<b>\$30,720</b>	<b>\$12,000</b>	<b>\$12,000</b>
<b>Financial and other expenditures</b>						
Interest on long term debt	\$567,419	\$609,939	\$684,835	\$790,928	\$723,495	\$841,746
Repayment on long term debt	\$1,320,318	\$1,474,566	\$1,805,866	\$2,156,424	\$2,148,202	\$2,382,880
Amortization of debt discount	\$11,005	\$13,365	\$18,291	\$24,816	\$22,282	\$23,392
Dividend/ grant in lieu of taxes	\$0	\$0	\$67,378	\$153,539	\$148,974	\$150,464
<b>Total</b>	<b>\$1,898,742</b>	<b>\$2,097,870</b>	<b>\$2,576,370</b>	<b>\$3,125,707</b>	<b>\$3,042,953</b>	<b>\$3,398,482</b>
<b>Earnings (loss) for the year</b>	<b>(\$495,601)</b>	<b>(\$1,730,533)</b>	<b>(\$2,421,641)</b>	<b>(\$4,912,303)</b>	<b>(\$4,187,023)</b>	<b>(\$5,061,711)</b>
<b>Surplus, beginning of year</b>	<b>\$8,158,789</b>	<b>\$7,663,188</b>	<b>\$5,932,655</b>	<b>\$3,511,014</b>	<b>(\$1,401,289)</b>	<b>(\$5,588,312)</b>
<b>Surplus, end of year</b>	<b>\$7,663,188</b>	<b>\$5,932,655</b>	<b>\$3,511,014</b>	<b>(\$1,401,289)</b>	<b>(\$5,588,312)</b>	<b>(\$10,650,023)</b>

## **Worksheet SW-2: Statement of Operating Expenditures and Revenue Requirements**

Worksheet SW-2 takes the operating and non-operating expenditure information from Worksheet SW-1 to develop revenue requirements for the test year 2022/23. The non-operating and other operating revenues are deducted from the expenditures to determine the revenue required from Stormwater Service customers.

Operating expenditures include a line item 'Calculated Depreciation – Donated Assets' which represents depreciation associated with contributed assets and represents a phase in of depreciation on contributed assets over a four (4) year period. The \$486 thousand is calculated as 25% of the current year's depreciation related to contributed assets of \$1.9 million.

Certain expenditures have been added back for the purposes of determining the revenue requirement. Adjustments include adding back the Stormwater portion of certain discretionary costs incurred by Halifax Water associated with sponsorships and donations, the Help for Others (H2O) Program, and an allocation of administrative costs.

Worksheet SW-2

<p style="text-align: center;"><b>Halifax Water</b> <b>Stormwater Rate Study</b> <b>Statement of Operating Expenditures and Revenue Requirements</b></p>						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating expenditures</b>						
Stormwater collection	\$4,901,148	\$4,752,846	\$4,700,418	\$5,885,469	\$5,281,085	\$5,425,260
Engineering and technology services	\$624,122	\$728,070	\$440,214	\$1,352,233	\$2,149,987	\$2,209,917
Technical services (SCADA)	\$49,147	\$55,548	\$61,691	\$43,887	\$15,317	\$15,788
Regulatory services	\$1,287,289	\$1,490,202	\$1,505,483	\$1,683,720	\$1,727,454	\$1,784,899
Customer service	\$334,590	\$370,354	\$277,705	\$341,031	\$203,273	\$209,519
Corporate services	\$0	\$0	\$0	\$214,342	\$145,503	\$149,296
Administration	\$521,581	\$484,119	\$482,143	\$338,174	\$286,895	\$295,045
Sub-total	\$7,717,877	\$7,881,139	\$7,467,654	\$9,858,856	\$9,809,514	\$10,089,724
Calculated depreciation - funded assets	\$974,338	\$1,221,847	\$1,512,398	\$2,045,883	\$1,848,487	\$2,087,436
Calculated depreciation - donated assets	\$0	\$0	\$0	\$0	\$484,586	\$484,586
<b>Total</b>	<b>\$8,692,215</b>	<b>\$9,102,986</b>	<b>\$8,980,052</b>	<b>\$11,904,739</b>	<b>\$12,142,587</b>	<b>\$12,661,746</b>
<b>Add: non-operating expenditures</b>						
Interest on long term debt	\$567,419	\$609,939	\$684,835	\$790,928	\$723,495	\$841,746
Repayment on long term debt	\$1,320,318	\$1,474,566	\$1,805,866	\$2,156,424	\$2,148,202	\$2,382,880
Amortization of debt discount	\$11,005	\$13,365	\$18,291	\$24,816	\$22,282	\$23,392
Dividend/ grant in lieu of taxes	\$0	\$0	\$67,378	\$153,539	\$148,974	\$150,464
Sub-total	\$1,898,742	\$2,097,870	\$2,576,370	\$3,125,707	\$3,042,953	\$3,398,482
Test year #1 - new interest on long term debt						\$247,694
Test year #1 - new repayment of long term debt						\$330,259
<b>Total</b>	<b>\$1,898,742</b>	<b>\$2,097,870</b>	<b>\$2,576,370</b>	<b>\$3,125,707</b>	<b>\$3,042,953</b>	<b>\$3,976,435</b>
<b>Less: other revenues</b>						
Investment Income	\$115,556	\$99,003	\$33,439	\$30,720	\$12,000	\$12,000
Late payment and other connection fees	\$118,476	\$81,129	\$37,696	\$104,400	\$103,700	\$103,700
Miscellaneous	\$120,294	\$93,731	\$101,894	\$97,337	\$97,337	\$97,337
<b>Total</b>	<b>\$354,326</b>	<b>\$273,863</b>	<b>\$173,029</b>	<b>\$232,457</b>	<b>\$213,037</b>	<b>\$213,037</b>
<b>Less: other adjustments</b>						
Sponsorships and donations	\$3,437	\$2,979	\$3,097	\$2,648	\$1,655	\$1,655
Help for Others (H2O) program	\$2,800	\$3,106	\$4,368	\$3,200	\$2,000	\$2,000
Administration				\$8,822	\$5,932	\$5,932
<b>Total</b>	<b>\$6,237</b>	<b>\$6,085</b>	<b>\$7,464</b>	<b>\$14,670</b>	<b>\$9,587</b>	<b>\$9,587</b>
<b>Revenue required from customers</b>	<b>\$10,230,394</b>	<b>\$10,920,908</b>	<b>\$11,375,929</b>	<b>\$14,783,319</b>	<b>\$14,962,916</b>	<b>\$16,415,558</b>

### Worksheet SW-3: Operating Expenditures and Financial Analysis

Worksheet W-4 details the operating expenditures by cost element group for each of the functional areas within the Stormwater Services, consisting of the following:

- Stormwater Collections.

For the following functional areas serving all three services of Halifax Water (Water, Wastewater and Stormwater), a summary has been provided outlining the cost effects as they pertain to Stormwater. Complete details for these functional areas can be found in the Water Rate Studies found in Appendix 1 of this Application.

- Technical Services (SCADA),
- Engineering and Technology Services (TS),
- Regulatory Services,
- Corporate Services, and
- Administration.

Data provided as part of the review and analysis includes:

- Actual results for 2018/19, 2019/20, and 2020/21,
- Approved budgets for 2021/22 and 2022/23 (Test Year # 1), and
- Projected results for 2023/24 (Test Year #2).

For operating expenditures related to 2023/24 (Test Year #2), the key assumptions regarding projected increases are as follows:

- Salaries and benefits: 3.5%
- Chemicals: 5.0%
- Electricity: 3.0%
- Other: 2.0%

On subsequent pages within this section, operating expenditures are reported for the core cost element groups within each functional area. As part of the analysis, variances have been provided with changes expressed as both dollar and percentage values, comparing year-over-year changes for the fiscal years 2019/20 through 2023/24. Commentary is provided for each of the cost elements groups falling within the functional areas, with additional details provided in situations where variances have increased over \$50 thousand.



### **Stormwater Collections**

- Salaries and Benefits - Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). It should be noted Wastewater and Stormwater Collections share the same wage pool, and therefore centrally managed. Cost fluctuations within one Service would have the opposite impact on the other. Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. In addition, salaries and benefits for Wastewater Collections reported an increase, indicating there was more of a focus on Wastewater operations during the period. For 2020/21 the situation was similar, where Wastewater operations reported an increase in salaries and benefits, with Stormwater operations reporting a decrease. Combined the overall increase was high however, this was due largely to additional personal protective equipment (PPE) required to operate during the pandemic. For 2021/22 focus of operations reverted to Stormwater, which reported an increase compared to Wastewater. Collectively the overall increase was high however, this was again attributed to required PPE and the hiring of a new senior manager for the Collections group. Stormwater operations costs decrease in 2022/23 with a corresponding increase in Wastewater operations. Collectively the overall increase was modest comparative to prior year's, and is due to a reduction in overtime costs to better reflect current spending levels, and having more time allocated to capital projects.
- Contract Services – Costs declined in 2019/20 as efforts were made to perform more work in-house as opposed to hiring external contractors. Where the Collections group is also responsible for Stormwater Collections, in 2020/21 and 2021/22 during the pandemic period, more focus was placed on stormwater maintenance services. With the increase in stormwater maintenance, there was a need to increase the usage of contract services such as traffic control, which added to costs during that period. Costs for 2022/23 decreased due to redirecting focus back to wastewater operations.
- Materials, Supplies & Services – Increased costs in both 2019/20 and 2020/21 were due to additional materials and supplies necessary where more work was performed internally versus outsourcing, as noted above. Additionally, there was an increase in purchasing of parts required to perform emergency repairs for combined sewer overflows (CSOs).
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.

Worksheet SW-3

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Stormwater Collections											
Salaries and benefits	\$1,886,699	\$1,743,043	\$1,431,339	\$2,441,003	\$2,212,575	\$2,290,015	(\$143,656) (8%)	(\$311,704) (18%)	\$1,009,664 71%	(\$228,428) (9%)	\$77,440 3%
Training and development	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Contract services	\$1,159,846	\$1,104,101	\$1,314,785	\$1,386,000	\$1,213,000	\$1,237,260	(\$55,745) (5%)	\$210,684 19%	\$71,215 5%	(\$173,000) (12%)	\$24,260 2%
Electricity	\$0	\$0	\$893	\$0	\$0	\$0	\$0 0%	\$893 0%	(\$893) (100%)	\$0 0%	\$0 0%
Materials, supplies and services	\$265,174	\$406,102	\$446,985	\$433,700	\$345,200	\$352,104	\$140,928 53%	\$40,883 10%	(\$13,285) (3%)	(\$88,500) (20%)	\$6,904 2%
Professional services	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Fleet services	\$949,166	\$838,792	\$698,563	\$922,954	\$873,041	\$890,502	(\$110,374) (12%)	(\$140,229) (17%)	\$224,391 32%	(\$49,913) (5%)	\$17,461 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$40,326	\$51,300	\$51,252	\$51,837	\$32,506	\$33,156	\$10,974 27%	(\$48) (0%)	\$585 1%	(\$19,331) (37%)	\$650 2%
Allocated from Wastewater Collection	\$599,937	\$609,508	\$756,601	\$649,975	\$604,763	\$622,223	\$9,571 2%	\$147,093 24%	(\$106,626) (14%)	(\$45,212) (7%)	\$17,460 3%
Total Stormwater Collections	\$4,901,148	\$4,752,846	\$4,700,418	\$5,885,469	\$5,281,085	\$5,425,260	(\$148,302) (3%)	(\$52,428) (1%)	\$1,185,051 25%	(\$604,384) (10%)	\$144,175 3%

**Technical Services (SCADA)**

A summary has been provided below for Technical Services (SCADA) outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Technical Services (SCADA) by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Technical Services (SCADA) during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed resulting in a reduction in the percentage of common costs allocated to Stormwater Services, from 3% to 1%. This includes the cost centers for Administration and Overheads (Technical Services), SCADA System, and Regional Technical Services. All other cost center allocations remain unchanged.

Halifax Water Stormwater Rate Study  Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Technical Services (SCADA)	\$49,147	\$55,548	\$61,691	\$43,887	\$15,317	\$15,788	\$6,401 13%	\$6,143 11%	(\$17,804) (29%)	(\$28,570) (65%)	\$471 3%

**Engineering and Technology Services (TS)**

A summary has been provided below for Engineering and Technology Services outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Engineering and Technology Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Engineering and Technology Services during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed resulting in an increase in the percentage of common costs allocated to Stormwater Services from 7% to 15%. This includes the cost centers for Administration and Overheads (Engineering and TS), Engineering Information, and Information Services. An increase is also proposed for the Asset Management and Capital Planning cost center, from 6% to 15%. Finally, a decrease is proposed for the Energy and Business Development cost center, from 4% to 0%. All other cost center allocations remain unchanged.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Engineering and Technology Services	\$624,122	\$728,070	\$440,214	\$1,352,233	\$2,149,987	\$2,209,917	\$103,948 17%	(\$287,856) (40%)	\$912,019 207%	\$797,754 59%	\$59,930 3%

**Regulatory Services**

A summary has been provided below for Regulatory Services outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Regulatory Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Regulatory Services during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed for the cost center Environmental Management System, resulting in an increase in the percentage of expenditures allocated to Stormwater Services from 0% to 20%. All other cost center allocations remain unchanged.

Halifax Water Stormwater Rate Study  Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Regulatory Services	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
	\$1,287,289	\$1,490,202	\$1,505,483	\$1,683,720	\$1,727,454	\$1,784,899	\$202,913 16%	\$15,281 1%	\$178,237 12%	\$43,734 3%	\$57,445 3%

**Customer Service**

A summary has been provided below for Customer Service outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Customer Service by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Customer Service during the period 2018/19 to 2023/24 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Customer Service	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
	\$334,590	\$370,354	\$277,705	\$341,031	\$203,273	\$209,519	\$35,764 11%	(\$92,649) (25%)	\$63,326 23%	(\$137,758) (40%)	\$6,246 3%

**Corporate Services**

A summary has been provided below for Corporate Services outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Corporate Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Corporate Services for 2021/22 are consistent with the allocations and the methodology identified in the Cost-of-Service Manual under the former System function “Administration and Pension”. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, costs related to Corporate Services were separated from the former “Administration and Pension” into two separate divisions within the organizational hierarchy. The allocations are consistent with those under the former Administration and Pension function.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Corporate Services	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
	\$0	\$0	\$0	\$214,342	\$145,503	\$149,296	\$0 0%	\$0 0%	\$214,342 0%	(\$68,839) (32%)	\$3,793 3%

**Administration**

A summary has been provided below for Administration outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Administration by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts reported below for Administration during the period 2018/19 to 2021/22 are consistent with the allocations and the methodology identified in the Cost-of-Service Manual under the System function “Administration and Pension”. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, costs related to Administration were separated from the former “Administration and Pension” within the organizational hierarchy. The allocations are consistent with those under the former Administration and Pension function.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Administration	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
	\$521,581	\$484,119	\$482,143	\$338,174	\$286,895	\$295,045	(\$37,462) (7%)	(\$1,976) (0%)	(\$143,969) (30%)	(\$51,279) (15%)	\$8,150 3%



#### **Worksheet SW-4: Service Area and Customer Balancing**

Worksheet SW-4 provides an account of the various components included in the Stormwater boundary, with reconciliation between the total impervious within the boundary and the billable impervious area for Site Related Flow and the Right-of-Way.

Customer information is provided for the billable impervious area related to the Site Related Flow for both residential and non-residential customers, including the tiered rate structure applicable to residential customers as outlined in Worksheet SW-4.

This worksheet incorporates updated high-resolution satellite imagery acquired in May 2020, and Halifax Water's most recent billing data. Information reported forms part of the proposed changes to the Cost-of-Service Manual contained in this Application.

Worksheet SW-4

Halifax Water  
Stormwater Rate Study

Service Area and Customer Balancing

Customer Data

System Data

Total Impervious Area within the Stormwater Boundary (in square meters) 98,809,690

Less:

Non-qualifying impervious area in parcels flagged as "Excluded"

Parcels outside the stormwater catchment

3,225,460

SRF Exempted parcels

2,245,350

Parcels identified as resource inside catchment

1,357,670

Parcels identified as unknown inside catchment

452,110

Non-qualifying impervious area in parcels flagged as "MICI"

Parcels over 50m<sup>2</sup>

3,724,430

Parcels under 50m<sup>2</sup>

394,265

Parcels under 50m<sup>2</sup>, having a culvert

14,500

SRF Exempted Parcels within stormwater catchment having a culvert

7,030

Parcels outside the stormwater catchment, having a culvert

4,460

Non-qualifying impervious area in parcels flagged as "Not Applicable"

Road parcel - arbitrary

20,200,900

Road parcel

8,695,070

Railroad Parcel

994,050

Water lot

113,820

Interim parcel

24,510

Water parcel

9,310

Unresolved parcel PID

4,910

Non-qualifying impervious area in parcels flagged as "Residential"

SRF Exempted Parcels within stormwater catchment having a culvert

109,270

Parcels outside the stormwater catchment, having a culvert

65,940

Interim parcel

1,390

(41,644,445)

Qualifying impervious area associated with Site Related Flow (SRF)

57,165,245

Qualifying impervious area associated with street rights-of-way, consists of:

Road parcel - arbitrary

20,200,900

Road parcel

8,695,070

28,895,970

Less: impervious area of the following stakeholders

Other

(14,780)

Billable impervious area associated with Right-of-Way (ROW)

28,881,190

Billable impervious area breakdown as follows:

Halifax (HRM)

23,564,330

Province of Nova Scotia

5,243,630

Halifax Dartmouth Bridge Commission

73,230

28,881,190

# Halifax Water Stormwater Rate Study

## Service Area and Customer Balancing

### Customer Data

#### Residential Customers:

	Tier	Tier Parameters * (in units)		Number of Parcels	Qualifying Impervious Area (square meters)
		from	to		
<u>Average Residential Size</u> ( Impervious Area/ # of Parcels)  <div>279 square meters</div>	1	less than	5 units	3,276	25,410
	2	5 units	20 units	34,701	5,395,110
	3	21 units	40 units	41,848	11,559,475
	4	41 units	80 units	8,569	4,494,815
	5	81 units	or more	1,690	2,793,700
Total qualifying impervious area				90,084	24,268,510
Less: Tier 1 parcels				(3,276)	(25,410)
Total billable impervious area				86,808	24,243,100

\* Each unit equals 10 square meters

#### Multi-residential, Industrial, Commercial and Institutional (MICI) Customers:

0-40 square meters	450	4,415
50 square meters or greater	8,159	32,891,350
Total qualifying impervious area	8,609	32,895,765
Less: parcels (1-40 square meters)	(450)	(4,415)
Total billable impervious area	8,159	32,891,350

#### Culvert only Customers \*\*

Residential	488	950
MICI	10	20
Total billable impervious area	498	970

\*\* Culvert only customers billed as

#### Reconciliation

Total qualifying impervious area	99,191	57,165,245
Less: exempt parcels		
Residential customers	(3,276)	(25,410)
MICI customers	(450)	(4,415)
Total billable impervious area	95,465	57,135,420

**Worksheet SW-5: Stormwater Customer Classifications, Cost Functions & Service Characteristics**

Worksheet SW-5 details the customer classifications, billing determinants, system functions with allocated percentages, service characteristics and operating and capital cost classifications for Stormwater Services as detailed in the Cost-of-Service Manual.

Worksheet SW-5

Halifax Water Stormwater Rate Study  Stormwater Customer Classifications, Cost Functions & Service Characteristics				
Customer Classifications				
Street Right-of-Way			Impervious Area	
Billing Determinants - System Wide				
Street Right-of-Way	28,881,190		Impervious Area	57,165,245
	33.56%			66.44%
System Functions				
Pipes, Manholes and Retention Ponds	Customer Service			
Combined Sewer Overflows	Administration			
Ditches and Culverts				
Catchbasins	Classification - Service Characteristics			
Regulatory Services	Street Right-of-Way Flow			
Engineering and Technology Services	Site Related Flow			
Technical Services (SCADA)	Customer Service			
Corporate Services	Indirect-General			
O&M and Capital Classifications				
	Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect-General
Function				
Pipes, Manholes and Retention Ponds	33.56%	66.44%	0.00%	0.00%
Combined Sewer Overflows	33.56%	66.44%	0.00%	0.00%
Ditches and Culverts	33.56%	66.44%	0.00%	0.00%
Catchbasins	100.00%	0.00%	0.00%	0.00%
Regulatory Services	0.00%	0.00%	0.00%	100.00%
Engineering and Technology Services	0.00%	0.00%	0.00%	100.00%
Technical Services (SCADA)	33.56%	66.44%	0.00%	0.00%
Corporate Services	0.00%	0.00%	0.00%	100.00%
Customer Service	0.00%	0.00%	100.00%	0.00%
Administration	0.00%	0.00%	0.00%	100.00%

**Worksheet SW-6: Operating Expense Cost Allocation**

Worksheet SW-6 details the Stormwater Service operating cost element groups, by the system functions detailed in the Cost-of-Service Manual. The total of the service functions equals the operating expense category in the revenue requirement in the test year 2022/23, and are reported as both dollar and percentage values. These are used in Worksheet SW-10 to allocate the operating and maintenance costs to the service characteristics.

## Worksheet SW-6

Halifax Water Stormwater Rate Study	
Allocated Stormwater O&M Expenses 2022/23	
	Test Year #1 2022/23 Budget
Stormwater Collections	
Salaries and benefits	\$2,212,575
Training and development	\$0
Contract services	\$1,213,000
Electricity	\$0
Materials, supplies and services	\$345,200
Professional services	\$0
Fleet services	\$873,041
Chemicals	\$0
Applied overheads and other allocations	\$32,506
Allocated from Wastewater Collection	\$604,763
Total Stormwater Collections	\$5,281,085
Regulatory Services	\$1,727,454
Engineering and Technology Services	\$2,149,987
Technical Services (SCADA)	\$15,317
Corporate Services	\$145,503
Customer Service	\$203,273
Administration	\$286,895
	\$4,528,429
Total O&M Expense	\$9,809,514

Halifax Water Stormwater Rate Study										
Operating Expense Cost Allocation Allocation of Costs to Functions 2022/23										
Pipes, Manholes and Retention Ponds	Combined Sewer Overflows	Ditches and Culverts	Catchbasins	Regulatory Services	Engineering and Technology Services	Technical Services (SCADA)	Corporate Services	Customer Service	Administration	Total
\$685,911	\$282,838	\$968,922	\$274,904							\$2,212,575
\$0	\$0	\$0	\$0							\$0
\$337,500	\$255,000	\$353,500	\$267,000							\$1,213,000
\$0	\$0	\$0								\$0
\$110,000	\$95,000	\$90,200	\$50,000							\$345,200
\$0	\$0	\$0	\$0							\$0
\$271,682	\$110,420	\$383,071	\$107,868							\$873,041
\$0	\$0	\$0	\$0							\$0
\$9,835	\$5,203	\$12,570	\$4,898							\$32,506
\$182,985	\$96,794	\$233,853	\$91,131							\$604,763
\$1,597,913	\$845,255	\$2,042,116	\$795,801	\$0	\$0	\$0	\$0	\$0	\$0	\$5,281,085
				\$1,727,454						\$1,727,454
					\$2,149,987					\$2,149,987
						\$15,317				\$15,317
							\$145,503			\$145,503
								\$203,273		\$203,273
									\$286,895	\$286,895
\$0	\$0	\$0	\$0	\$1,727,454	\$2,149,987	\$15,317	\$145,503	\$203,273	\$286,895	\$4,528,429
\$1,597,913	\$845,255	\$2,042,116	\$795,801	\$1,727,454	\$2,149,987	\$15,317	\$145,503	\$203,273	\$286,895	\$9,809,514

[illegible]



### **Worksheet SW-7: Continuity Schedule/ Depreciation for Utility Plant in Service**

Worksheet SW-7 provides additional detail on the following:

- Funded utility plant in service,
- Contributed assets,
- Projected utility plant in service additions, net of projected retirements,
- Accumulated depreciation, net of projected retirements,
- Calculated depreciation, and
- Projected net book value.

The spreadsheet is broken down by asset and class. For the purposes of the revenue requirement, depreciation for Stormwater transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services. The amount included in the revenue requirement in the rate study is \$484,586 (25% of \$1,938,344) as reported on Worksheets SW-1 (Comparative Statement of Operations) and SW-2 (Statement of Operating Expenditures and Revenue Requirements).

Halifax Regional Water Commission Utility Plant in Service-Stormwater  Continuity Schedule/ Depreciation for Utility Plant in Service 2022-23																		
	Useful Life in years	Funded Utility Plant in Service Mar-22	Contributed Utility Plant in Service Mar-22	Total Utility Plant in Service Mar-22	Work in Process approved in Previous Years 2022-23	Utility Plant in Service Additions 2022-23	Contributed Utility Plant in Service Additions 2022-23	Projected Retirements 2022-23	Projected Utility Plant in Service Mar-23	Accumulated Depreciation Mar-22	Accumulated Depreciation on funded assets Mar-22	Accumulated Depreciation on donated assets Mar-22	Projected Retirement of Accumulated Depreciation 2022-23	Projected Net Book Value before Depreciation Mar-23	Depreciation on donated assets 2022-23	Depreciation expense on funded assets 2022-23	Regulatory asset expense 2022-23	Projected Net Book Value after Depreciation Mar-23
Intangible Plant																		
Organization and Working Capital	10	791,319	-	791,319					791,319	237,545	237,545	-		553,774		79,132		474,642
		-	-	-					-	-	-	-		-				-
LAND AND LAND RIGHTS		-	-	-					-	-	-	-		-				-
Office Land		438,577	-	438,577		-			438,577	-	-	-		438,577				438,577
Easements & Rights of Ways		11,280	-	11,280					11,280	-	-	-		11,280				11,280
Structures		-	-	-					-	-	-	-		-				-
Retention Ponds	50 - 75	5,388,680	6,409,581	11,798,261		607,426			12,405,687	2,312,138	863,018	1,449,119		10,093,550	109,597	113,601	976	9,870,352
Gen. Structures & Improvements	75	2,507,505	101,112	2,608,616					2,608,616	147,689	133,683	14,007		2,460,927	1,574	50,949	-	2,408,405
Pipes		-	-	-					-	-	-	-		-				-
Stormwater Mains	75	20,218,943	84,951,362	105,170,305		2,162,500	109,500		107,442,305	27,515,302	1,119,975	26,395,327		79,927,003	1,153,625	288,430	-	78,484,947
Ditches & Culverts	20	15,755,969	7,990,424	23,746,393		1,659,500			25,405,893	3,169,227	1,657,549	1,511,678		22,236,666	185,652	427,292	-	21,623,722
Combined Sewers - Portion	75 - 100	10,354,587	12,088,641	22,443,227					22,443,227	3,092,999	1,440,614	1,652,385		19,350,228	143,115	124,124	1,036	19,082,989
Manholes and Catchbasins	20 - 50	5,194,880	12,488,712	17,683,592					17,683,592	2,713,680	554,925	2,158,755		14,969,912	272,460	118,376	-	14,579,076
Laterals	50	1,875,647	3,614,599	5,490,246		115,000			5,605,246	812,637	254,109	558,529		4,792,609	72,321	38,663	-	4,681,625
Equipment		-	-	-					-	-	-	-		-		-	-	-
Transportation Equipment	5	1,545,065	-	1,545,065		246,000			1,791,065	1,267,584	1,267,584	-		523,482		157,943	-	365,539
Office Furniture and Equipment	5 - 30	176,774	-	176,774					176,774	173,004	173,004	-		3,770	-	2,513	-	1,257
Computer Equipment and Software	3 - 10	4,597,916	-	4,597,916		978,595			5,576,511	2,018,236	2,018,236	-		3,558,276		602,117	-	2,956,159
Tools & Equipment	10 - 20	26,746	12,588	39,333		2,961			42,295	29,874	17,286	12,588		12,421	-	1,278	-	11,143
TOTAL		68,883,887	127,657,019	196,540,906	-	5,771,982	109,500	-	202,422,388	43,489,914	9,737,528	33,752,386	-	158,932,474	1,938,344	2,004,418	2,012	154,989,712

**Worksheet SW-8: Calculation of Depreciation of Tangible Plant at Total Cost, Functionalization of Depreciation**

Worksheet SW-8 allocates the projected annual depreciation for the test year 2022/23, including the phasing in of 25% of depreciation on donated assets, to the system functions based on their in-service use as detailed in the Cost-of-Service Manual. The functionalization of depreciation is reported as both a dollar and a percentage value. The percentages created are then used in Worksheet SW-10 to allocate depreciation to the service characteristics.

Worksheet SW-8

Halifax Water Stormwater Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2022/23	
	Annual Depreciation
<b>Intangible Plant</b>	
Organization and Working Capital	\$79,132
<b>Land and Land Rights</b>	
SW Office Land	\$0
SW Easements and Right-of-ways	\$0
<b>Stormwater Structures</b>	
SW Retention Ponds	\$141,976
SW General Structures and Improvements	\$51,342
<b>Stormwater Pipes</b>	
SW Mains	\$576,837
SW Culverts	\$473,705
SW Combined Sewers (SW portion only)	\$160,939
SW Manholes and Catchbasins	\$186,491
SW Laterals	\$56,743
<b>Stormwater Equipment</b>	
SW Office Furniture and Equipment	\$2,513
SW Information and Technology	\$602,117
SW Tools & Equipment	\$1,278
<b>Total</b>	<b>\$2,333,073</b>

Halifax Water Stormwater Rate Study									
Calculation of Depreciation of Tangible Plant at Total Cost Functionalization of Depreciation Expressed as a Percentage (%) 2022/23									
Pipes, Manholes and Retention Ponds	Combined Sewer Overflows	Ditches and Culverts	Catchbasins	Regulatory Services	Engineering and Technology Services	Technical Services (SCADA)	Corporate Services	Customer Service	Administration
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
25%	25%	25%	25%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
70%	10%	10%	10%	0%	0%	0%	0%	0%	0%



**Worksheet SW-9 Allocation of Utility Plant in Service, Functionalization of the Rate Base**

Worksheet SW-9 allocates the projected Utility Plant in Service for the test year 2022/23 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, reported as both a dollar and percentage value. These are used in Worksheet SW-10 to allocate debt servicing costs to the service characteristics.



Halifax Water Stormwater Rate Study					
Allocation of Utility Plant in Service 2022/23					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Contributed Plant, excluded from Rate Base	Rate Base (Col D - Col E)
Intangible Plant					
Organization and Working Capital	\$791,319	\$316,677	\$474,642	\$0	\$474,642
Land and Land Rights					
SW Office Land	\$438,577	\$0	\$438,577	\$0	\$438,577
SW Easements and Right-of-ways	\$11,280	\$0	\$11,280	\$0	\$11,280
Stormwater Structures					
SW Retention Ponds	\$12,405,687	\$2,535,335	\$9,870,352	\$4,850,865	\$5,019,487
SW General Structures and Improvements	\$2,608,616	\$200,212	\$2,408,405	\$85,532	\$2,322,873
Stormwater Pipes					
SW Mains	\$107,442,305	\$28,957,358	\$78,484,947	\$57,511,910	\$20,973,037
SW Culverts	\$25,405,893	\$3,782,171	\$21,623,722	\$6,293,094	\$15,330,628
SW Combined Sewers (SW portion only)	\$22,443,227	\$3,360,238	\$19,082,989	\$10,293,141	\$8,789,848
SW Manholes and Catchbasins	\$17,683,592	\$3,104,516	\$14,579,076	\$10,057,498	\$4,521,579
SW Laterals	\$5,605,246	\$923,621	\$4,681,625	\$2,983,750	\$1,697,875
Stormwater Equipment					
SW Transportation Equipment	\$1,791,065	\$1,425,526	\$365,539	\$0	\$365,539
Office Furniture and Equipment	\$176,774	\$175,518	\$1,257	\$0	\$1,257
SW Information and Technology	\$5,576,511	\$2,620,352	\$2,956,159	\$0	\$2,956,159
SW Tools & Equipment	\$42,295	\$31,152	\$11,143	\$0	\$11,143
Total	\$202,422,388	\$47,432,676	\$154,989,712	\$92,075,789	\$62,913,924

Halifax Water Stormwater Rate Study									
Allocation of Utility Plant in Service Functionalization of the Rate Base Expressed as a Percentage (%) 2022/23									
Pipes, Manholes and Retention Ponds	Combined Sewer Overflows	Ditches and Culverts	Catchbasins	Regulatory Services	Engineering and Technology Services	Technical Services (SCADA)	Corporate Services	Customer Service	Administration
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
25%	25%	25%	25%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
70%	10%	10%	10%	0%	0%	0%	0%	0%	0%



### **Worksheet SW-10: Stormwater Cost Classification & Unit Rate Calculations**

Worksheet SW-10 details the costs as allocated to the system functions in Worksheets WW-6, WW-8, and WW-9, and allocates them to the service characteristics based on the percentages for each characteristic detailed in the Cost-of-Service Manual. Allocations are performed within the categories of operation and maintenance, depreciation, debt service expenses, and dividend/grant in lieu, then Revenue Requirements are totaled for each of Street Right-of-Way and Site Related Flow.

Using the Equivalent Residential Unit (ERU), the standard median charge can be determined for Residential customers, which forms the basis for Residential tiering as reported on Worksheet SW-11. The rate for Multi-Residential, Industrial, Commercial, and Institutional (MICI) customers is also calculated, with this group billed based on impervious area of each individual MICI customer.

Worksheet SW-10

Halifax Water Stormwater Rate Study														
Stormwater Cost Classification & Unit Rate Calculations 2022/23														
Cost Classifications														
		Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect-General	Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect-General	Street Right-of-Way Flow	Site Related Flow	Customer Service	Total	
		Classification Percentages				Classification Amounts								
O&M Expenses by Function														
Pipes, Manholes and Retention Ponds		\$1,597,913	33.56%	66.44%	0.00%	0.00%	\$536,334	\$1,061,579	\$0	\$0	\$536,335	\$1,061,579	\$0	\$1,597,914
Combined Sewer Overflows		\$845,255	33.56%	66.44%	0.00%	0.00%	\$283,707	\$561,548	\$0	\$0	\$283,707	\$561,548	\$0	\$845,255
Ditches and Culverts		\$2,042,116	33.56%	66.44%	0.00%	0.00%	\$685,429	\$1,356,687	\$0	\$0	\$685,429	\$1,356,687	\$0	\$2,042,116
Catchbasins		\$795,801	100.00%	0.00%	0.00%	0.00%	\$795,801	\$0	\$0	\$0	\$795,801	\$0	\$0	\$795,801
Regulatory Services		\$1,727,454	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$1,727,454	\$724,447	\$939,159	\$63,848	\$1,727,454
Engineering and Technology Services		\$2,149,987	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$2,149,987	\$901,645	\$1,168,876	\$79,465	\$2,149,987
Technical Services (SCADA)		\$15,317	33.56%	66.44%	0.00%	0.00%	\$5,141	\$10,176	\$0	\$0	\$5,141	\$10,176	\$0	\$15,317
Corporate Services		\$145,503	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$145,503	\$61,020	\$79,105	\$5,378	\$145,503
Customer Service		\$203,273	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$203,273	\$0	\$0	\$0	\$203,273	\$203,273
Administration		\$286,895	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$286,895	\$120,316	\$155,975	\$10,604	\$286,895
Sub-Total		\$9,809,514					\$2,306,412	\$2,989,990	\$203,273	\$4,309,839	\$4,113,841	\$5,333,106	\$362,569	\$9,809,515
							42%	54%	4%					
Depreciation Expense by Function														
\$		2,333,073												
Pipes, Manholes and Retention Ponds	63.78%	\$1,488,034	33.56%	66.44%	0.00%	0.00%	\$499,453	\$988,581	\$0	\$0	\$499,453	\$988,581	\$0	\$1,488,034
Combined Sewer Overflows	32.71%	\$763,148	33.56%	66.44%	0.00%	0.00%	\$256,148	\$507,000	\$0	\$0	\$256,148	\$507,000	\$0	\$763,148
Ditches and Culverts	0.01%	\$233	33.56%	66.44%	0.00%	0.00%	\$78	\$155	\$0	\$0	\$78	\$155	\$0	\$233
Catchbasins	0.01%	\$233	100.00%	0.00%	0.00%	0.00%	\$233	\$0	\$0	\$0	\$233	\$0	\$0	\$233
Regulatory Services	0.00%	\$0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Engineering and Technology Services	0.00%	\$0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Technical Services (SCADA)	0.00%	\$0	33.56%	66.44%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Corporate Services	0.00%	\$0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Customer Service	0.00%	\$0	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Administration	3.50%	\$81,658	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$81,658	\$34,245	\$44,395	\$3,018	\$81,658
Sub-Total	100.01%	\$2,333,306					\$755,912	\$1,495,736	\$0	\$81,658	\$790,157	\$1,540,131	\$3,018	\$2,333,306
							34%	66%	0%					



Return and Rate Calculations									
Revenue Requirements				Street Right-of-Way Flow	Site Related Flow	Customer Service			Total
O&M Expenses		\$9,809,514		\$4,113,841	\$5,333,106	\$362,569			\$9,809,515
Depreciation Expenses		\$2,333,306		\$790,157	\$1,540,131	\$3,018			\$2,333,306
		\$12,142,820		\$4,903,998	\$6,873,237	\$365,587			\$12,142,821
Return Components									
Debt Service		\$2,894,268		\$976,562	\$1,915,534	\$2,283			\$2,894,380
Dividend/ grant in lieu of taxes		\$148,989		\$50,270	\$98,607	\$112			\$148,989
Less: Other Revenues		(\$213,037)		(\$71,879)	(\$140,991)	(\$168)			(\$213,038)
Less: Other Adjustments		(\$9,587)		(\$3,235)	(\$6,345)	(\$8)			(\$9,588)
		\$2,820,633		\$951,718	\$1,866,805	\$2,219			\$2,820,743
Total Revenue Requirements		\$14,963,453		\$5,855,716	\$8,740,042	\$367,806			\$14,963,564
Return Calculation				40.12%	59.88%	Directly Allocated Percentages			
Projected Utility Plant in Service, end of year		\$202,422,388		\$147,564	\$220,242	Indirect Cost Allocation			
Projected Accumulated Depreciation, end of year		(\$47,432,676)							
Projected Net Book Value, end of year		\$154,989,712							
Contributed Plant, excluded from Rate Base		(\$92,075,789)							
Rate Base		\$62,913,924							
Return on Rate Base		4.48%							
Billing Determinations									
Equivalent Residential Unit (ERU)		221							
Calculation of ERU's									
		Number of Parcels	ERUs per Parcel	Total ERU's					
ICI Customers (equivalent)		148,830	1	148,830					
Residential Customers									
Tier 1		3,276	exempt						
Tier 2		34,701	0.5	17,351					
Tier 3		41,848	1	41,848					
Tier 4		8,569	2	17,138					
Tier 5		1,690	3	5,070					
Culvert only Customers		498	0.5	249					
				230,485					
Rate Per Billing Unit									
ICI Customers		(Standard Median Charge-Residential/ ERU)				\$0.176	Charge per m2 of impervious area		
Residential Customers		(Revenue Requirement-Site Related Flow/ Total ERU's)				\$39.00	Standard Median Charge (annual fixed charge)		

## Worksheet SW-11: Residential Charges and Revenue Reconciliation

Worksheet SW-11 details the proposed rates for residential customers based on a tiered rate structure.

Worksheet SW-11 also provides a reconciliation of the Revenue Requirement from the two (2) sources, Street Right of Way and Site Related Flow, with the Site Related Flow broken down between ICI and Residential customers.

### Worksheet SW-11

<div> Halifax Water  Stormwater Rate Study  Residential Charges and Revenue Reconciliation </div>							
Calculation of Rates for Residential Customers							
Tier	Tier Parameters (in units)		Equivalent Residential Unit (ERU)	Rate per Billing Unit	Rate Adjustment	Tier Rate	Standard Annual Charge
Label	Each unit equals 10 square meters		A	B	C	B X C	A X B X C, rounded to the nearest \$
1	less than	5 units	221	\$0.176	0%	\$0.000	\$0.000
2	6 units	20 units	221	\$0.176	50%	\$0.088	\$19.000
3	21 units	40 units	221	\$0.176	100%	\$0.176	\$39.000
4	41 units	80 units	221	\$0.176	200%	\$0.352	\$78.000
5	81 units	or more	221	\$0.176	300%	\$0.528	\$117.000

Reconciliation of Revenue Requirement			
	Impervious Area	Number of Parcels	Revenue Requirement
Street Right-of Way (ROW)			
Halifax (HRM)			\$4,898,100
Province of Nova Scotia			\$1,089,900
Halifax Dartmouth Bridge Commission			\$15,200
Site Related Flow (SRF)			
Multi-Residential, Industrial, Commercial, Institutional (MICI)	32,891,350		\$0.176 \$5,788,878
Residential			
Tier 1	25,410	3,276	\$0.000 \$0
Tier 2	5,395,110	34,701	\$19.000 \$659,319
Tier 3	11,559,475	41,848	\$39.000 \$1,632,072
Tier 4	4,494,815	8,569	\$78.000 \$668,382
Tier 5	2,793,700	1,690	\$117.000 \$197,730
Culvert only Customers	970	498	\$19.000 \$9,462
Preliminary Revenue Total			\$14,959,043
Less: Revenue Requirement			(\$14,963,566)
Excess (deficiency) compared to Revenue Requirement			(\$4,524)

**Worksheet Appendix SW-1: Proposed Additions to Utility Plant in Service and Capital Funding**

Appendix SW-1 details the proposed additions to Utility Plant in Service and capital funding for the test year 2022/23.

Additions to Utility Plant in Service for 2022/23 are estimated based on status of capital work in progress (projects approved in prior fiscal years), the projects from the 2022/23 capital budget, and historical levels of contributed utility plant in service.

Halifax Water projects capital additions of \$5.9 million in assets to Utility Plant in Service during the 2022/23 fiscal year.

## Appendix SW-1

<b>Halifax Regional Water Commission</b> <b>Stormwater Rate Study</b> <b>Proposed Additions to Utility Plant in Service and Capital Funding</b> <b>2022/23</b>				
	Additions to the Utility Plant in Service	Capital Cost Contribution from Others	Utility Cost of Plant in Service	
<b>Land and Land Rights</b>				
SW Office Land	\$0	\$0	\$0	
SW Easements and Right-of-ways	\$0	\$0	\$0	
<b>Stormwater Structures</b>				
SW Retention Ponds	\$607,426	\$0	\$607,426	
SW General Structures and Improvements	\$0	\$0	\$0	
<b>Stormwater Pipes</b>				
SW Mains	\$2,272,000	\$109,500	\$2,162,500	
SW Culverts	\$1,659,500	\$0	\$1,659,500	
SW Combined Sewers (SW portion only)	\$0	\$0	\$0	
SW Manholes and Catchbasins	\$0	\$0	\$0	
SW Laterals	\$115,000	\$0	\$115,000	
<b>Stormwater Equipment</b>				
SW Transportation Equipment	\$246,000	\$0	\$246,000	
SW Office Furniture and Equipment	\$0	\$0	\$0	
SW Information and Technology	\$978,595	\$0	\$978,595	
SW Tools & Equipment	\$2,961	\$0	\$2,961	
<b>TOTAL</b>	<b>\$5,881,482</b>	<b>\$109,500</b>	<b>\$5,771,982</b>	
<b><u>Sources of Funding</u></b>				
Capital Cost Contributions	\$0	Depreciation Fund Balance, beginning of year	\$0	
Regional Development Charges	\$0	Add:		
External Funding	\$109,500	Interest earned on fund balance	\$0	
Contributions - Other	\$0	Depreciation funded in Current year	\$2,333,073	
Working Capital	(\$16,376,624)	Depreciation Fund Balance available	\$2,333,073	
Depreciation fund	\$2,333,073	Less:		
Long Term Debt	\$19,815,533	Expenditure in Current Year	(\$2,333,073)	
<b>TOTAL</b>	<b>\$5,881,482</b>	Depreciation Fund Balance, end of year	\$0	

**Worksheet Appendix SW-2: Amortization Schedule for Long Term Debt**

Appendix SW-2 details the amortization schedule of the proposed long-term debt associated with 2022/23. The amortization is based on a 30-year blended serial debenture at 2.5%. Debt servicing costs related to principle and interest will commence in test year 2023/24.



## Appendix SW-2

### Halifax Regional Water Commission Stormwater Rate Study

#### Amortization Schedule for Projected Long Term Debt 2022/23

Interest Rate	2.50%
Term in years	30
Capital	\$19,815,533

#### Amortization Schedule

Year	Principal	Interest	Total	Balance
1	\$660,518	\$495,388	\$1,155,906	\$19,155,016
2	\$660,518	\$478,875	\$1,139,393	\$18,494,498
3	\$660,518	\$462,362	\$1,122,880	\$17,833,980
4	\$660,518	\$445,850	\$1,106,367	\$17,173,462
5	\$660,518	\$429,337	\$1,089,854	\$16,512,945
6	\$660,518	\$412,824	\$1,073,341	\$15,852,427
7	\$660,518	\$396,311	\$1,056,828	\$15,191,909
8	\$660,518	\$379,798	\$1,040,316	\$14,531,391
9	\$660,518	\$363,285	\$1,023,803	\$13,870,873
10	\$660,518	\$346,772	\$1,007,290	\$13,210,356
11	\$660,518	\$330,259	\$990,777	\$12,549,838
12	\$660,518	\$313,746	\$974,264	\$11,889,320
13	\$660,518	\$297,233	\$957,751	\$11,228,802
14	\$660,518	\$280,720	\$941,238	\$10,568,285
15	\$660,518	\$264,207	\$924,725	\$9,907,767
16	\$660,518	\$247,694	\$908,212	\$9,247,249
17	\$660,518	\$231,181	\$891,699	\$8,586,731
18	\$660,518	\$214,668	\$875,186	\$7,926,213
19	\$660,518	\$198,155	\$858,673	\$7,265,696
20	\$660,518	\$181,642	\$842,160	\$6,605,178
21	\$660,518	\$165,129	\$825,647	\$5,944,660
22	\$660,518	\$148,617	\$809,134	\$5,284,142
23	\$660,518	\$132,104	\$792,621	\$4,623,624
24	\$660,518	\$115,591	\$776,108	\$3,963,107
25	\$660,518	\$99,078	\$759,595	\$3,302,589
26	\$660,518	\$82,565	\$743,083	\$2,642,071
27	\$660,518	\$66,052	\$726,570	\$1,981,553
28	\$660,518	\$49,539	\$710,057	\$1,321,036
29	\$660,518	\$33,026	\$693,544	\$660,518
30	\$660,518	\$16,513	\$677,031	\$0

**Halifax Regional Water Commission**  
**(“Halifax Water”)**  
**Stormwater Rate Study**  
**2023/24**

Prepared By:

Halifax Water Staff

## **Notes on Worksheet**

### **Worksheet SW-1: Comparative Statement of Operations**

Worksheet SW-1 provides a comparative Statement of Operations for Stormwater Services for fiscal years ending March 31 as follows:

- Actual results for the fiscal years 2018/19, 2019/20 and 2020/21 for Stormwater Services.
- Approved budgets by Halifax Water's Board of Commissioners for 2021/22 and 2022/23, with 2022/23 representing Test Year #1 for the purposes of the Rate Study.
- Projections for 2023/24, representing Test Year #2 for the purposes of the Rate Study.

Revenues are budgeted/projected based on current rates. This worksheet details the budgeted deficits at current rates in Stormwater Services for the two test years.

Stormwater Services had a cumulative surplus of \$3.5 million as at March 31, 2021 however, with budgeted deficits in 2021/22 and 2022/23 of \$4.9 million and \$4.2 million respectively, and a projected deficit of \$5.1 million in 2023/24, the projected accumulated deficit as at March 31, 2024 is estimated at \$10.7 million. Of note, the current forecast for the 2021/22 fiscal year to December 31, 2021 is reporting a projected loss of \$3.6 million, an improvement of approximately \$1.3 million compared to the approved budget. Based on this, the projected accumulated surplus as at March 31, 2021 would be \$9.6 million.

The calculation of the Revenue Requirement is shown on Worksheet SW-2.

Depreciation in Test Year #2 has been calculated the same way as Test Year #1, there is no approved operating budget to compare against. The calculation begins with the same data, the 2023/24 capital budget. This is then adjusted to align with projected additions to rate-based assets. For an operating budget, the adjustment is amortized over forty years, whereas for the test year data the adjustment is prorated between assets classes, therefore spreading the depreciation more evenly amongst the asset classes. In addition, corporate projects are amortized over ten years within an operating budget, whereas for the test year data, projects are reviewed further and more appropriately aligned with an asset class, therefore allocating depreciation into future years. In addition,, the depreciation on donated assets within the operating budget is more refined as it is based on individual assets instead of the overall depreciation

**Worksheet SW-1**

<p style="text-align: center;"><b>Halifax Water</b> <b>Stormwater Rate Study</b>  <b>Comparative Statement of Operations</b> Fiscal Years ending March 31st</p>						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating revenues</b>						
Stormwater site related service	\$5,906,018	\$5,361,448	\$5,126,740	\$6,050,674	\$6,789,818	\$6,789,818
Stormwater right-of-way service	\$3,835,012	\$3,835,012	\$3,835,012	\$3,835,012	\$3,995,662	\$3,995,662
Late payment and other connection fees	\$118,476	\$81,129	\$37,696	\$104,400	\$103,700	\$103,700
Miscellaneous	\$120,294	\$93,731	\$101,894	\$97,337	\$97,337	\$97,337
<b>Total</b>	<b>\$9,979,800</b>	<b>\$9,371,320</b>	<b>\$9,101,342</b>	<b>\$10,087,423</b>	<b>\$10,986,517</b>	<b>\$10,986,517</b>
<b>Operating expenditures</b>						
Stormwater collection	\$4,901,148	\$4,752,846	\$4,700,418	\$5,885,469	\$5,281,085	\$5,425,260
Engineering and technology services	\$624,122	\$728,070	\$440,214	\$1,352,233	\$2,149,987	\$2,209,917
Technical services (SCADA)	\$49,147	\$55,548	\$61,691	\$43,887	\$15,317	\$15,788
Regulatory services	\$1,287,289	\$1,490,202	\$1,505,483	\$1,683,720	\$1,727,454	\$1,784,899
Customer service	\$334,590	\$370,354	\$277,705	\$341,031	\$203,273	\$209,519
Corporate services	\$0	\$0	\$0	\$214,342	\$145,503	\$149,296
Administration	\$521,581	\$484,119	\$482,143	\$338,174	\$286,895	\$295,045
Calculated Depreciation - Funded Assets	\$974,338	\$1,221,847	\$1,512,398	\$2,045,883	\$1,848,487	\$2,087,436
Calculated Depreciation - Donated Assets	\$0	\$0	\$0	\$0	\$484,586	\$484,586
<b>Total</b>	<b>\$8,692,215</b>	<b>\$9,102,986</b>	<b>\$8,980,052</b>	<b>\$11,904,739</b>	<b>\$12,142,587</b>	<b>\$12,661,746</b>
<b>Earnings from operations</b>	<b>\$1,287,585</b>	<b>\$268,334</b>	<b>\$121,290</b>	<b>(\$1,817,316)</b>	<b>(\$1,156,070)</b>	<b>(\$1,675,229)</b>
<b>Financial and other revenues</b>						
Investment Income	\$115,556	\$99,003	\$33,439	\$30,720	\$12,000	\$12,000
<b>Total</b>	<b>\$115,556</b>	<b>\$99,003</b>	<b>\$33,439</b>	<b>\$30,720</b>	<b>\$12,000</b>	<b>\$12,000</b>
<b>Financial and other expenditures</b>						
Interest on long term debt	\$567,419	\$609,939	\$684,835	\$790,928	\$723,495	\$841,746
Repayment on long term debt	\$1,320,318	\$1,474,566	\$1,805,866	\$2,156,424	\$2,148,202	\$2,382,880
Amortization of debt discount	\$11,005	\$13,365	\$18,291	\$24,816	\$22,282	\$23,392
Dividend/ grant in lieu of taxes	\$0	\$0	\$67,378	\$153,539	\$148,974	\$150,464
<b>Total</b>	<b>\$1,898,742</b>	<b>\$2,097,870</b>	<b>\$2,576,370</b>	<b>\$3,125,707</b>	<b>\$3,042,953</b>	<b>\$3,398,482</b>
<b>Earnings (loss) for the year</b>	<b>(\$495,601)</b>	<b>(\$1,730,533)</b>	<b>(\$2,421,641)</b>	<b>(\$4,912,303)</b>	<b>(\$4,187,023)</b>	<b>(\$5,061,711)</b>
<b>Surplus, beginning of year</b>	<b>\$8,158,789</b>	<b>\$7,663,188</b>	<b>\$5,932,655</b>	<b>\$3,511,014</b>	<b>(\$1,401,289)</b>	<b>(\$5,588,312)</b>
<b>Surplus, end of year</b>	<b>\$7,663,188</b>	<b>\$5,932,655</b>	<b>\$3,511,014</b>	<b>(\$1,401,289)</b>	<b>(\$5,588,312)</b>	<b>(\$10,650,023)</b>

## **Worksheet SW-2: Statement of Operating Expenditures and Revenue Requirements**

Worksheet SW-2 takes the operating and non-operating expenditure information from Worksheet SW-1 to develop revenue requirements for the test year 2023/24. The non-operating and other operating revenues are deducted from the expenditures to determine the revenue required from Stormwater Service customers.

Operating expenditures include a line item 'Calculated Depreciation – Donated Assets' which represents depreciation associated with contributed assets and represents a phase in of depreciation on contributed assets over a four (4) year period. The \$486 thousand is calculated as 25% of the current year's depreciation related to contributed assets of \$1.9 million.

Certain expenditures have been added back for the purposes of determining the revenue requirement. Adjustments include adding back the Stormwater portion of certain discretionary costs incurred by Halifax Water associated with sponsorships and donations, the Help for Others (H2O) Program, and an allocation of administrative costs.

**Worksheet SW-2**

<p style="text-align: center;"><b>Halifax Water</b> <b>Stormwater Rate Study</b>  <b>Statement of Operating Expenditures and Revenue Requirements</b></p>						
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
<b>Operating expenditures</b>						
Stormwater collection	\$4,901,148	\$4,752,846	\$4,700,418	\$5,885,469	\$5,281,085	\$5,425,260
Engineering and technology services	\$624,122	\$728,070	\$440,214	\$1,352,233	\$2,149,987	\$2,209,917
Technical services (SCADA)	\$49,147	\$55,548	\$61,691	\$43,887	\$15,317	\$15,788
Regulatory services	\$1,287,289	\$1,490,202	\$1,505,483	\$1,683,720	\$1,727,454	\$1,784,899
Customer service	\$334,590	\$370,354	\$277,705	\$341,031	\$203,273	\$209,519
Corporate services	\$0	\$0	\$0	\$214,342	\$145,503	\$149,296
Administration	\$521,581	\$484,119	\$482,143	\$338,174	\$286,895	\$295,045
Sub-total	\$7,717,877	\$7,881,139	\$7,467,654	\$9,858,856	\$9,809,514	\$10,089,724
Calculated depreciation - funded assets	\$974,338	\$1,221,847	\$1,512,398	\$2,045,883	\$1,848,487	\$2,087,436
Calculated depreciation - donated assets	\$0	\$0	\$0	\$0	\$484,586	\$484,586
<b>Total</b>	<b>\$8,692,215</b>	<b>\$9,102,986</b>	<b>\$8,980,052</b>	<b>\$11,904,739</b>	<b>\$12,142,587</b>	<b>\$12,661,746</b>
<b>Add: non-operating expenditures</b>						
Interest on long term debt	\$567,419	\$609,939	\$684,835	\$790,928	\$723,495	\$841,746
Repayment on long term debt	\$1,320,318	\$1,474,566	\$1,805,866	\$2,156,424	\$2,148,202	\$2,382,880
Amortization of debt discount	\$11,005	\$13,365	\$18,291	\$24,816	\$22,282	\$23,392
Dividend/ grant in lieu of taxes	\$0	\$0	\$67,378	\$153,539	\$148,974	\$150,464
Sub-total	\$1,898,742	\$2,097,870	\$2,576,370	\$3,125,707	\$3,042,953	\$3,398,482
Test year #1 - new interest on long term debt						\$247,694
Test year #1 - new repayment of long term debt						\$330,259
<b>Total</b>	<b>\$1,898,742</b>	<b>\$2,097,870</b>	<b>\$2,576,370</b>	<b>\$3,125,707</b>	<b>\$3,042,953</b>	<b>\$3,976,435</b>
<b>Less: other revenues</b>						
Investment Income	\$115,556	\$99,003	\$33,439	\$30,720	\$12,000	\$12,000
Late payment and other connection fees	\$118,476	\$81,129	\$37,696	\$104,400	\$103,700	\$103,700
Miscellaneous	\$120,294	\$93,731	\$101,894	\$97,337	\$97,337	\$97,337
<b>Total</b>	<b>\$354,326</b>	<b>\$273,863</b>	<b>\$173,029</b>	<b>\$232,457</b>	<b>\$213,037</b>	<b>\$213,037</b>
<b>Less: other adjustments</b>						
Sponsorships and donations	\$3,437	\$2,979	\$3,097	\$2,648	\$1,655	\$1,655
Help for Others (H2O) program	\$2,800	\$3,106	\$4,368	\$3,200	\$2,000	\$2,000
Administration				\$8,822	\$5,932	\$5,932
<b>Total</b>	<b>\$6,237</b>	<b>\$6,085</b>	<b>\$7,464</b>	<b>\$14,670</b>	<b>\$9,587</b>	<b>\$9,587</b>
<b>Revenue required from customers</b>	<b>\$10,230,394</b>	<b>\$10,920,908</b>	<b>\$11,375,929</b>	<b>\$14,783,319</b>	<b>\$14,962,916</b>	<b>\$16,415,558</b>

### Worksheet SW-3: Operating Expenditures and Financial Analysis

Worksheet W-4 details the operating expenditures by cost element group for each of the functional areas within the Stormwater Services, consisting of the following:

- Stormwater Collections.

For the following functional areas serving all three services of Halifax Water (Water, Wastewater and Stormwater), a summary has been provided outlining the cost effects as they pertain to Stormwater. Complete details for these functional areas can be found in the Water Rate Studies found in Appendix 1 of this Application.

- Technical Services (SCADA),
- Engineering and Technology Services (TS),
- Regulatory Services,
- Corporate Services, and
- Administration.

Data provided as part of the review and analysis includes:

- Actual results for 2018/19, 2019/20, and 2020/21,
- Approved budgets for 2021/22 and 2022/23 (Test Year # 1), and
- Projected results for 2023/24 (Test Year #2).

For operating expenditures related to 2023/24 (Test Year #2), the key assumptions regarding projected increases are as follows:

- Salaries and benefits: 3.5%
- Chemicals: 5.0%
- Electricity: 3.0%
- Other: 2.0%

On subsequent pages within this section, operating expenditures are reported for the core cost element groups within each functional area. As part of the analysis, variances have been provided with changes expressed as both dollar and percentage values, comparing year-over-year changes for the fiscal years 2019/20 through 2023/24. Commentary is provided for each of the cost elements groups falling within the functional areas, with additional details provided in situations where variances have increased over \$50 thousand.

### **Stormwater Collections**

- Salaries and Benefits - Costs are reflective of normal increases for unionized staff in accordance with the respective collective agreements, and for non-union staff typically based on the Consumer Price Index (CPI). It should be noted Wastewater and Stormwater Collections share the same wage pool, and therefore centrally managed. Cost fluctuations within one Service would have the opposite impact on the other. Costs in 2019/20 increased at a higher rate than expected due to retroactive pay increases for unionized staff effective November 1, 2018, paid in August 2019. In addition, salaries and benefits for Wastewater Collections reported an increase, indicating there was more of a focus on Wastewater operations during the period. For 2020/21, the situation was similar, where Wastewater operations reported an increase in salaries and benefits, with Stormwater operations reporting a decrease. Combined the overall increase was high however, this was due largely to additional personal protective equipment (PPE) required to operate during the pandemic. For 2021/22 focus of operations reverted to Stormwater, which reported an increase compared to Wastewater. Collectively the overall increase was high however, this was again attributed to required PPE and the hiring of a new senior manager for the Collections group. Stormwater operations costs decrease in 2022/23 with a corresponding increase in Wastewater operations. Collectively the overall increase was modest comparative to prior year's, and is due to a reduction in overtime costs to better reflect current spending levels, and having more time allocated to capital projects.
- Contract Services – Costs declined in 2019/20 as efforts were made to perform more work in-house as opposed to hiring external contractors. Where the Collections group is also responsible for Stormwater Collections, in 2020/21 and 2021/22 during the pandemic period, more focus was placed on stormwater maintenance services. With the increase in stormwater maintenance, there was a need to increase the usage of contract services such as traffic control, which added to costs during that period. Costs for 2022/23 decreased due to redirecting focus back to wastewater operations.
- Materials, Supplies & Services – Increased costs in both 2019/20 and 2020/21 were due to additional materials and supplies necessary where more work was performed internally versus outsourcing, as noted above. Additionally, there was an increase in purchasing of parts required to perform emergency repairs for combined sewer overflows (CSOs).
- Fleet Services – Costs are assigned to various business units based on the types of vehicles and/or equipment required to meet operational needs. Costs decreased in 2020/21 as a result in how costs were allocated to shared services.



Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Stormwater Collections											
Salaries and benefits	\$1,886,699	\$1,743,043	\$1,431,339	\$2,441,003	\$2,212,575	\$2,290,015	(\$143,656) (8%)	(\$311,704) (18%)	\$1,009,664 71%	(\$228,428) (9%)	\$77,440 3%
Training and development	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Contract services	\$1,159,846	\$1,104,101	\$1,314,785	\$1,386,000	\$1,213,000	\$1,237,260	(\$55,745) (5%)	\$210,684 19%	\$71,215 5%	(\$173,000) (12%)	\$24,260 2%
Electricity	\$0	\$0	\$893	\$0	\$0	\$0	\$0 0%	\$893 0%	(\$893) (100%)	\$0 0%	\$0 0%
Materials, supplies and services	\$265,174	\$406,102	\$446,985	\$433,700	\$345,200	\$352,104	\$140,928 53%	\$40,883 10%	(\$13,285) (3%)	(\$88,500) (20%)	\$6,904 2%
Professional services	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Fleet services	\$949,166	\$838,792	\$698,563	\$922,954	\$873,041	\$890,502	(\$110,374) (12%)	(\$140,229) (17%)	\$224,391 32%	(\$49,913) (5%)	\$17,461 2%
Chemicals	\$0	\$0	\$0	\$0	\$0	\$0	\$0 0%	\$0 0%	\$0 0%	\$0 0%	\$0 0%
Applied overheads and other allocations	\$40,326	\$51,300	\$51,252	\$51,837	\$32,506	\$33,156	\$10,974 27%	(\$48) (0%)	\$585 1%	(\$19,331) (37%)	\$650 2%
Allocated from Wastewater Collection	\$599,937	\$609,508	\$756,601	\$649,975	\$604,763	\$622,223	\$9,571 2%	\$147,093 24%	(\$106,626) (14%)	(\$45,212) (7%)	\$17,460 3%
Total Stormwater Collections	\$4,901,148	\$4,752,846	\$4,700,418	\$5,885,469	\$5,281,085	\$5,425,260	(\$148,302) (3%)	(\$52,428) (1%)	\$1,185,051 25%	(\$604,384) (10%)	\$144,175 3%

**Technical Services (SCADA)**

A summary has been provided below for Technical Services (SCADA) outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Technical Services (SCADA) by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Technical Services (SCADA) during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed resulting in a reduction in the percentage of common costs allocated to Stormwater Services, from 3% to 1%. This includes the cost centers for Administration and Overheads (Technical Services), SCADA System, and Regional Technical Services. All other cost center allocations remain unchanged.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Technical Services (SCADA)	\$49,147	\$55,548	\$61,691	\$43,887	\$15,317	\$15,788	\$6,401 13%	\$6,143 11%	(\$17,804) (29%)	(\$28,570) (65%)	\$471 3%

**Engineering and Technology Services (TS)**

A summary has been provided below for Engineering and Technology Services outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Engineering and Technology Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Engineering and Technology Services during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23, and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed resulting in an increase in the percentage of common costs allocated to Stormwater Services from 7% to 15%. This includes the cost centers for Administration and Overheads (Engineering and TS), Engineering Information, and Information Services. An increase is also proposed for the Asset Management and Capital Planning cost center, from 6% to 15%. Finally, a decrease is proposed for the Energy and Business Development cost center, from 4% to 0%. All other cost center allocations remain unchanged.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Engineering and Technology Services	\$624,122	\$728,070	\$440,214	\$1,352,233	\$2,149,987	\$2,209,917	\$103,948 17%	(\$287,856) (40%)	\$912,019 207%	\$797,754 59%	\$59,930 3%

## Regulatory Services

A summary has been provided below for Regulatory Services outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Regulatory Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Regulatory Services during the period 2018/19 to 2021/22 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, allocations have changed for the cost center Environmental Management System, resulting in an increase in the percentage of expenditures allocated to Stormwater Services from 0% to 20%. All other cost center allocations remain unchanged.

Halifax Water Stormwater Rate Study  Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Regulatory Services	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
	\$1,287,289	\$1,490,202	\$1,505,483	\$1,683,720	\$1,727,454	\$1,784,899	\$202,913 16%	\$15,281 1%	\$178,237 12%	\$43,734 3%	\$57,445 3%

**Customer Service**

A summary has been provided below for Customer Service outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Customer Service by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Customer Service during the period 2018/19 to 2023/24 inclusive are consistent with the allocations and the methodology identified in the Cost-of-Service Manual.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Customer Service	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
	\$334,590	\$370,354	\$277,705	\$341,031	\$203,273	\$209,519	\$35,764 11%	(\$92,649) (25%)	\$63,326 23%	(\$137,758) (40%)	\$6,246 3%

**Corporate Services**

A summary has been provided below for Corporate Services outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Corporate Services by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts allocated from Corporate Services for 2021/22 are consistent with the allocations and the methodology identified in the Cost-of-Service Manual under the former System function “Administration and Pension”. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, costs related to Corporate Services were separated from the former “Administration and Pension” into two separate divisions within the organizational hierarchy. The allocations are consistent with those under the former Administration and Pension function.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
Corporate Services	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
	\$0	\$0	\$0	\$214,342	\$145,503	\$149,296	\$0 0%	\$0 0%	\$214,342 0%	(\$68,839) (32%)	\$3,793 3%

**Administration**

A summary has been provided below for Administration outlining the cost impacts of this function relative to Stormwater Services. Complete details relating to operating expenditures for Administration by cost element group during the period, including commentary, can be found in the Water Rate Studies, in Appendix 1 of this Application.

Amounts reported below for Administration during the period 2018/19 to 2021/22 are consistent with the allocations and the methodology identified in the Cost-of-Service Manual under the System function “Administration and Pension”. For 2022/23 and beyond, as part of the proposed changes to the Cost-of-Service Manual contained in this Application, costs related to Administration were separated from the former “Administration and Pension” within the organizational hierarchy. The allocations are consistent with those under the former Administration and Pension function.

Halifax Water Stormwater Rate Study											
Operating Expenditures and Financial Analysis (excluding depreciation expense)											
	Operating Expenditures						Changes ( year over year - \$ and % )				
	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget	2019/20 Actual	2020/21 Actual	2021/22 Budget	Test Year #1 2022/23 Budget	Test Year #2 2023/24 Budget
Administration	\$521,581	\$484,119	\$482,143	\$338,174	\$286,895	\$295,045	(\$37,462) (7%)	(\$1,976) (0%)	(\$143,969) (30%)	(\$51,279) (15%)	\$8,150 3%

#### **Worksheet SW-4: Service Area and Customer Balancing**

Worksheet SW-4 provides an account of the various components included in the Stormwater boundary, with reconciliation between the total impervious within the boundary and the billable impervious area for Site Related Flow and the Right-of-Way.

Customer information is provided for the billable impervious area related to the Site Related Flow for both residential and non-residential customers, including the tiered rate structure applicable to residential customers as outlined in Worksheet SW-4.

This worksheet incorporates updated high-resolution satellite imagery acquired in May 2020, and Halifax Water's most recent billing data. Information reported forms part of the proposed changes to the Cost-of-Service Manual contained in this Application.



Halifax Water  
Stormwater Rate Study

Service Area and Customer Balancing

Customer Data

System Data

Total Impervious Area within the Stormwater Boundary (in square meters) 98,809,690

Less:

Non-qualifying impervious area in parcels flagged as "Excluded"

Parcels outside the stormwater catchment	3,225,460
SRF Exempted parcels	2,245,350
Parcels identified as resource inside catchment	1,357,670
Parcels identified as unknown inside catchment	452,110

Non-qualifying impervious area in parcels flagged as "MICI"

Parcels over 50m <sup>2</sup>	3,724,430
Parcels under 50m <sup>2</sup>	394,265
Parcels under 50m <sup>2</sup> , having a culvert	14,500
SRF Exempted Parcels within stormwater catchment having a culvert	7,030
Parcels outside the stormwater catchment, having a culvert	4,460

Non-qualifying impervious area in parcels flagged as "Not Applicable"

Road parcel - arbitrary	20,200,900
Road parcel	8,695,070
Railroad Parcel	994,050
Water lot	113,820
Interim parcel	24,510
Water parcel	9,310
Unresolved parcel PID	4,910

Non-qualifying impervious area in parcels flagged as "Residential"

SRF Exempted Parcels within stormwater catchment having a culvert	109,270
Parcels outside the stormwater catchment, having a culvert	65,940
Interim parcel	1,390

(41,644,445)

Qualifying impervious area associated with Site Related Flow (SRF)

57,165,245

Qualifying impervious area associated with street rights-of-way, consists of:

Road parcel - arbitrary	20,200,900
Road parcel	8,695,070
	28,895,970

Less: impervious area of the following stakeholders

Other	(14,780)
-------	----------

Billable impervious area associated with Right-of-Way (ROW)

28,881,190

Billable impervious area breakdown as follows:

Halifax (HRM)	23,564,330	
Province of Nova Scotia	5,243,630	
Halifax Dartmouth Bridge Commission	73,230	28,881,190

## Halifax Water Stormwater Rate Study

### Service Area and Customer Balancing

#### Customer Data

##### Residential Customers:

	Tier	Tier Parameters * (in units)		Number of Parcels	Qualifying Impervious Area (square meters)
		from	to		
<div>Average Residential Size ( Impervious Area/ # of Parcels)</div> <div><div>279</div> square meters</div>	1	less than	5 units	3,276	25,410
	2	5 units	20 units	34,701	5,395,110
	3	21 units	40 units	41,848	11,559,475
	4	41 units	80 units	8,569	4,494,815
	5	81 units	or more	1,690	2,793,700
	Total qualifying impervious area			90,084	24,268,510
Less: Tier 1 parcels			(3,276)	(25,410)	
Total billable impervious area			86,808	24,243,100	

\* Each unit equals 10 square meters

##### Multi-residential, Industrial, Commercial and Institutional (MICI) Customers:

0-40 square meters	450	4,415	
50 square meters or greater	8,159	32,891,350	
Total qualifying impervious area	8,609	32,895,765	
Less: parcels (1-40 square meters)	(450)	(4,415)	
Total billable impervious area	8,159	32,891,350	

##### Culvert only Customers \*\*

Residential	488	950	
MICI	10	20	
Total billable impervious area	498	970	

\*\* Culvert only customers billed as

##### Reconciliation

Total qualifying impervious area	99,191	57,165,245
Less: exempt parcels		
Residential customers	(3,276)	(25,410)
MICI customers	(450)	(4,415)
Total billable impervious area	95,465	57,135,420

**Worksheet SW-5: Stormwater Customer Classifications, Cost Functions & Service Characteristics**

Worksheet SW-5 details the customer classifications, billing determinants, system functions with allocated percentages, service characteristics and operating and capital cost classifications for Stormwater Services as detailed in the Cost-of-Service Manual.

Worksheet SW-5

Halifax Water Stormwater Rate Study  Stormwater Customer Classifications, Cost Functions & Service Characteristics				
Customer Classifications				
Street Right-of-Way			Impervious Area	
Billing Determinants - System Wide				
Street Right-of-Way	28,881,190		Impervious Area	57,165,245
	33.56%			66.44%
System Functions				
Pipes, Manholes and Retention Ponds	Customer Service			
Combined Sewer Overflows	Administration			
Ditches and Culverts				
Catchbasins	Classification - Service Characteristics			
Regulatory Services	Street Right-of-Way Flow			
Engineering and Technology Services	Site Related Flow			
Technical Services (SCADA)	Customer Service			
Corporate Services	Indirect-General			
O&M and Capital Classifications				
	Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect-General
Function				
Pipes, Manholes and Retention Ponds	33.56%	66.44%	0.00%	0.00%
Combined Sewer Overflows	33.56%	66.44%	0.00%	0.00%
Ditches and Culverts	33.56%	66.44%	0.00%	0.00%
Catchbasins	100.00%	0.00%	0.00%	0.00%
Regulatory Services	0.00%	0.00%	0.00%	100.00%
Engineering and Technology Services	0.00%	0.00%	0.00%	100.00%
Technical Services (SCADA)	33.56%	66.44%	0.00%	0.00%
Corporate Services	0.00%	0.00%	0.00%	100.00%
Customer Service	0.00%	0.00%	100.00%	0.00%
Administration	0.00%	0.00%	0.00%	100.00%

**Worksheet SW-6: Operating Expense Cost Allocation**

Worksheet SW-6 details the Stormwater Service operating cost element groups, by the system functions detailed in the Cost-of-Service Manual. The total of the service functions equals the operating expense category in the revenue requirement in the test year 2023/24, and are reported as both dollar and percentage values. These are used in Worksheet SW-10 to allocate the operating and maintenance costs to the service characteristics.

Halifax Water Stormwater Rate Study	
Allocated Stormwater O&M Expenses 2023/24	
	Test Year #2 2023/24 Budget
Stormwater Collections	
Salaries and benefits	\$2,290,015
Training and development	\$0
Contract services	\$1,237,260
Electricity	\$0
Materials, supplies and services	\$352,104
Professional services	\$0
Fleet services	\$890,502
Chemicals	\$0
Applied overheads and other allocations	\$33,156
Allocated from Wastewater Collection	\$622,223
Total Stormwater Collections	\$5,425,260
Regulatory Services	\$1,784,899
Engineering and Technology Services	\$2,209,917
Technical Services (SCADA)	\$15,788
Corporate Services	\$149,296
Customer Service	\$209,519
Administration	\$295,045
	\$4,664,464
Total O&M Expense	\$10,089,724

Halifax Water Stormwater Rate Study										
Operating Expense Cost Allocation Allocation of Costs to Functions 2023/24										
Pipes, Manholes and Retention Ponds	Combined Sewer Overflows	Ditches and Culverts	Catchbasins	Regulatory Services	Engineering and Technology Services	Technical Services (SCADA)	Corporate Services	Customer Service	Administration	Total
\$709,918	\$292,737	\$1,002,834	\$284,526							\$2,290,015
\$0	\$0	\$0	\$0							\$0
\$344,250	\$260,100	\$360,570	\$272,340							\$1,237,260
\$0	\$0	\$0	\$0							\$0
\$112,200	\$96,900	\$92,004	\$51,000							\$352,104
\$0	\$0	\$0	\$0							\$0
\$277,116	\$112,628	\$390,732	\$110,025							\$890,501
\$0	\$0	\$0	\$0							\$0
\$9,871	\$5,337	\$12,923	\$5,025							\$33,156
\$188,279	\$99,454	\$240,838	\$93,652							\$622,223
\$1,641,634	\$867,156	\$2,099,901	\$816,568	\$0	\$0	\$0	\$0	\$0	\$0	\$5,425,259
				\$1,784,899						\$1,784,899
					\$2,209,917					\$2,209,917
						\$15,788				\$15,788
							\$149,296			\$149,296
								\$209,519		\$209,519
									\$295,045	\$295,045
\$0	\$0	\$0	\$0	\$1,784,899	\$2,209,917	\$15,788	\$149,296	\$209,519	\$295,045	\$4,664,464
\$1,641,634	\$867,156	\$2,099,901	\$816,568	\$1,784,899	\$2,209,917	\$15,788	\$149,296	\$209,519	\$295,045	\$10,089,723

Halifax Water Stormwater Rate Study	
Allocated Stormwater O&M Expenses 2023/24	
	Test Year #2 2023/24 Budget
<b>Stormwater Collections</b>	
Salaries and benefits	\$2,290,015
Training and development	\$0
Contract services	\$1,237,260
Electricity	\$0
Materials, supplies and services	\$352,104
Professional services	\$0
Fleet services	\$890,502
Chemicals	\$0
Applied overheads and other allocations	\$33,156
Allocated from Wastewater Collection	\$622,223
<b>Total Stormwater Collections</b>	<b>\$5,425,260</b>
<b>Regulatory Services</b>	\$1,784,899
<b>Engineering and Technology Services</b>	\$2,209,917
<b>Technical Services (SCADA)</b>	\$15,788
<b>Corporate Services</b>	\$149,296
<b>Customer Service</b>	\$209,519
<b>Administration</b>	\$295,045
<b>Total O&amp;M Expense</b>	<b>\$4,664,464</b>
	<b>\$10,089,724</b>

Halifax Water Stormwater Rate Study									
Operating Expense Cost Allocation Percent of Costs to Functions 2023/24									
Pipes, Manholes and Retention Ponds	Combined Sewer Overflows	Ditches and Culverts	Catchbasins	Regulatory Services	Engineering and Technology Services	Technical Services (SCADA)	Corporate Services	Customer Service	Administration
31%	13%	44%	12%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
28%	21%	29%	22%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
32%	28%	26%	14%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
31%	13%	44%	12%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
30%	16%	39%	15%	0%	0%	0%	0%	0%	0%
30%	16%	39%	15%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

### **Worksheet SW-7: Continuity Schedule/ Depreciation for Utility Plant in Service**

Worksheet SW-7 provides additional detail on the following:

- Funded utility plant in service,
- Contributed assets,
- Projected utility plant in service additions, net of projected retirements,
- Accumulated depreciation, net of projected retirements,
- Calculated depreciation, and
- Projected net book value.

The spreadsheet is broken down by asset and class. For the purposes of the revenue requirement, depreciation for Stormwater transportation equipment is excluded since the associated depreciation is expensed in the operating and maintenance expenses of the various System functions, under fleet services. The amount included in the revenue requirement in the rate study is \$484,586 (25% of \$1,938,344) as reported on Worksheets SW-1 (Comparative Statement of Operations) and SW-2 (Statement of Operating Expenditures and Revenue Requirements).



Halifax Regional Water Commission Utility Plant in Service-Stormwater  Continuity Schedule/ Depreciation for Utility Plant in Service 2023-24																		
	Useful Life in years	Funded Utility Plant in Service Mar-23	Contributed Utility Plant in Service Mar-23	Total Utility Plant in Service Mar-23	Work in Process approved in Previous Years 2023-24	Utility Plant in Service Additions 2023-24	Contributed Utility Plant in Service Additions 2023-24	Projected Retirements 2023-24	Projected Utility Plant in Service Mar-24	Accumulated Depreciation Mar-23	Accumulated Depreciation on funded assets Mar-23	Accumulated Depreciation on donated assets Mar-23	Projected Retirement of Accumulated Depreciation 2023-24	Projected Net Book Value before Depreciation Mar-24	Depreciation on donated assets 2023-24	Depreciation expense on funded assets 2023-24	Regulatory asset expense 2023-24	Projected Net Book Value after Depreciation Mar-24
Intangible Plant																		
Organization and Working Capital	10	791,319	-	791,319					791,319	316,677	316,677	-		474,642		76,257		398,385
		-	-	-					-	-	-	-		-				-
LAND AND LAND RIGHTS		-	-	-					-	-	-	-		-				-
Office Land		438,577	-	438,577		-			438,577	-	-	-		438,577				438,577
Easements & Rights of Ways		11,280	-	11,280					11,280	-	-	-		11,280				11,280
Structures		-	-	-					-	-	-	-		-				-
Retention Ponds	50 - 75	5,996,107	6,409,581	12,405,687		2,272,800			14,678,487	2,535,335	976,620	1,558,716		12,143,152	109,597	142,404	976	11,891,152
Gen. Structures & Improvements	75	2,507,505	101,112	2,608,616					2,608,616	200,212	184,632	15,580		2,408,405	1,574	50,949	-	2,355,882
Pipes		-	-	-					-	-	-	-		-			-	-
Stormwater Mains	75	22,381,443	85,060,862	107,442,305		9,675,000	10,220,000		127,337,305	28,957,358	1,408,406	27,548,952		98,379,947	1,153,625	367,347	-	96,858,974
Ditches & Culverts	20	17,415,469	7,990,424	25,405,893		3,300,000			28,705,893	3,782,171	2,084,841	1,697,330		24,923,722	185,652	460,355	-	24,277,714
Combined Sewers - Portion	75 - 100	10,354,587	12,088,641	22,443,227					22,443,227	3,360,238	1,564,738	1,795,500		19,082,989	143,115	124,124	1,036	18,815,750
Manholes and Catchbasins	20 - 50	5,194,880	12,488,712	17,683,592					17,683,592	3,104,516	673,301	2,431,215		14,579,076	272,460	118,376	-	14,188,241
Laterals	50	1,990,647	3,614,599	5,605,246		115,000			5,720,246	923,621	292,772	630,849		4,796,625	72,321	40,963	-	4,683,341
Equipment		-	-	-					-	-	-	-		-		-	-	-
Transportation Equipment	5	1,791,065	-	1,791,065		348,000			2,139,065	1,425,526	1,425,526	-		713,539		179,303	-	534,236
Office Furniture and Equipment	5 - 30	176,774	-	176,774					176,774	175,518	175,518	-		1,257	-	1,257	-	-
Computer Equipment and Software	3 - 10	5,576,511	-	5,576,511		1,639,000			7,215,511	2,620,352	2,620,352	-		4,595,159		702,113	-	3,893,045
Tools & Equipment	10 - 20	29,707	12,588	42,295		-			42,295	31,152	18,564	12,588		11,143	-	1,280	-	9,863
TOTAL		74,655,870	127,766,519	202,422,388	-	17,349,800	10,220,000	-	229,992,188	47,432,676	11,741,946	35,690,730	-	182,559,512	1,938,344	2,264,728	2,012	178,356,441
TOTAL		74,655,870	127,766,519	202,422,388	-	17,349,800	10,220,000	-	229,992,188	47,432,676	11,741,946	35,690,730	-	182,559,512	1,938,344	2,264,728	2,012	178,356,441

**Worksheet SW-8: Calculation of Depreciation of Tangible Plant at Total Cost, Functionalization of Depreciation**

Worksheet SW-8 allocates the projected annual depreciation for the test year 2023/24, including the phasing in of 25% of depreciation on donated assets, to the system functions based on their in-service use as detailed in the Cost-of-Service Manual. The functionalization of depreciation is reported as both a dollar and a percentage value. The percentages created are then used in Worksheet SW-10 to allocate depreciation to the service characteristics.

Worksheet SW-8

Halifax Water Stormwater Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2023/24	
	Annual Depreciation
<b>Intangible Plant</b>	
Organization and Working Capital	\$76,257
<b>Land and Land Rights</b>	
SW Office Land	\$0
SW Easements and Right-of-ways	\$0
<b>Stormwater Structures</b>	
SW Retention Ponds	\$170,779
SW General Structures and Improvements	\$51,342
<b>Stormwater Pipes</b>	
SW Mains	\$655,753
SW Culverts	\$506,768
SW Combined Sewers (SW portion only)	\$160,939
SW Manholes and Catchbasins	\$186,491
SW Laterals	\$59,043
<b>Stormwater Equipment</b>	
SW Office Furniture and Equipment	\$1,257
SW Information and Technology	\$702,113
SW Tools & Equipment	\$1,280
<b>Total</b>	<b>\$2,572,022</b>

Halifax Water Stormwater Rate Study									
Calculation of Depreciation of Tangible Plant at Total Cost Functionalization of Depreciation Expressed as a Percentage (%) 2023/24									
Pipes, Manholes and Retention Ponds	Combined Sewer Overflows	Ditches and Culverts	Catchbasins	Regulatory Services	Engineering and Technology Services	Technical Services (SCADA)	Corporate Services	Customer Service	Administration
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
25%	25%	25%	25%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
70%	10%	10%	10%	0%	0%	0%	0%	0%	0%

Halifax Water Stormwater Rate Study	
Calculation of Depreciation of Tangible Plant at Total Cost 2023/24	
	Annual Depreciation
<b>Intangible Plant</b>	
Organization and Working Capital	\$76,257
<b>Land and Land Rights</b>	
SW Office Land	\$0
SW Easements and Right-of-ways	\$0
<b>Stormwater Structures</b>	
SW Retention Ponds	\$170,779
SW General Structures and Improvements	\$51,342
<b>Stormwater Pipes</b>	
SW Mains	\$655,753
SW Culverts	\$506,768
SW Combined Sewers (SW portion only)	\$160,939
SW Manholes and Catchbasins	\$186,491
SW Laterals	\$59,043
<b>Stormwater Equipment</b>	
SW Office Furniture and Equipment	\$1,257
SW Information and Technology	\$702,113
SW Tools & Equipment	\$1,280
<b>Total</b>	<b>\$2,572,022</b>

[illegible]

**Worksheet SW-9 Allocation of Utility Plant in Service, Functionalization of the Rate Base**

Worksheet SW-9 allocates the projected Utility Plant in Service for the test year 2023/24 to the system functions based on their in-service use as detailed in the Cost-of-Service Manual, reported as both a dollar and percentage value. These are used in Worksheet SW-10 to allocate debt servicing costs to the service characteristics.

# Worksheet SW-9

Halifax Water Stormwater Rate Study					
Allocation of Utility Plant in Service 2023/24					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Contributed Plant, excluded from Rate Base	Rate Base (Col D - Col E)
<b>Intangible Plant</b>					
Organization and Working Capital	791,319	392,934	398,385	0	398,385
<b>Land and Land Rights</b>					
SW Office Land	438,577	0	438,577	0	438,577
SW Easements and Right-of-ways	11,280	0	11,280	0	11,280
<b>Stormwater Structures</b>					
SW Retention Ponds	14,678,487	2,787,335	11,891,152	4,741,269	7,149,883
SW General Structures and Improvements	2,608,616	252,734	2,355,882	83,958	2,271,924
<b>Stormwater Pipes</b>					
SW Mains	127,337,305	30,478,330	96,858,974	66,578,284	30,280,690
SW Culverts	28,705,893	4,428,179	24,277,714	6,107,442	18,170,273
SW Combined Sewers (SW portion only)	22,443,227	3,627,477	18,815,750	10,150,025	8,665,724
SW Manholes and Catchbasins	17,683,592	3,495,351	14,188,241	9,785,038	4,403,203
SW Laterals	5,720,246	1,036,905	4,683,341	2,911,429	1,771,912
<b>Stormwater Equipment</b>					
SW Transportation Equipment	2,139,065	1,604,829	534,236	0	534,236
Office Furniture and Equipment	176,774	176,774	0	0	0
SW Information and Technology	7,215,511	3,322,466	3,893,045	0	3,893,045
SW Tools & Equipment	42,295	32,432	9,863	0	9,863
<b>Total</b>	<b>229,992,188</b>	<b>51,635,747</b>	<b>178,356,441</b>	<b>100,357,445</b>	<b>77,998,996</b>

0

[illegible]

Halifax Water Stormwater Rate Study					
Allocation of Utility Plant in Service 2023/24					
	Projected Utility Plant in Service, end of year	Projected Accumulated Depreciation, end of year	Projected Net Book Value, end of year	Contributed Plant, excluded from Rate Base	Rate Base (Col D - Col E)
Intangible Plant					
Organization and Working Capital	791,319	392,934	398,385	0	398,385
Land and Land Rights					
SW Office Land	438,577	0	438,577	0	438,577
SW Easements and Right-of-ways	11,280	0	11,280	0	11,280
Stormwater Structures					
SW Retention Ponds	14,678,487	2,787,335	11,891,152	4,741,269	7,149,883
SW General Structures and Improvements	2,608,616	252,734	2,355,882	83,958	2,271,924
Stormwater Pipes					
SW Mains	127,337,305	30,478,330	96,858,974	66,578,284	30,280,690
SW Culverts	28,705,893	4,428,179	24,277,714	6,107,442	18,170,273
SW Combined Sewers (SW portion only)	22,443,227	3,627,477	18,815,750	10,150,025	8,665,724
SW Manholes and Catchbasins	17,683,592	3,495,351	14,188,241	9,785,038	4,403,203
SW Laterals	5,720,246	1,036,905	4,683,341	2,911,429	1,771,912
Stormwater Equipment					
SW Transportation Equipment	2,139,065	1,604,829	534,236	0	534,236
Office Furniture and Equipment	176,774	176,774	0	0	0
SW Information and Technology	7,215,511	3,322,466	3,893,045	0	3,893,045
SW Tools & Equipment	42,295	32,432	9,863	0	9,863
Total	229,992,188	51,635,747	178,356,441	100,357,445	77,998,996

Halifax Water Stormwater Rate Study									
Allocation of Utility Plant in Service Functionalization of the Rate Base Expressed as a Percentage (%) 2023/24									
Pipes, Manholes and Retention Ponds	Combined Sewer Overflows	Ditches and Culverts	Catchbasins	Regulatory Services	Engineering and Technology Services	Technical Services (SCADA)	Corporate Services	Customer Service	Administration
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
25%	25%	25%	25%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
70%	10%	10%	10%	0%	0%	0%	0%	0%	0%

### **Worksheet SW-10: Stormwater Cost Classification & Unit Rate Calculations**

Worksheet SW-10 details the costs as allocated to the system functions in Worksheets WW-6, WW-8, and WW-9, and allocates them to the service characteristics based on the percentages for each characteristic detailed in the Cost-of-Service Manual. Allocations are performed within the categories of operation and maintenance, depreciation, debt service expenses, and dividend/grant in lieu, then Revenue Requirements are totaled for each of Street Right-of-Way and Site Related Flow.

Using the Equivalent Residential Unit (ERU), the standard median charge can be determined for Residential customers, which forms the basis for Residential tiering as reported on Worksheet SW-11. The rate for Multi-Residential, Industrial, Commercial, and Institutional (MICI) customers is also calculated, with this group billed based on impervious area of each individual MICI customer.



Worksheet SW-10

Halifax Water Stormwater Rate Study														
Stormwater Cost Classification & Unit Rate Calculations 2023/24														
Cost Classifications														
O&M Expenses by Function		Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect-General	Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect-General	Street Right-of-Way Flow	Site Related Flow	Customer Service	Total	
		Classification Percentages				Classification Amounts								
Pipes, Manholes and Retention Ponds	1,641,634	33.56%	66.44%	0.00%	0.00%	\$551,009	\$1,090,625	\$0	\$0	\$551,010	\$1,090,625	\$0	\$1,641,635	
Combined Sewer Overflows	867,156	33.56%	66.44%	0.00%	0.00%	\$291,058	\$576,098	\$0	\$0	\$291,058	\$576,098	\$0	\$867,156	
Ditches and Culverts	2,099,901	33.56%	66.44%	0.00%	0.00%	\$704,825	\$1,395,076	\$0	\$0	\$704,825	\$1,395,076	\$0	\$2,099,901	
Catchbasins	816,568	100.00%	0.00%	0.00%	0.00%	\$816,568	\$0	\$0	\$0	\$816,568	\$0	\$0	\$816,568	
Regulatory Services	1,784,899	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$1,784,899	\$748,243	\$970,473	\$66,183	\$1,784,899	
Engineering and Technology Services	2,209,917	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$2,209,917	\$926,414	\$1,201,561	\$81,942	\$2,209,917	
Technical Services (SCADA)	15,788	33.56%	66.44%	0.00%	0.00%	\$5,299	\$10,489	\$0	\$0	\$5,299	\$10,489	\$0	\$15,788	
Corporate Services	149,296	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$149,296	\$62,586	\$81,174	\$5,536	\$149,296	
Customer Service	209,519	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$209,519	\$0	\$0	\$0	\$209,519	\$209,519	
Administration	295,045	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$295,045	\$123,685	\$160,420	\$10,940	\$295,045	
Sub-Total	10,089,723					\$2,368,759	\$3,072,288	\$209,519	\$4,439,157	\$4,229,687	\$5,485,917	\$374,120	\$10,089,724	
						42%	54%	4%						
Depreciation Expense by Function														
\$	2,572,022													
Pipes, Manholes and Retention Ponds	63.42%	1,631,176	33.56%	66.44%	0.00%	0.00%	\$547,499	\$1,083,677	\$0	\$0	\$547,499	\$1,083,677	\$0	\$1,631,176
Combined Sewer Overflows	33.56%	863,171	33.56%	66.44%	0.00%	0.00%	\$289,720	\$573,451	\$0	\$0	\$289,720	\$573,451	\$0	\$863,171
Ditches and Culverts	0.00%	0	33.56%	66.44%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Catchbasins	0.00%	0	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Regulatory Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Engineering and Technology Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Technical Services (SCADA)	0.00%	0	33.56%	66.44%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Corporate Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Customer Service	0.00%	0	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Administration	3.01%	77,418	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$77,418	\$32,454	\$42,093	\$2,871	\$77,418
Sub-Total	99.99%	2,571,765					\$837,219	\$1,657,128	\$0	\$77,418	\$869,673	\$1,699,221	\$2,871	\$2,571,765
						34%	66%	0%						

Cost Classifications														
			Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect-General	Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect-General	Street Right-of-Way Flow	Site Related Flow	Customer Service	Total
			Classification Percentages				Classification Amounts							
Debt Service Expenses by Function														
\$	3,825,971													
Pipes, Manholes and Retention Ponds	82.13%	3,142,270	33.56%	66.44%	0.00%	0.00%	\$1,054,692	\$2,087,578	\$0	\$0	\$1,054,692	\$2,087,578	\$0	\$3,142,270
Combined Sewer Overflows	16.11%	616,364	33.56%	66.44%	0.00%	0.00%	\$206,880	\$409,484	\$0	\$0	\$206,880	\$409,484	\$0	\$616,364
Ditches and Culverts	0.00%	0	33.56%	66.44%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Catchbasins	0.00%	0	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Regulatory Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Engineering and Technology Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Technical Services (SCADA)	0.00%	0	33.56%	66.44%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Corporate Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Customer Service	0.00%	0	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Administration	1.76%	67,337	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$67,337	\$28,228	\$36,612	\$2,497	\$67,337
Sub-Total	100.00%	3,825,971					\$1,261,572	\$2,497,062	\$0	\$67,337	\$1,289,800	\$2,533,674	\$2,497	\$3,825,971
Dividend/ grant in lieu of taxes														
\$	150,464													
Pipes, Manholes and Retention Ponds	82.13%	123,576	33.56%	66.44%	0.00%	0.00%	\$41,478	\$82,098	\$0	\$0	\$41,478	\$82,098	\$0	\$123,576
Combined Sewer Overflows	16.11%	24,240	33.56%	66.44%	0.00%	0.00%	\$8,136	\$16,104	\$0	\$0	\$8,136	\$16,104	\$0	\$24,240
Ditches and Culverts	0.00%	0	33.56%	66.44%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Catchbasins	0.00%	0	100.00%	0.00%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Regulatory Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Engineering and Technology Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Technical Services (SCADA)	0.00%	0	33.56%	66.44%	0.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Corporate Services	0.00%	0	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Customer Service	0.00%	0	0.00%	0.00%	100.00%	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Administration	1.76%	2,648	0.00%	0.00%	0.00%	100.00%	\$0	\$0	\$0	\$2,648	\$1,110	\$1,440	\$98	\$2,648
Sub-Total		150,464					\$49,614	\$98,202	\$0	\$2,648	\$50,724	\$99,642	\$98	\$150,464
34.00% 66.00% 0.00%														

Return and Rate Calculations									
Revenue Requirements				Street Right-of-Way Flow	Site Related Flow	Customer Service			Total
O&M Expenses		\$10,089,723		\$4,229,687	\$5,485,917	\$374,120			\$10,089,724
Depreciation Expenses		\$2,571,765		\$869,673	\$1,699,221	\$2,871			\$2,571,765
		\$12,661,488		\$5,099,361	\$7,185,138	\$376,990			\$12,661,489
Return Components									
Debt Service		\$3,825,971		\$1,289,800	\$2,533,674	\$2,595			\$3,826,069
Dividend/ grant in lieu of taxes		\$150,464		\$50,724	\$99,642	\$98			\$150,464
Less: Other Revenues		(\$213,037)		(\$71,817)	(\$141,076)	(\$144)			(\$213,037)
Less: Other Adjustments		(\$9,587)		(\$3,232)	(\$6,348)	(\$6)			(\$9,586)
		\$3,753,811		\$1,265,475	\$2,485,892	\$2,543			\$3,753,910
Total Revenue Requirements		\$16,415,299		\$6,364,836	\$9,671,030	\$379,534			\$16,415,399
Return Calculation				39.69%	60.31%	Directly Allocated Percentages			
Projected Utility Plant in Service, end of year		\$229,992,188		\$150,637	\$228,897	Indirect Cost Allocation			
Projected Accumulated Depreciation, end of year		(\$51,635,747)							
Projected Net Book Value, end of year		\$178,356,441							
Contributed Plant, excluded from Rate Base		(\$100,357,445)							
Rate Base		\$77,998,996							
Return on Rate Base		4.81%							
Billing Determinations									
Equivalent Residential Unit (ERU)		221							
Calculation of ERU's									
		Number of Parcels	ERUs per Parcel	Total ERU's					
ICI Customers (equivalent)		148,830	1	148,830					
Residential Customers									
Tier 1		3,276	exempt						
Tier 2		34,701	0.5	17,351					
Tier 3		41,848	1	41,848					
Tier 4		8,569	2	17,138					
Tier 5		1,690	3	5,070					
Culvert only Customers		498	0.5	249					
				230,485					
Rate Per Billing Unit									
ICI Customers		(Standard Median Charge-Residential/ ERU)				\$0.195 Charge per m2 of impervious area			
Residential Customers		(Revenue Requirement-Site Related Flow/ Total ERU's)				\$43.00 Standard Median Charge (annual fixed charge)			

## Worksheet SW-11: Residential Charges and Revenue Reconciliation

Worksheet SW-11 details the proposed rates for residential customers based on a tiered rate structure.

Worksheet SW-11 also provides a reconciliation of the Revenue Requirement from the two (2) sources, Street Right of Way and Site Related Flow, with the Site Related Flow broken down between ICI and Residential customers.

### Worksheet SW-11

<div> Halifax Water  Stormwater Rate Study  Residential Charges and Revenue Reconciliation </div>							
Calculation of Rates for Residential Customers							
	Tier Parameters (in units)		Equivalent Residential Unit (ERU)	Rate per Billing Unit	Rate Adjustment	Tier Rate	Standard Annual Charge
	Each unit equals 10 square meters						
Label			A	B	C	B X C	A X B X C, rounded to the nearest \$
1	less than	5 units	221	\$0.195	0%	\$0.000	\$0.000
2	6 units	20 units	221	\$0.195	50%	\$0.098	\$22.000
3	21 units	40 units	221	\$0.195	100%	\$0.195	\$43.000
4	41 units	80 units	221	\$0.195	200%	\$0.390	\$86.000
5	81 units	or more	221	\$0.195	300%	\$0.585	\$129.000

Reconciliation of Revenue Requirement			
	Impervious Area	Number of Parcels	Revenue Requirement
Street Right-of Way (ROW)			
Halifax (HRM)			\$5,316,000
Province of Nova Scotia			\$1,182,900
Halifax Dartmouth Bridge Commission			\$16,500
Site Related Flow (SRF)			
Industrial, Commercial, Institutional (ICI)			
Residential			
Tier 1	25,410	3,276	\$0.000
Tier 2	5,395,110	34,701	\$22.000
Tier 3	11,559,475	41,848	\$43.000
Tier 4	4,494,815	8,569	\$86.000
Tier 5	2,793,700	1,690	\$129.000
Culvert only Customers	970	498	\$22.000
Preliminary Revenue Total			\$10,956
Less: Revenue Requirement			\$16,457,999
Excess (deficiency) compared to Revenue Requirement			(\$16,415,400)
			\$42,599

**Worksheet Appendix SW-1: Proposed Additions to Utility Plant in Service and Capital Funding**

Appendix SW-1 details the proposed additions to Utility Plant in Service and capital funding for the test year 2023/24.

Additions to Utility Plant in Service for 2023/24 are estimated based on status of capital work in progress (projects approved in prior fiscal years), the projects from the 2023/24 capital budget, and historical levels of contributed utility plant in service.

Halifax Water projects capital additions of \$27.7 million in assets to Utility Plant in Service during the 2023/24 fiscal year.

## Appendix SW-1

<b>Halifax Regional Water Commission</b> <b>Stormwater Rate Study</b> <b>Proposed Additions to Utility Plant in Service and Capital Funding</b> <b>2023/24</b>				
	Additions to the Utility Plant in Service	Capital Cost Contribution from Others	Utility Cost of Plant in Service	
<b>Land and Land Rights</b>				
SW Office Land	\$0	\$0	\$0	
SW Easements and Right-of-ways	\$0	\$0	\$0	
<b>Stormwater Structures</b>				
SW Retention Ponds	\$2,272,800	\$0	\$2,272,800	
SW General Structures and Improvements	\$0	\$0	\$0	
<b>Stormwater Pipes</b>				
SW Mains	\$19,895,000	\$10,220,000	\$9,675,000	
SW Culverts	\$3,300,000	\$0	\$3,300,000	
SW Combined Sewers (SW portion only)	\$0	\$0	\$0	
SW Manholes and Catchbasins	\$0	\$0	\$0	
SW Laterals	\$115,000	\$0	\$115,000	
<b>Stormwater Equipment</b>				
SW Transportation Equipment	\$348,000	\$0	\$348,000	
SW Office Furniture and Equipment	\$0	\$0	\$0	
SW Information and Technology	\$1,639,000	\$0	\$1,639,000	
SW Tools & Equipment	\$0	\$0	\$0	
<b>TOTAL</b>	<b>\$27,569,800</b>	<b>\$10,220,000</b>	<b>\$17,349,800</b>	
<b><u>Sources of Funding</u></b>				
Capital Cost Contributions	\$0	Depreciation Fund Balance, beginning of year	\$0	
Regional Development Charges	\$0	Add:		
External Funding	\$10,220,000	Interest earned on fund balance	\$0	
Contributions - Other	\$0	Depreciation funded in Current year	\$2,572,022	
Working Capital	\$529,778	Depreciation Fund Balance available	\$2,572,022	
Depreciation fund	\$2,572,022	Less:		
Long Term Debt	\$14,248,000	Expenditure in Current Year	(\$2,572,022)	
<b>TOTAL</b>	<b>\$27,569,800</b>	Depreciation Fund Balance, end of year	\$0	

**Worksheet Appendix SW-2: Amortization Schedule for Long Term Debt**

Appendix SW-2 details the amortization schedule of the proposed long-term debt associated with 2023/24. The amortization is based on a 30-year blended serial debenture at 2.5%. Debt servicing costs related to principle and interest will commence in test year 2024/25.

## Appendix SW-2

### Halifax Regional Water Commission Stormwater Rate Study

#### Amortization Schedule for Projected Long Term Debt 2023/24

Interest Rate	2.50%
Term in years	30
Capital	\$14,248,000

#### Amortization Schedule

Year	Principal	Interest	Total	Balance
1	\$474,933	\$356,200	\$831,133	\$13,773,067
2	\$474,933	\$344,327	\$819,260	\$13,298,133
3	\$474,933	\$332,453	\$807,387	\$12,823,200
4	\$474,933	\$320,580	\$795,513	\$12,348,267
5	\$474,933	\$308,707	\$783,640	\$11,873,333
6	\$474,933	\$296,833	\$771,767	\$11,398,400
7	\$474,933	\$284,960	\$759,893	\$10,923,467
8	\$474,933	\$273,087	\$748,020	\$10,448,533
9	\$474,933	\$261,213	\$736,147	\$9,973,600
10	\$474,933	\$249,340	\$724,273	\$9,498,667
11	\$474,933	\$237,467	\$712,400	\$9,023,733
12	\$474,933	\$225,593	\$700,527	\$8,548,800
13	\$474,933	\$213,720	\$688,653	\$8,073,867
14	\$474,933	\$201,847	\$676,780	\$7,598,933
15	\$474,933	\$189,973	\$664,907	\$7,124,000
16	\$474,933	\$178,100	\$653,033	\$6,649,067
17	\$474,933	\$166,227	\$641,160	\$6,174,133
18	\$474,933	\$154,353	\$629,287	\$5,699,200
19	\$474,933	\$142,480	\$617,413	\$5,224,267
20	\$474,933	\$130,607	\$605,540	\$4,749,333
21	\$474,933	\$118,733	\$593,667	\$4,274,400
22	\$474,933	\$106,860	\$581,793	\$3,799,467
23	\$474,933	\$94,987	\$569,920	\$3,324,533
24	\$474,933	\$83,113	\$558,047	\$2,849,600
25	\$474,933	\$71,240	\$546,173	\$2,374,667
26	\$474,933	\$59,367	\$534,300	\$1,899,733
27	\$474,933	\$47,493	\$522,427	\$1,424,800
28	\$474,933	\$35,620	\$510,553	\$949,867
29	\$474,933	\$23,747	\$498,680	\$474,933
30	\$474,933	\$11,873	\$486,807	(\$0)



February | 2022

**Halifax Regional Water Commission**

**WATER, WASTEWATER AND STORMWATER  
COST-OF-SERVICE MANUAL**



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## 1 SECTION 1 - INTRODUCTION

### 2 **Background**

3 Following the transfer of Wastewater and Stormwater service delivery responsibilities from the  
4 Halifax Regional Municipality (HRM) to the Halifax Regional Water Commission (Halifax Water) in  
5 2007, Halifax Water became the first regulated water, wastewater, and stormwater utility in Canada.  
6 Halifax Water is a self-financing regulated utility under the Public Utilities Act by the Nova Scotia  
7 Utility and Review Board (NSUARB). Halifax Water generates the majority of its revenue from rates  
8 and charges for the services provided to its customers. These rates and charges must be approved  
9 by the NSUARB following a review process and public hearing. This process ensures that rates are  
10 fair and equitable for the services provided. Following assessment of operating and capital  
11 improvement requirements of the combined utility, Halifax Water filed a general rate application  
12 [2010 NSUARB 244] to address funding needs. In a decision dated December 17, 2010, the  
13 NSUARB directed Halifax Water to file a Cost-of-Service and Rate Methodology Study that would  
14 form the basis of a “stand alone” proceeding. This was filed by Halifax Water on May 20, 2011.

15 Following completion of documentary discovery and filing of evidence by interested parties, a  
16 settlement agreement dated November 21, 2011 related to matters at issue in the application was  
17 signed by Halifax Water, the Consumer Advocate, and the Investment Property Owners Association  
18 of Nova Scotia (IPOANS). The settlement agreement was supported by all interveners who filed  
19 evidence and was not opposed by other parties to the proceeding.

20 The Cost-of-Service (COS) Manual was examined as part of Halifax Water’s 2013 general rate  
21 application [2013 NSUARB 127]. Through the hearing process, the consultants working on behalf  
22 of the NSUARB and the Consumer Advocate noted several suggestions and improvements to the  
23 COS Manual. Those revisions have been incorporated in this updated COS Manual, and all  
24 underlying data relied upon in the COS Manual has been updated.

25 In the June 24, 2013 NSUARB decision on the general rate application, Section 2 (pages 9-19)  
26 address cost-of-service rate design. In Paragraph [48], the NSUARB approved the COS Manual.

27 [48] Based upon the information provided, the Board approves the COS Manual  
28 with the revisions as recommended by Mr. Rubin and Mr. Whalen.

## **Process Leading to COS Manual Development**

In response to the NSUARB direction, Halifax Water<sup>1</sup> evaluated the existing NSUARB methodology and well established cost-of-service/rate design methodologies delineated in manuals of practice of the American Water Works Association (AWWA), and Water Environment Federation (WEF) in the context of the local and operational characteristics prevalent for Halifax Water. As part of the review, Halifax Water's consultants worked directly with a broad group of Halifax Water staff with direct operational responsibilities and who are best positioned to understand the cost drivers and distribution of costs for their respective functional areas.

Various options were considered based on industry best practices and standards, and analytical models were constructed for each option to illustrate the implications of methodological alternatives. The respective characteristics and relative merits of the models were evaluated against established utility rate setting principles as discussed in Section 2 – Methodology Review.

The AWWA/WEF framework achieved substantial improvements over the NSUARB alternatives in terms of fairness, defensibility, and relationship to costs. Additionally, because cost allocations are tailored to reflect system characteristics, the approach is adaptable to changing circumstances. This model is more complex than the previously established Halifax Water rate calculation procedure. However, the AWWA/WEF methodological framework was deemed preferable in that it provides for more detailed and system specific evaluation of Halifax Water's increasingly complex operations, facilitates rate designs that can be adapted in response to change, and allocates costs in a fair and equitable manner.

Given the potential improvements in fairness and equity of cost allocations and that the resultant rate structures would feature the same fundamental components (e.g., fixed charges by meter size and uniform volume rates), thereby easing customer understanding and acceptance, Halifax Water recommended the adoption of the AWWA/WEF framework on a go forward basis.

## **Review of COS Submittal Settlement Agreement**

On May 20, 2011, Halifax Water filed an application for approval of a Cost-of-Service and Rate Design Methodology. A public hearing was held on November 21, 2011 to consider the proposed COS recommendation. At the request of the NSUARB, Board Counsel convened a meeting of the

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<sup>1</sup> Halifax Water engaged the services of Galardi Rothstein Group, LLC, G.A. Isenor Consulting, Ltd., and Blaine Rooney Consulting Ltd. to assist with the methodology review process and prepare the Cost-of-Service Methodology submission filed with the NSUARB.

expert witnesses prior to the hearing on November 17, 2011, to determine whether any of the issues in the proceeding could be resolved in advance of the hearing. The meeting of expert witnesses resulted in a settlement agreement signed by Halifax Water, the Consumer Advocate, and IPOANS that was filed with the Board when the hearing commenced. Other interveners, who were not part of the settlement process such as the Halifax Port Authority, Labatt Breweries, and Concerned Citizens of Springfield Lake, were permitted to review the proposed settlement, and pose questions to a Halifax Water panel at the hearing, and present information. Details of the settlement agreement include the following;

- 1) Subject to section (7), the AWWA Base-Extra Capacity (BEC) cost-of-service methodology is an appropriate method for assigning water costs to Halifax Water's customers. However, the percentages used in Halifax Water's submission to assign costs will be refined as described in (5).
- 2) The total cost of fire protection (public and private) will be determined within the BEC method and appropriately allocated between the two. The cost of fire protection shall be allocated between public and private fire protection by use of the size of water main connections for public fire connections and the size of private fire service lines at the first point of use that reflects the actual flow demand. <sup>2</sup>
- 3) The WEF hybrid method is an acceptable cost-of-service method for assigning wastewater costs to Halifax Water's customers. However, the percentages used in Halifax Water's submission to assign costs will be refined as described in (5). Should the refined percentages not support the hybrid method, one of the other WEF methods may be recommended by Halifax Water.
- 4) Halifax Water's proposed cost-of-service method for assigning stormwater costs to Halifax Water's customers is appropriate with the revision presented in Exhibit 4 of Halifax Water's rebuttal evidence of November 14, 2011, a copy of which is attached to the settlement agreement. IPOANS reserves its right to take the position that HRM should be responsible for the Right-of-Way flow charge.
- 5) Halifax Water will collaborate with stakeholders to develop a COS Manual. This COS Manual will document the basis for all cost assignments (functionalization, classifications, and allocations) applied to water, wastewater and stormwater. It will be completed before any application is made to the NSUARB for new rates based on the new cost-of-service.

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<sup>2</sup> As clarified as part of the last General Rate Application of January 9, 2013, the private fire protection charge shall be based on the size of the fire service line before the first (point of use) connection, whether it is a hydrant line or sprinkler line entering the building. IPOANS 1

6) Parties retain the right to challenge any portion of the COS Manual when it is first used by Halifax Water as the basis for new rates.

7) For greater certainty, the issue of whether density should be taken into account for the cost-of-service for each of the services remains to be determined. Halifax Water agrees to provide further available information in response to reasonable requests from IPOANS in order to study this issue. Where Halifax Water considers the level of effort to respond to requests to be excessive, IPOANS will explain the reasons for the request and Halifax Water will explain the reasons for its objections. Halifax Water and IPOANS will collaborate to find alternative approaches to obtain reasonably required information. The parties agree to refer any dispute regarding such requests to the Board for resolution.

The NSUARB issued their decision on January 16, 2012 and stated in part:

[33] The Board has considered the evidence in the proceeding, including the Settlement Agreement and submissions by the parties, and is satisfied that the Settlement Agreement is in the public interest. The Board approves the Settlement Agreement as filed.

[34] Halifax Water, in accordance with the Settlement Agreement, and in collaboration with the Interveners, is to prepare a COS Manual which will be submitted to the Board for approval. The Board orders Halifax Water to complete this COS Manual no later than August 30, 2012 and provide a schedule to achieve this deadline by January 30, 2012.

Halifax Water's terms of reference for development of the COS Manual were approved on February 17, 2012.

The timeline was altered as a result of the NSUARB decision regarding Halifax Water's Aerotech rate application. In this decision, the NSUARB directed Halifax Water to submit a rate application for a combined Urban Core & Aerotech System by January 31, 2013. As a result of consideration of the combined Urban Core & Aerotech System, the COS Manual deadline was extended to October 31, 2012 to permit inclusion of the Aerotech system. The COS Manual was filed on October 24, 2012 and approved in the June 24, 2013 general rate application decision M05463.

The decision spoke to the topic of density at paragraphs [45] and [46]

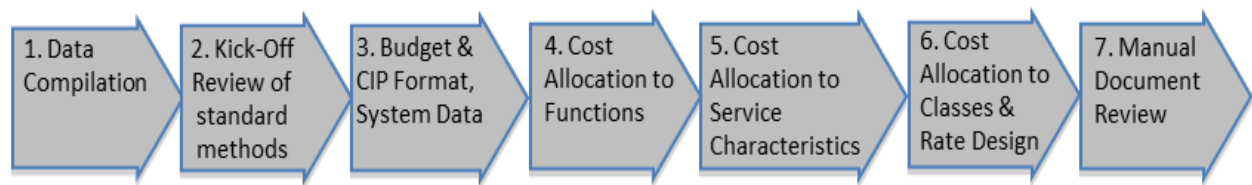
[45] The Board understands the argument with respect to cost of service differentials related to density which IPOANS notes have been used in other, albeit not water service, utilities. However, no data has been presented, or appears to be available at this time, to support any calculation of these differentials. In the absence of such data, the Loudon Report has been relied upon, which, at this time, represents the best data available. Halifax Water has indicated that it is in the initial stages of looking at the installation of

AMI technology. Once it is installed it can be used to collect the relevant data. However, it will be several years before such data can be collected and properly analyzed.

[46] Therefore, the Board accepts that the density concept should not be included in the COS Manual at this time. The Board will not revisit this issue until significant research, based upon data obtained by the new metering technology, has been collected and analyzed. The Board views the COS Manual as a living document which allows any changes to be made as a result of updated relevant data and information.

Halifax Water completed [the implementation of AMI technology in 2019/20](#)~~evaluation study in February 2014. The AMI meters have enabled Halifax Water to develop the Customer Connect portal and to begin to provide high consumption notifications to customers. Additional analyses, decisions and approvals are pending to consider a)~~ [conversion to monthly versus quarterly billing, and b\) technology selection across AMI, AMR, or hybrid options. Once decisions and approvals are in place, it is estimated that three years will be required to implement the new technology. This would be a significant project impacting all Halifax Water HRWC metered customers. In the interim, Halifax Water HRWC engaged R.M. Loudon to update his 2009 report by examining whether statistically significant / material changes in system or customer characteristics have occurred, and to do an updated demand analysis. R.M. Loudon's 2014](#) [Halifax Water has engaged Raftelis to develop an](#) updated Water Demand [Analysis concludes there has been little change in system or customer characteristics.](#)

The COS Manual was developed through a seven-step process highlighted by engagement with interested parties, including prior rate case interveners and the NSUARB. This process is illustrated below and is aligned with the cost allocation processes outlined in industry standard manuals of practice:



Stakeholder consultation meetings were held on March 7, May 9 & 10, and September 25, 2012. Feedback from stakeholders was accepted throughout the process, resulting in many changes and improvements in the final product.



## Purpose and Scope

The fundamental purpose of this manual is to allow for the development of equitable water, wastewater and stormwater rate structures to ensure that all users pay, through user charges, for their share of the costs imposed on the system. Some of these expenditures are a function of water used, wastewater discharged or stormwater contributed; others may be a function of the characteristics of that use (e.g., peak demands) or discharge (e.g., strength loadings). Finally, some costs (e.g., billing and meter costs) are associated with serving customers regardless of the volume consumed or discharged, or the volume of stormwater contributed.

The COS Manual addresses the procedures involved in calculation of proposed water, wastewater and stormwater rates including the presentation of *pro-forma* rate revenue requirements, cost allocations and rate design. The COS Manual delineates procedures for Water System rate calculations, including charges for public and private fire protection, through the identification of Water System functions, the classification of these functional costs, and their allocation as set out in the “base-extra capacity” method described in the AWWA *Principles of Water Rates, Fees and Charges, Manual of Practice (M1)*. The COS Manual is based on combining the AWWA methodology with the existing NSUARB standard procedures for accounting and reporting. In response to IR-2MUL in the 2013 general rate hearing, Halifax Water noted that “In general, the AWWA and NSUARB methods are combined in the sense that the prescribed methodology uses the formats and initial schedules for delineation of system revenue requirements as has been employed historically for NSUARB rate application filings while the procedures employed for cost allocation are drawn from the methodological approaches delineated in the AWWA’s Principles of Water Rates, Fees and Related Charges (M1) Manual of Practice”.

Similarly, the COS Manual delineates procedures for Wastewater System rate calculations, including charges for over-strength discharges through the identification of Wastewater System functions, the classification of these functional costs, and their allocation as set out in the methods described in the WEF Manual of Practice No. 27 *Financing and Charges for Wastewater Systems*. The COS Manual is based on combining the “WEF” methodology with the principles used in the NSUARB standard procedures for accounting and reporting for Water Systems. As noted in response to IR-3MUL in the 2013 general rate application, “In general, the WEF and NSUARB methods are combined in the sense that the prescribed methodology uses the formats and initial schedules for delineation of system revenue requirements as has been employed historically for NSUARB rate application filings while the procedures employed for cost allocation are drawn from

the methodological approaches delineated in the WEF's Financing and Charges of Wastewater Systems (M29) Manual of Practice".

The COS Manual identifies procedures for stormwater rate calculations based on the system characteristics which drive costs. The first COS Manual and 2013 rate application proposed a two-part rate structure to assign costs to customer groups such that all users pay for core (street right-of-way) services while only those contributing flow to Halifax Water's system pay for management of site-generated flows. The NSUARB directed that the costs for street right of way services be billed to HRM.

The need to enhance understanding about the nature of stormwater services being received by Halifax Water's customers was evident following implementation of the first regulated rates for stormwater service. In so doing, the merits of the cost of service, and ratemaking process may also be articulated. Halifax Water has included updated information on stormwater service within the COS Manual to reflect developments since the October 2012 filing of the first COS Manual.

The purpose of the COS Manual is to provide guidance (through explanations, standard schedules, and example calculations) of the NSUARB approved AWWA/WEF approach to cost-of-service/rate design methodology. The NSUARB approved this approach in a decision dated January 16, 2012. This methodology employs the approach for determination of revenue requirements as presented in the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Halifax Water notes that accurately establishing the cost of service for the regulated services offered is only the first step in establishing rates, and that there are other important rate design considerations that come into play. Accordingly, Halifax Water will reference the updated COS Manual to prepare the rate studies for the next rate application, but may submit for rates which differ from the COS Manual approach to take into account objectives such as revenue stability, gradual redistribution of revenue responsibilities and rate-smoothing.

## **COS Manual Structure**

This COS Manual is structured to provide direction and examples of cost allocation procedures for each of Halifax Water's individual utility systems. The COS Manual offers a general review of a common methodological framework that is employed across systems – and which represents the foundation of both the AWWA and WEF cost-of-service methodologies. Subsequent sections provide guidance on the distribution of costs to functions, classification of costs by service

characteristic and calculation of unit costs of service (potentially for allocation to distinct customer classes). This refers to the potential for future disaggregation of Halifax Water's customer classification structure in the event that pronounced distinctions in potential customer class user characteristics are determined. For Water System customer classifications, the potential for class distinctions on the basis of peak vs. average demand has not been demonstrated. This is due to the relative homogeneity of demand patterns across customer types as evidenced by the Loudon Demand Study. The potential for Wastewater System customer classifications on the basis of strength differentials is examined through a plant balance analysis provided in Halifax Water's worksheet WW-1: User Characteristics and Plant Balance Analysis. This form of analysis is useful for ensuring that assigned strength loading attributes of individual customer classes result in overall values for influent strengths that are consistent with actual plant influent values. In so doing, user rates are based on actual system flow/loading characteristics. In the event that strength differentiated classifications were considered, assigned strength loading differences would need to maintain consistency with overall plant influent loading values to ensure resultant rates reflect true costs of service.

For Water System cost allocation, unique considerations relate to relationships between peak and average demands and identifying costs associated with providing fire protection capabilities. For the Wastewater System, unique considerations relate to allocations of costs for dry and wet weather flow management and treatment for different pollutant loadings. For the Stormwater System, issues relate to the allocation of costs for management of stormwater flows in street rights-of-way and discharged from private properties and complexities caused by multi-jurisdictional responsibility for stormwater. The COS Manual sections outline information as summarized below:

- 1) **Introduction** – Provides a discussion of the process leading to development of the COS Manual, the purpose of scope of the document and its structure;
- 2) **Methodology Review** – Provides a general review of the multi-step process for determination of utility rates by utility system; Principles of cost allocation commonly employed across utility systems are outlined;
- 3) **Allocation of Requirements Across Utility Systems** – Principles of cost allocation commonly employed across utility systems are outlined;

- 239 4) **Water System Cost Allocation** – Provides a review of the application of the AWWA  
240 cost allocation methodology for determination of rates based on revenue requirements  
241 delineated using standard NSUARB formats;
- 242 5) **Wastewater System Cost Allocation** - Provides a review of the application of the WEF  
243 cost allocation methodology for determination of rates based on revenue requirements  
244 delineated using standard NSUARB formats; and,
- 245 6) **Stormwater System Cost Allocation** - Provides a review of the simplified application  
246 of common AWWA/WEF procedures for determination of stormwater fees based on  
247 impervious area measures.

248

## 249 SECTION 2 - METHODOLOGY REVIEW

### 250 **General Review**

251 For Water, Wastewater and Stormwater service, the methodology selected for the COS Manual  
252 and for rate setting is based on calculating the revenue requirements using the Handbook while  
253 cost allocations are based on the AWWA and WEF methodologies for water and wastewater.  
254 Stormwater rate setting will be based on using the framework from the NSUARB for determination  
255 of revenue requirements and the WEF approach for cost functionalization, classification and  
256 allocation. Rates for stormwater will be based on impervious area and will exempt customers that  
257 do not contribute stormwater from their property into Halifax Water's system. They will not provide  
258 for recognition of the indirect/common benefit individuals receive for stormwater management  
259 associated with the street right-of-way.

### 260 **Rate Setting Principles**

261 For each of Halifax Water's utility services, rates and charges should reflect the balancing of basic,  
262 often conflicting, rate-setting principles. Referenced by the NSUARB in its deliberations, these basic  
263 principles of utility rate setting were outlined in seminal work by James Bonbright<sup>3</sup> and have been  
264 reformulated and made more accessible for use in guiding Halifax Water's rate setting as follows:

- 265 1) **Revenue adequacy** - Effectively yield the revenue requirements in a fair and reasonable  
266 manner from the customers of Halifax Water without undue capital spending while meeting  
267 service and quality objectives;
- 268 2) **Revenue stability** - Provide revenue stability and predictability for Halifax Water with  
269 minimum of unexpected changes;
- 270 3) **Rate continuity** - Provide stable and predictable rates with a minimum of unexpected  
271 changes that have adverse effect on Halifax Water's customers;
- 272 4) **Cost-based rates** - Establish rate structures that discourages the wasteful use of the  
273 service provided while promoting all justified uses and amounts;
- 274 5) **Fairness vs. Benefits** - Set rates that fairly reflect the benefits from the service provided;

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<sup>3</sup> Bonbright et al., *Principles of Public Utility Rates* (Columbia University Press, 1961), pp. 383-384

- 275 6) **Defendable vs. Costs** - Set rates that are fair and equitable and that apportion costs of  
276 service among the different customer classes that are not arbitrary and capricious;
- 277 7) **Fairness by Class** - Set rate structures that avoid discrimination in rate relationships and  
278 that avoid inter-customer burdens;
- 279 8) **Adaptable to Changing Circumstances** - Set rate structures that are dynamic and  
280 promote innovation and that respond to changing demand and supply patterns;
- 281 9) **Simple and Acceptable** - Set rate structures that are simple to use and understand,  
282 convenient, economic to implement and maintain, and, are publicly acceptable while  
283 meeting the requirements of the Public Utilities Act;
- 284 10) **Understandable** - Set rate structures and rules and regulations that are unambiguous and  
285 easy to interrupt; and,
- 286 11) **Conservation** – Establish rate structure that promotes conservation while ensuring rates  
287 that are adequate to meet changing regulatory requirements.

288 Insofar as the AWWA/WEF methodologies were designed to reflect and further these rate design  
289 principles, the rate methodologies proposed likewise reflect these principles. Halifax Water's  
290 proposed rates are thereby guided by the Bonbright principles. For Halifax Water's Water,  
291 Wastewater and Stormwater Systems cost allocation and rate setting process, a number of  
292 additional aspects of standard rate making principles and procedures are noteworthy.

### 293 **Fixed vs. Variable Costs**

294 Common to all three utility services is the fact that infrastructure investment requirements result in  
295 cost structures that feature relatively high, fixed costs from an accounting perspective. A  
296 fundamental principle of cost-of-service analysis however is to allocate costs on the basis of cost  
297 causation rather than on whether or not they are fixed or variable from an accounting perspective.  
298 For Water Service, therefore, most fixed costs are allocated based on volume-related customer  
299 demand characteristics. Similarly, for Wastewater Service, a significant share of collection and  
300 treatment cost is distributed in proportion to flow and loading parameters. For Stormwater Service,  
301 fixed costs are allocated based on the determinants of stormwater flows from served parcels that  
302 must be managed by the public stormwater system.

## **Growth-Related Capacity Costs**

As a general proposition, the cost-of-service methodologies outlined below relate to calculation of unit costs by service characteristic and ultimately distribution of cost responsibilities to customers. Rates calculated for new customers within a class are the same as those for customers who have been served for an extended period of time. Regional Development Charges (previously referred to as Availability Charges) that are assessed upon new customers to the respective systems are used to require such customers to recover growth related capacity costs.

## **Halifax Water Common Costs**

An equally fundamental challenge that is common to all three utility Services is that a number of utility functions are shared across each utility Service. While Halifax Water has established a budgeting and accounting structure to segregate costs by Service, there are a number of functions that are performed with resources that are effectively shared across all three systems. Though most Halifax Water costs are incurred directly by an individual Service as discussed in subsequent sections of the COS Manual, cost-of-service rate setting requires allocation of common costs across Services (as discussed in detail in section 3 – Allocation of Requirements Across Utility Systems).

Given the establishment of revenue requirements by utility Service through the allocation of shared and specific Halifax Water costs to utility Services, the basic AWWA/WEF approaches to cost allocation may be applied for each Service.

## **Revenue Requirements**

### **Accounting System Review**

Halifax Water's corporate financial system is a fully integrated SAP software system that was initially implemented in August 2004. The modules implemented at that time were FI (financial, including general ledger and accounts payable) CO (controlling, including cost centre and work orders) and MM (materials management for inventory or procurement). The SAP HCM payroll module was added to the system in August 2009. In 2020, this module was replaced, moving to a more robust standalone system, VIP. The new system provides Halifax Water greater efficiencies and mitigates risks inherent under the previous system associated with redundancy of work, high volumes of payroll records entered manually, and the approval process. The system is fully interactive providing a web portal for employees and managers alike. Finally, the new

system allows Halifax Water improved functionality with the inclusion of modules in such areas as human capital management and pension administration.

The SAP system is a robust system consisting of over 300242 cost centres and 200 general ledger accounts for revenues and expenses. Within the hierarchy and reporting structure of the system, cost centres can be created and maintained to track costs by Service and also for specific functions within each Service. Certain cost centres exist in which shared costs applicable to all Services are accumulated centrally, and then allocated to each Service as necessary. Distributions of these common costs are described further below. Finally, within the system is the capability to create and maintain work orders to track specific costs, either from a capital or operating perspective. Halifax Water is moving to a new enterprise resource planning (ERP) system which will be equally as robust as the SAP system. The expected go-live date is November 2022.

Audited financial statements are prepared on an annual basis. Internal unaudited financial statements are prepared monthly, on both a consolidated basis and unconsolidated basis for each individual Service. Current year results are presented in comparison to the current year's budget and forecast, as well as historic actual results from the prior year. Unaudited financial statements are reviewed by Halifax Water's Board of Commissioners, and annual audited financial statements approved.

### **Budget Process Review**

A standardized, consolidated budgeting process was developed by Halifax Water and was implemented for the first time for the 2011/2012 fiscal year. The budgeting process involves the completion of standardized budgeting templates by Halifax Water managerial staff responsible for specific utility functions. Budget templates are prepared for all cost centres and require both quantitative and qualitative inputs. Once completed all templates are reviewed by the appropriate Director before being forwarded to Finance. Finance staff review and validate the budget templates for consistency and accuracy. Before being submitted to Halifax Water's Board of Commissioners for approval, the budget are reviewed by the Senior Management Team and Halifax Water's Audit and Finance Committee.



## 360 **Revenue Requirement Format**

361 The overall objective of the determination of revenue requirements is to provide Halifax Water  
362 sufficient operating revenues to cover the operating and non-operating costs for Water,  
363 Wastewater and Stormwater Services for the test year(s) included in the application. As such,  
364 properly developed revenue requirements will ensure the financial sustainability and integrity of  
365 Halifax Water. Operating and non-operating costs supporting the application are derived from  
366 the operating budget(s) as compiled by Halifax Water, which are prepared annually and approved  
367 by Halifax Water's Board of Commissioners.

368 Key considerations in determining revenue requirements also include:

- 369 • Changes in the number of customers,
- 370 • Changes in annual volume of water sold, and
- 371 • Anticipating capital expenditures for the test years, and the associated costs with respect  
372 to depreciation and debt servicing.<sup>4</sup>

373 Revenue requirements for each Service are presented for rate application using a common format  
374 employed by the NSUARB. This general format is presented in Table 1 on the following page where  
375 Service-specific cost centres and line items are employed as applicable.

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<sup>4</sup> This is based on the premise that these expenditures are included in revenue requirements if the infrastructure is "in service".

376 Table 1 Revenue Requirement Template

Halifax Regional Water Commission			
Utility System			
Statement of Operating Expenditures and Revenue Requirements			
Fiscal Years ending March 31st			
	Historical Year	Current Year	Test Year
	Actual	Budget	Budget
<b>OPERATING EXPENDITURES</b>			
Service-Specific Cost Centre #1			
Service-Specific Cost Centre #2			
Technical Services (SCADA)			
Engineering and Information Services			
Environmental Services			
Customer Service			
Administration and Pension			
Sub-total	\$0	\$0	\$0
Depreciation			
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>ADD NON-OPERATING EXPENDITURES</b>			
Debt Charges - Principal			
Debt Charges - Interest			
Amortization of Bond Discount			
New Debt - Principal			
New Debt - Interest			
New Debt - Principal			
New Debt - Interest			
Grant in Lieu of Taxes			
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>LESS NON-OPERATING REVENUES</b>			
Regulated Activities			
System-Specific Revenues			
Investment Income			
Miscellaneous			
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>LESS OTHER OPERATING REVENUE</b>			
System-Specific Revenues			
Late Payment Fees			
Sponsorships and Donations			
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>LESS OTHER ADJUSTMENTS</b>			
Pension Adjustment			
Sponsorships and Donations			
Miscellaneous			
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>REVENUE REQUIRED FROM CUSTOMERS</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>

377

<b>Halifax Water</b> <b>Utility System</b> <b>Statement of Operating Expenses and Revenue Requirements</b> Fiscal Years ending March 31st					
	Historic Year Actual	Historic Year Actual	Historic Year Actual	Current Year Budget	Test Year Budget
<b>OPERATING EXPENSES</b>					
<i>System-specific expenses #1</i>					
<i>System-specific expenses #2</i>					
Engineering and Technology Services					
Regulatory Services					
Corporate Services					
Administration					
	0	0	0	0	0
Depreciation					
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>ADD: FINANCIAL EXPENSES</b>					
Interest on long term debt					
Repayment of long term debt					
Amortization of debt discount					
Dividend/ grant in lieu of taxes					
New - interest on long term debt					
New - repayment of long term debt					
New - interest on long term debt					
New - repayment of long term debt					
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>LESS: OTHER OPERATING REVENUE</b>					
<i>System-specific revenues</i>					
Late payment fees					
Miscellaneous					
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>LESS: FINANCIAL REVENUE</b>					
<i>System-specific revenues</i>					
Investment Income					
Miscellaneous					
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>LESS: OTHER ADJUSTMENTS</b>					
Pension adjustment					
Sponsorships and donations					
Miscellaneous					
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>REVENUE REQUIRED FROM CUSTOMERS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

## AWWA / WEF Cost Allocation Steps

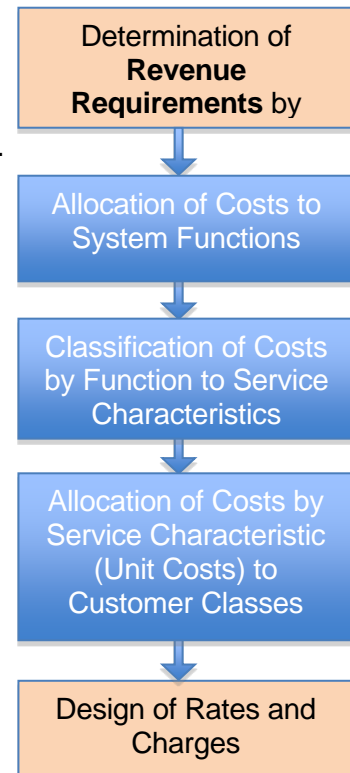
The fundamental COS process across all three utility Services involves a three-step procedure for allocation of revenue requirements to customer classes. Costs are first distributed to system functions – often referred to as “functionalization”, then to service characteristics – referred to as “classification”, and finally to customer classes – referred to as “allocation”. Cost-of-service based rates recover revenues from customer classes based on those respective customer classes’ proportionate share of system demands or use attributes.

## Step 1: Allocate Costs to System Functions

Utilities incur varying levels of costs to perform the different functions needed to meet customer demands and deliver essential services (e.g., fire protection). The functionalization process involves categorizing revenue requirements according to the functions in order to more appropriately assign costs to Customers. Water System functions typically include supply, treatment, storage, pumping, transmission, distribution, fire protection, and meter and Customer-related service. Wastewater functions are similar, including collection, transmission, treatment, wet weather flow management, solids handling, and customer related service. Functions may be further refined to reflect particular attributes of the utility's system configuration. For example, some water systems use storage tanks while others may not; some wastewater systems may use solids digester facilities while others may not. Functions are defined to facilitate the distribution of expenses to utility service characteristics.

## Step 2: Classify Costs by Service Characteristics

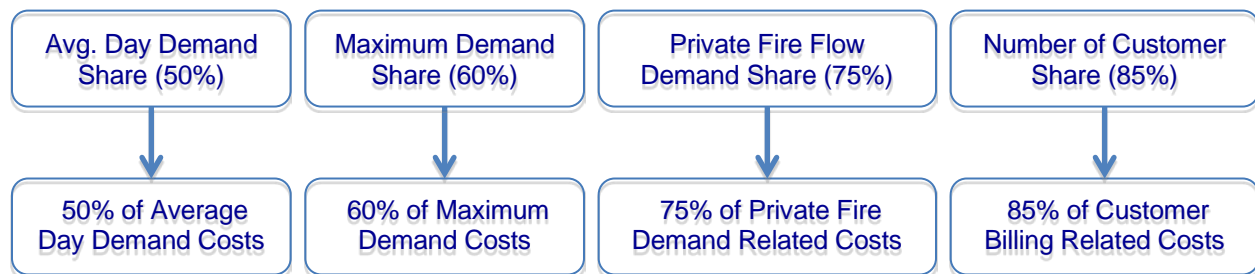
Following functionalization, a classification process is undertaken. A fundamental objective in developing a rate system is to price utility services so that each customer pays for the service they receive in proportion to their use or claim on system capacity. For Water Systems, some costs the utility incurs are a function of the water quantity used; other costs are associated with meeting peak usage demands, and others to enable fire protection. Similarly, for wastewater systems, some costs are incurred to handle dry weather flows while other costs are incurred for wet weather management, or to remove given pollutants. Customer related service, billing, and meter functional costs are generally a function of the number of customers served, and the size and type of meter or service. The classification process involves distribution of functional costs to these service characteristics in a consistent manner that reflects cost causation.



### Step 3: Allocate Costs to Customers (or Classes)

Determination of the costs to deliver established service characteristics, whether they be peak water demands or the handling of wastewater strength loadings provides the foundation for calculation of unit costs to serve - and ultimately allocation of cost to customers based on their demands and uses of system facilities. Costs by service characteristic are simply divided by the projected level of service to be rendered to determine the unit costs of a given service parameter. For example, the system-wide cost per cubic meter of maximum hour demand is calculated by taking the costs determined to meet maximum hour demands divided by the projected (customer related) maximum hour demands for the system. Likewise, the cost per kilogram of total suspended solids (TSS) removed is determined by dividing the system-wide costs for TSS removal by the projected units of billable suspended solids. Costs are then allocated to customers (or more generally to customer classes) based on their use of these parameters. As a result, if residential users represent 50 percent of average day water demands, 60 percent of peak-day and maximum hour demands, 75 percent private of fire flow demands, and 85 percent of the numbers of customers, they will be

#### Cost Allocation\* – Conceptual Example for Residential Users



\* Cost allocations typically segregate maximum demands by maximum-day and maximum hour and/or customer service costs across meter equivalents (for meter-related costs) and customers (for billing-related costs).

allocated 50 percent of average day demand related costs, 60 percent of peak demand related costs, 75 percent of fire protection costs, and 85 percent of customer billing expenses. In so doing, the basic objective of cost-of-service analysis is accomplished – namely the allocation of costs to customers in proportion to their uses of the system. Data sources generally include customer billing information, system operations reports, and engineering studies.

### SECTION 3 - ALLOCATION OF REQUIREMENTS ACROSS UTILITY SYSTEMS

Certain cost centres exist within the accounting system in which shared costs applicable to all Services have been accumulated centrally. In order to present costs properly for each Service, these common costs are allocated across Services. Most common costs are accounted for in a specific cost centre. However, as is evidenced with customer service detailed below, the allocation may involve a group of like cost centres. In several cases, a “primary allocation” is made to distribute costs between Water Services and both Wastewater and Stormwater Services then a “secondary allocation” is made to apportion costs between Wastewater and Stormwater Services.

A summary of the allocations crossing Service boundaries is provided below for each of the Services provided by Halifax Water:

#### **Water Service**

There are no shared or common costs accumulated within Water Services that relate to other Halifax Water Services.<sup>5</sup> Any cost allocations performed are specific to Water Services, and are required for internal reporting purposes only, typically for sub-systems within Water Services.

~~HRWC's wastewater treatment plants are designed based on regulations from Nova Scotia Environment who specify the volume of wastewater to be handled based on a multiple of dry weather flow. For instance NS Environment may specify that a treatment plant in a specific location must be designed to handle 4 times dry weather flow with all flow above this level considered to be stormwater and allowed to by-pass the treatment plant (as is the case with the Halifax Harbour Solution Plants). While a portion of that design requirement is undoubtedly made up of stormwater it is by regulation considered wastewater.~~

~~Based on this design/approval procedure, HRWC's treatment plants only treat wastewater as defined by its regulator with all flows in excess of the design loading by-passed without treatment.~~

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<sup>5</sup> In the 2013 rate hearing, Halifax Water was asked whether the wastewater treatment plants ever treat stormwater? If so, should any of the cost of wastewater treatment be assigned to stormwater? If so, what portion? (IR-8MUL).

## Wastewater Service

### Wastewater Treatment Plants

Halifax Water's wastewater treatment plants are designed based on regulations from Nova Scotia Environment and Climate Change (NSECC) and Environment Climate Change Canada (ECCC) who specify the wastewater discharge requirements aligning with the Wastewater Effluent System Regulations (WSER) ~~who specify the volume of wastewater to be handled based on a multiple of dry weather flow.~~ The discharge requirements may vary based on the receiving waters. ~~For instance NSE may specify that a treatment plant in a specific location must be designed to handle four times dry weather flow with all flow above this level considered to be stormwater and allowed to by-pass the treatment plant (as is the case with the Halifax Harbour Solution Plants). While a portion of that design requirement is undoubtedly made up of stormwater it is by regulation considered wastewater.~~

~~Based on this design/approval procedure, Halifax Water's treatment plants only treat wastewater as defined~~ approved by its regulator. ~~with all flows in excess of the design loading by-passed without treatment.~~

There are no shared or common costs accumulated within Wastewater treatment relating to other Services of Halifax Water. Any cost allocations performed are specific to Wastewater Treatment, and are required for internal reporting purposes only, typically for sub-systems within Wastewater Services.

### Wastewater Collection

Allocations relating to common costs within Wastewater collection reflect the extent to which administrative activities are related to both Wastewater and Stormwater Services and the portion of the collection system served by combined sewers. Regional administration costs are allocated between Wastewater and Stormwater Services on an indirect basis using budgeted, direct operating costs for each Service for the test year(s). Other Wastewater collection costs are allocated to Stormwater Service based on the proportionate share of length of pipe that are combined sewers, and the portion of combined sewer flow related to stormwater.

Allocations using the fiscal year (FY) ~~2020/21~~ 2013/14 actuals as the basis ~~base year~~ are summarized in the table below:

484 Table 2

<b>Wastewater Collection Allocation of Common Costs to Services</b>				
<b>Common Cost Centres</b>	<b>Cost Centre No.</b>	<b>Water</b>	<b>Wastewater</b>	<b>Stormwater</b>
Regional Administration			<u>9086.0%</u>	<u>1044.0%</u>
Sanitary Mains – West, East & Central	12400, 22400, 32400		<u>92.04.2%</u>	8.08% <sup>6</sup> (40% of 20%)
Inspections – West, East & Central	12402, 22402, 32402		<u>92.094.2%</u>	8.08% (40% of 20%)
Sanitary Manholes – West, East & Central	12407, 22407, 32407		<u>92.094.2%</u>	8.08% (40% of 20%)
Buildings - East & Central	22409, 32409		<u>92.094.2%</u>	8.08% (40% of 20%)
Administration and Overheads– West, East & Central	12470, 22470, 32470		<u>92.094.2%</u>	8.08% (40% of 20%)

485 As can be seen in the above table, the regional administration cost centre under Wastewater  
 486 Collection is a common cost centre for both Wastewater and Stormwater Services. Of the  
 487 common costs contained in this cost centre, 1044% are allocated to Stormwater Collection. The  
 488 basis for this allocation was calculated using the actual, direct operating costs for each Service  
 489 for 2020/212013/14. —(The initial COS Manual was based on the 2011/12 Budget)

490 Secondary allocations are performed with respect to specific Wastewater collection cost centres as  
 491 noted in the table above, to Stormwater collection. The purpose of these allocations is to recognize  
 492 the existence of combined sewers within the collection system. Based on Halifax Water records,  
 493 20% of the entire collection system is comprised of combined sewers. Halifax Water<sup>7</sup> calculated  
 494 that, on average, 40% of the capacity of the combined sewers relates to Stormwater flows. Using  
 495 these percentages will allow a portion of the costs incurred in the Wastewater Service to be  
 496 transferred to the Stormwater Service since the combined sewers handle stormwater together with  
 497 wastewater. These allocations could change if the proportion of wastewater to stormwater changes  
 498 over time, or the proportion of stormwater relative to sanitary sewer flows change in the combined  
 499 sewers.

<sup>6</sup> Updated based on IR-28MUL, 2015 Rate Application, M06540

<sup>7</sup> Cost of Service Study, November 2009 by G. A. Isenor Consulting Limited in association with W.H. Gates Utility Consultants Limited and R. M. Loudon Limited



## Technical Services (SCADA)

Technical Services (SCADA), a division under Engineering and Technology Services (TS) within the organizational hierarchy, contains three (3) common cost centres, each of which accumulate shared costs for the benefit of Water, Wastewater and Stormwater Services. Costs are allocated to each Service are based on the number of data points (tags) monitored in each Service.

Allocations relating common costs within Technical Services (SCADA) are summarized in the table below:

Table 3

Technical Services (SCADA) Allocation of Common Costs to Services				
Common Cost Centres	Cost Centre	Water	Wastewater	Stormwater
SCADA System	43598	<u>3227%</u>	<u>6770%</u>	<u>13%</u>
Regional Technical Services	43570	<u>3227%</u>	<u>6770%</u>	<u>13%</u>
Administration and Overheads	43592	<u>3227%</u>	<u>6770%</u>	<u>13%</u>

## Engineering and TS:

Engineering and TS (excluding Technical Services (SCADA)) consists of three (3) common cost centres which contain shared costs for Water, Wastewater and Stormwater. The percentage distribution between Services is determined by the Director of Engineering and TS based on budgeted costs and allocation of staff time employed for each respective Service~~For these common cost centres, the primary allocations performed are between Water and Wastewater Services based on the prorated number of total customers and has been consistent historically. System data, updated as of March 31, 2019, affirms the apportionment to Water and Wastewater Services of 51% and 49% respectively.~~

Secondary allocations are performed of costs apportioned to Wastewater costs to provide for segregation between Wastewater and Stormwater Services. The basis for this allocation was calculated using the direct, operating costs for each Service for 2020/21~~This apportionment is on an indirect basis, and is calculated using budgeted direct operating costs for each Service, with the 2013/14 Actuals as the base year.~~

Allocations relating to common costs within Engineering and TS~~TS~~ are summarized in the table below:

524 Table 4

Engineering and <del>Information</del> Technology Services Allocation of Common Costs to Services				
Common Cost Centres	Cost Centre	Water	Wastewater	Stormwater
Administration*	43525	<del>33</del> 54%	<del>52</del> 42%	<del>15</del> 7%
Record Information*	43532	<del>33</del> 54%	<del>52</del> 42%	<del>15</del> 7%
Information Services*	43565	<del>33</del> 54%	<del>52</del> 42%	<del>15</del> 7%
Energy Efficiency Programs	43526	<del>39</del> 25%	<del>61</del> 74%	<del>0</del> 4%
Asset Management_*	42529	<del>33</del> 46%	<del>52</del> 48%	<del>15</del> 6%
* Distribution of costs shared across all systems is based on a primary apportionment of 51% to the Water System and 49% to Wastewater/Stormwater. Common costs across Wastewater and Stormwater Systems are apportioned 90% and 10% respectively. *Distribution to costs shared across all systems based on primary apportionment of 51% to Water System and 49% to Wastewater/Stormwater. Common costs across Wastewater and Stormwater Systems are apportioned 86% / 14%				

525 The basis for the allocation between Water and Wastewater continues to be calculated using the  
 526 customer base for each Service. The allocation remains at 51/49 and has been confirmed using  
 527 customer data as at March 31, 2021, which reported water and wastewater customers of 86,288  
 528 and 82,637 respectively.

529 ~~The data used to calculate the initial 51/49 split was the customer base as at March 31, 2012. This~~  
 530 ~~was updated to reflect the customer base as at March 31, 2019 and there is no change in the split,~~  
 531 ~~as there were 84,847 water customers and 81,231 wastewater customers for a 51/49 split.~~

532 Separate cost centres capture costs related to the only Water, Wastewater and Stormwater  
 533 Systems. Budgeted operating costs are an appropriate basis for allocation between Water,  
 534 Wastewater and Stormwater functions. These services are administrated by the same operations  
 535 group and operating costs reflect the direct costs imposed by the assets under management, their  
 536 annual operating costs and indirectly the Engineering and TS provided to deliver these respective  
 537 services. Allocation in this manner is reasonable as a method to reflect cost causation.

## 538 Regulatory Services:

539 Regulatory Services consists of sevenix (~~76~~) cost centres, with the primary allocations for each  
 540 spread between Water, Wastewater and Stormwater. The percentage distributions between  
 541 Services are determined by the Director of Regulatory Services based on budgeted costs and  
 542 staff time employed for each respective Service. For the 2013 application, Halifax Water indicated

in response to IR-12MUL that it anticipated that the percentages shown in Table 5 will remain relatively stable from rate case to rate case based on the work focus of Regulatory Services. Since that time, due to the implementation of stormwater billing and the process to review requests for stormwater exemptions, Halifax Water staff determined based on time tracking that the allocation to Stormwater should increase slightly to reflect the estimated increase in staff time dedicated to stormwater issues.

Allocations relating common costs within Regulatory Services are summarized in the table below:

Table 5

<b>Regulatory Services Allocation of Common Costs to Services</b>				
<b>Common Cost Centres</b>	<b>Cost Centre</b>	<b>Water</b>	<b>Wastewater</b>	<b>Stormwater</b>
Administration and Overheads	42500	20%	35%	45%
Environmental Engineering	42501	100%	45%	45%
Regulatory Compliances	42502	65%	35%	0%
Stormwater Engineering	42504	0%	0%	100%
Environmental Management System	42505	40%	40%	20%
Development Approvals	43531	35%	35%	30%

## Customer Service:

Customer Service, a division under Corporate Services within the organizational hierarchy, consists of seven (7) cost centres in total, with the primary allocations for the collective costs split between Water and Wastewater Services based on the prorated number of total customers. These shares have historically been consistent and system data as of March 31, 2021 affirms the apportionment to Water and Wastewater Services at 51% and 49% respectively.

Secondary allocations are performed for costs apportioned to Wastewater for five (5) of the above noted cost centres, to provide for segregation between Wastewater and Stormwater Services. This apportionment is on an indirect basis, and is calculated using budgeted actual direct operating costs for each Service, with the FY Fiscal Year 2020/21 as the basis year. Allocations for these relating cost centres within Customer Service, based on

~~2013/14 actual data, and re-affirmed by system data as of March 31, 2019,~~ are summarized as follows:

Water	= 51%
Wastewater	= <u>4441%</u> (49% x <u>9084%</u> wastewater share of Wastewater/Stormwater Costs)
Stormwater	= <u>58%</u> (49% x <u>1046%</u> stormwater share of Wastewater/Stormwater Costs)

For the remaining two (2) cost centres, Meter Reading and Operation and Maintenance of Meters, combined costs within these cost centres are allocated between Water and Wastewater Services only, at 51% and 49% respectively. Meters are not employed within Stormwater Service in determining revenue, either as a base charge or volumetric rate perspective, nor is there evidence of cost causation.

## **Corporates Services**

Corporate Services (excluding Customer Service) consists of five (5) cost centres, with the primary allocations for the collective costs split between Water and Wastewater Services at 51% and 49% respectively.

Secondary allocations are performed for costs apportioned to Wastewater costs to provide for a segregation between Wastewater and Stormwater Services. This apportionment is on an indirect basis and is calculated using actual direct operating costs for each Service, with the FY 2020/21 as the basis.

Allocations relating to common costs within Corporate Services are summarized as follows:

<u>Water</u>	<u>= 51%</u>
<u>Wastewater</u>	<u>= 44% (49% x 90% wastewater share of Wastewater/Stormwater Costs)</u>
<u>Stormwater</u>	<u>= 5% (49% x 10% stormwater share of Wastewater/Stormwater Costs)</u>

## **Administration**

~~Administration and Pension~~ consists of ~~twelvenine~~ (129) cost centres in total, with the primary allocations for the collective costs split between Water and Wastewater Services based on the

prorated number of total customers. These shares have historically has been consistent. System data as of March 31, ~~2021~~2019 provides for apportionment to Water and Wastewater Services at 51% and 49% respectively.

Secondary allocations are performed of costs apportioned to Wastewater costs to provide for segregation between Wastewater and Stormwater Services. This apportionment is on an indirect basis, and is calculated using ~~budgeted~~ actual direct operating costs for each Service, with the ~~FY 2020/21~~2013/14 Actuals as the base year.

Allocations relating common costs within Administration ~~and Pension, based on 2013/14 Actuals, and re-affirmed by system data as of March 31, 2019,~~ are summarized as follows:

Water \_\_\_\_\_ = 51%

Wastewater = ~~44~~41% (49% x ~~90~~84% wastewater share of Wastewater/Stormwater Costs)

Stormwater = ~~5~~8% (49% x ~~10~~46% stormwater share of Wastewater/Stormwater Costs)

The ~~twelve~~nine (129) cost centres are as follows, with a brief description of the costs captured in each:

- ~~General Manager's Office~~Administration and General

Costs include those related to the general administration of the utility as a whole, which cannot be directly attributed to particular Service or cost centre. ~~Costs include those for~~This includes ~~functions such as communications, procurement, accounting, finance,~~ administrative support staff and executive remuneration (30%) not assigned to general overheads (see below)

- Security Costs

Costs include those related to the safety and security of Halifax Water facilities and its employees. Major costs include labour, contract services and professional services;

- Payroll Interface (error collection)

This is a cost centre used to isolate or “red flag” errors that may occur with the interface between the payroll and accounting modules. Typically, this would retain no costs as posts contained therein would be corrected through re-allocation;

618 • Human Resources

619 This cost centre is for the sole purpose of Halifax Water's Human Resource department. Labour  
620 is a major cost within the department, which supports such functions as payroll, corporate wide  
621 training initiatives, hiring, job placements and other such functions;

622 • Employee Benefits

623 The major cost recorded in this cost centre is pre-retirement leave pay. Other minor costs tracked  
624 include wages, benefits and recoveries relating to any employees on long-term disability (LTD) or  
625 workers' compensation (WCB). Other employee benefit costs are posted directly to the cost  
626 centres through the payroll system;

627 • Operation & Maintenance of Cowie Administration Building

628 Includes all costs associated with the operation and maintenance of the main administration  
629 building, located at 450 Cowie Hill Road. These costs are then allocated to the respective  
630 departments using the facility in the form of rent;

631 • Operation & Maintenance of Cowie Operations Building

632 Includes all costs associated with the operation and maintenance of the operations building,  
633 located at 455 Cowie Hill Road. These costs are then allocated to the respective departments  
634 using the facility in the form of rent;

635 • General Overhead Expenses

636 This cost centre captures 70% of executive remuneration and corresponding benefits, which in  
637 turn is recovered from other cost centres within the organization in the form of a general overhead  
638 recovery;

639 • Administration & Overheads

640 Includes lease/rent expenses, plus applied overheads.

641 • Communications

642 Includes costs associated with both the internal and external communications for the utility.

643 • Legal

644 Includes costs associated with legal and consulting services on various matters, insurance claims,  
645 and document management for the utility.

646 • Sponsorships and Donations

647 Includes costs associated with sponsorships and donations for the utility, considered unregulated  
648 expenditures by nature, and excluded from revenue requirements.

649 The costs captured under Administration ~~and Pension~~ differs from the Administrative costs for  
650 Engineering and ~~Technology Information Services~~ TS, Corporate Services or Regulatory Services.

651 The Administrative costs within Engineering and TS, Corporate Services or Regulatory Services  
652 are administration costs specific to those areas, and required for the performance of the functions  
653 of those units. Administration costs captured within Administration are incurred for and benefit  
654 the organization as a whole rather than one specific department or service.

655 Allocations of common overhead costs are imprecise and require judgments. In 2007, it was  
656 decided with the transfer of the Wastewater and Stormwater Systems to Halifax Water that  
657 customer base is a fair, equitable and consistent means to allocate these common costs. This  
658 judgment remains valid today, and allocation based on customer base was accepted in the first  
659 COS Manual allocation of common costs based on the number of employees within each service  
660 is not a viable or appropriate option for several reasons:

- 661 • Varying the allocations based on changing staffing levels would provide inconsistencies,  
662 especially with respect to year-over-year comparisons and would unduly complicate  
663 variance analysis;
- 664 • Using the number of employees as a substitute for number of customers, requiring a  
665 deviation from historical practice, will not result in any greater precision or equity in cost  
666 distributions, given what needs to be accomplished; and
- 667 • Increasingly with system integration and enhanced efficiencies, employees will  
668 discharge their duties across service boundaries.

## 669 **Recognition and Allocation of Unregulated Revenues**

670 Halifax Water has revenues and expenses from unregulated activities. These are reported on  
671 Schedule D of Halifax Water's Audited Financial Statements. The unregulated activities include  
672 consulting services, operation of a dewatering facility at the Aerotech Park, treatment of effluent  
673 from airplanes, landfill leachate treatment, contract revenue, and treatment of septage sludge

674 from septage haulers. Halifax Water also has various energy projects underway to explore  
675 expansion of business opportunities, deemed to be unregulated activities by NSUARB<sup>8</sup>, and  
676 include wind energy, generation of electricity using solar, in-line turbines in the Water System,  
677 and combined heat and power generation using bio-solids or methane. The projects will be  
678 financed through un-regulated revenues with the objective of increasing non-operating revenues  
679 to reduce future revenue requirements from rate-regulated activities. Initially, financing any  
680 projects that proceed will result in some reduction of non-operating revenues available to reduce  
681 rate-regulated activities.

682 Net proceeds from unregulated businesses will be allocated in whole or in part back to the  
683 Services whose assets were employed in their generation.

684 In the 2013 rate application Halifax Water proposed guiding principles for unregulated activities:

- 685 1. The rate base cannot be exposed to undue financial risk associated with capital financing.
- 686 2. Unregulated expenses must be funded by unregulated revenues.
- 687 3. Cost causation principles must be employed and there should be no subsidization of  
688 unregulated activities from regulated activities.
- 689 4. There should be a net return/benefit to the rate base from unregulated activities.

690 In its decision, the Board specifically addressed unregulated activities and reporting, and on page  
691 65 of the decision had the following findings.

#### 692 10.1 Findings

693 [214] The Board directs Halifax Water to review the projected revenues for unregulated  
694 activities To ensure they are on a full cost recovery basis and report its findings by  
695 September 30, 2013.

696 [215] In addition, the Board assumes that any supervisory time or use of common facilities  
697 is minimal. They should not distract senior staff from focusing on the effective, efficient  
698 and economic operation of the three systems. The Board directs Halifax Water to have

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<sup>8</sup> The NSUARB order W-HRWC-R-12 dated June 25, 2012 stated that it is hereby ordered that Halifax Water: “[7] assume its wind energy projects are an unregulated service unless subsequently determined by the Board to be otherwise.” A letter from the NSUARB dated July 9, 2012 also directed that in-line turbine projects are unregulated business.



senior staff record the time they are required to devote to unregulated activities and that this be reported on a percentage basis, annually.

Halifax Water complied with the Board order, conducted the review, and found that there were no material misstatements with respect to budget and reporting on unregulated activities, but there were some recommended improvements. The changes implemented include:

- Establishing separate cost centres to segregate and track costs for tower leases, energy projects, rental properties, contract revenue, consulting
- Preparing a template for directors, supervisors or managers to track costs/projections related to unregulated activity and adjust accounting records as required to allocate actual costs accordingly.
- Implementing a 1% mark-up to salaries and benefits charged to unregulated activities to recoup miscellaneous expenses.

Figures for overhead costs recovered from unregulated activities in 2013/14 and prior included salaries and benefits only. Expenses specifically identified as being unregulated, are charged as a direct unregulated expense. Effective April 1, 2014 Halifax Water assigned an additional 1% mark-up to salaries and benefits charged to unregulated activities to recoup miscellaneous expenses such as office supplies, photocopying, telephone, etc. The 1% is based on the fact that unregulated revenues represent approximately 1% of total revenues; and overhead expenses are minimal.

As mentioned previously, in 2020 Halifax Water implemented a new standalone payroll system. The new system allows staff to record time spent related to unregulated activities directly into the payroll system using statistical work orders, which compiles costs and posts to the appropriate unregulated cost centre. This eliminates Excel spreadsheets which had been used as a tracking mechanism, requiring a manual entry of costs into the accounting system.

## **Capital Assets**

Infrastructure and capital assets are of primary importance to Halifax Water, mainly due to the magnitude of investment required monetarily. With respect to rate applications, one of the major components in the determination of the revenue requirement is depreciation, which is directly associated with capital assets. Other expenditures closely linked to capital assets from an operational perspective are debt servicing, which again is a main contributor in the determination of the revenue requirement.

Tracking capital assets is an important function. Complexities can arise given the fact that capital not only is funded internally, but may also be contributed/ donated, so segregation is required from a tracking standpoint. This segregation not only applies to anticipated additions in the current year, but also for balances carried forward year over year with respect to both total cost and accumulated depreciation. Special attention is also given to additions in any given year. For example, for the purposes of the rate application, assets cannot be brought into Plant in Service unless the assets are or will be in service. Finally, from a continuity perspective, retirements/ disposals require proper treatment to ensure their capital cost and any associated accumulated depreciation is removed from the accounting records.

The calculation of depreciation is a relatively straightforward process however, care must be exercised in that accounting policies and principles surrounding depreciation and capital assets are adhered to.

Capital assets associated with each utility Service are presented in the rate application using a standardized format that has been adopted from previous rate applications to the NSUARB. This general format is shown in Table 6 below, where System-specific capital assets are presented on a line-by-line basis under the following common categories:

- Intangible Plant;
- Land and Land Rights;
- Structures and Improvements;
- Equipment;
- Mains and
- Other.

Additional categories will be added as required for each utility System to further capture other types of capital assets unique to that particular system.

Capital assets that are common to all three systems are allocated 5150% to Water, 4950% to Wastewater, with a secondary allocation of 1046% from Wastewater to Stormwater. This is consistent with the approach to sharing common operating costs between Wastewater and Stormwater noted previously on page 23. Direct allocation is employed when possible – such as allocating buildings based on square footage utilized by each Service.

758 Some examples of capital assets common to all three systems would include Administration  
759 Buildings and Corporate Enterprise Systems. Meters are capital assets common to two systems.  
760 Historically, Halifax Water has treated Meters entirely as Water assets. It was recently recognized  
761 in conjunction with investigation of future metering technology improvements, that the meters are  
762 assets that serve both water and wastewater customers. Based on the March 31, ~~2021~~2014  
763 customer data, a 51%/49% split between Water and Wastewater is appropriate.

764

<div> <div>Halifax Water</div> <div>Utility System</div> <div>Utility Plant in Service</div> <div>Depreciation/Continuity Schedule</div> </div>													
Test Year													
	Funded Utility Plant in Service Opening Balance	Donated Utility Plant in Service Opening Balance	Total Utility Plant in Service Opening Balance	Work in Process approved in Prior Years	Utility Plant in Service Additions	Donated Utility Plant in Service Additions	Projected Retirement	Projected Utility Plant in Service	Accumulated Depreciation Opening Balance	Accumulated Depreciation on funded assets Opening Balance	Accumulated Depreciation on donated assets Opening Balance	Projected Retirement of Accumulated Depreciation	Projected Net Book Value after Depreciation
	Test Year	Test Year	Test Year	Test Year	Test Year	Test Year	Test Year	Test Year	Test Year	Test Year	Test Year	Test Year	Test Year
Immovable Plant													
Organization and Working Capital													
LAND AND LAND RIGHTS													
System Specific - Land													
System Specific - Right of Ways													
System Specific - Other Rights													
System Specific - Other													
STRUCTURES AND IMPROVEMENTS													
System Specific - Structures													
General													
Office Building													
Equipment													
System Specific - Pumping Equipment													
System Specific - Tools and Equipment													
System Specific - Transportation													
System Specific - Office Equipment													
System Specific - Computer Equipment													
System Specific - Other													
Mains													
System Specific - Mains and Laterals													
Other													
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0

## SECTION 4 - WATER SYSTEM COST ALLOCATIONS

### General Review – Base / Extra Capacity Methodology

Water system COS analyses employ a multi-step procedure to assign revenue responsibilities to customer classes in proportion to their respective shares of system demands and uses of system facilities (e.g., standby for fire protection). Using the base-extra capacity method, COS is usually separated into four primary cost components: (1) base or average demand-related costs, (2) extra capacity costs - often further segregated into maximum-day and maximum-hour costs, (3) customer costs- often segregated into meter-related costs and those incurred for billing, and (4) fire-protection costs.

- **Base costs** vary with the total quantity of water used or are those operations and maintenance (O&M) expenses and capital costs incurred to deliver services under average demand conditions.
- **Extra capacity costs** are associated with meeting demand requirements in excess of average and include O&M expenses and capital costs for system capacity beyond that required to meet average demands. These costs may be subdivided into costs necessary to meet maximum-day extra demand and maximum-hour demand in excess of maximum-day extra demand.
- **Customer costs** comprise those costs associated with serving customers, irrespective of the amount or rate of water use. They include meter reading, billing, and customer accounting and collecting expense, as well as maintenance and capital costs related to meters and services.
- **Fire-protection costs** include costs directly related to public fire hydrants and related branch mains and valves. It is noted that the costs allocated to the direct fire-protection cost component are usually only a small part of the total cost of fire protection. A significant portion of extra capacity costs can be allocated to fire protection in distributing costs to customer classes. Fire protection costs are primarily capital-related with relatively limited operational costs incurred to deliver this service attribute.

In the base-extra capacity method, the appropriate classification factors between base and extra capacity should be calculated using actual operating history or design criteria. The basic formulas are as follows:

- For functions classified to maximum-day and average day service characteristics:

$$\text{Average Day \%} = \text{Average Day Demand} / \text{Maximum-Day Demand}$$

$$\text{Maximum-Day \%} = (\text{Maximum-Day Demand} - \text{Average Day Demand}) / \text{Maximum-Average-Day Demand}$$

- For functions classified to maximum-hour, maximum-day and average day service characteristics:

$$\text{Average Day \%} = \text{Average Day Demand} / \text{Maximum-Hour Demand}$$

$$\text{Maximum-Day \%} = (\text{Maximum-Day Demand} - \text{Average Day Demand}) / \text{Maximum-Hour Demand}$$

$$\text{Maximum-Hour \%} = (\text{Maximum-Hour Demand} - \text{Maximum-Day Demand}) / \text{Maximum-Hour Demand}$$

The classification of costs by function is based on the design and operation of the facilities used to perform the functions in question. For example, raw-and treated-water pumping and treatment facilities are typically classified to the average-day and maximum-day extra capacity cost components since these facilities are typically designed to meet maximum-day demands. In contrast, storage facilities are typically apportioned to each of the three demand-related components because storage tanks serve principally to assist utilities in meeting maximum-hour extra capacity requirements.

Fire Protection is classified between public fire protection and private fire protection based on the flows that each could potentially demand. The cross-sectional area of the pipe is used as a surrogate for this flow classification. All public hydrants are assumed to have a 150 mm (6 inch) connection to the Halifax Water System while all private connections are based on the recorded or observed size of the connection to the Halifax Water System. As noted in response to IR-IPOANS 1 during the 2013 rate application, the charge shall be based on the size of the line before the first point of use connection whether it be a hydrant line or a sprinkler line entering the building. The total cross-sectional area for all public hydrants is calculated along with the total cross-sectional area of all private hydrants and sprinkler connections. These areas are used to calculate the percentage of the fire protection charge to be recovered from the public system versus the percentage to be recovered from private connections.

In classifying costs to utility service characteristics, it is useful to develop as complete an accounting of utility system performance measures as is practicable. Accordingly, it is useful to develop a high-level reconciliation of system production data – identifying the shares of production associated with billed usage (by customer class) versus that associated with non-revenue water (e.g., losses). The determination of shares of production that are billed and lost are among the measures that are used to manage non-revenue water (including non-metered water uses and water losses) as discussed in more detail in response to IR-IPOANS-18 of the general rate application of 2013. For cost-of-service analysis purposes, it is noteworthy that costs are incurred relative to water production, yet costs must be allocated to billable water demands. Understanding these relationships provides a more complete picture of cost causation and allocated revenue responsibilities.

The elements of the water production and billable volume data are compiled for Tables 7 & 8. Beyond the point noted above the relationship between production and billable volumes are not used directly in the cost-of-service analysis.

Classified costs are allocated to customers through the calculation of unit costs of service for each service characteristic, and apportionment of costs to customer classes based on the number of service units required by the respective customer classes. So, for example, if cost classification indicates that annual average-demand related costs are \$10 million and average annual demands are 5 million cubic meters, the \$2 per cubic meter unit cost is distributed to Customers by including in rates the \$2 costs per cubic meter.

#### **System and Customer Use Data (for Cost Allocation)**

A map of the System is provided in the COS Manual Appendix and general system information may be referenced from Halifax Water's Annual Report. Water System production data, similar to that provided in the example format below using FY 2020/21~~13/14~~ Halifax Water data, is used to develop cost classification percentages as outlined in section 2 Methodology Review.

851 Table 7  
 852 Water System Production  
 853 Development of Demand-Related Cost Classification Percentages

Halifax Water - Water System Production – FY <del>2020/2013</del> /2114*							
Water Production	Average-Day Demand	Maximum-Day Demand	Max-Day Factor	Avg-Day / Max-Day Percent	Maximum-Hour Demand	Max-Hour Factor**	Avg-Day / Max-Day / Max-Hour Percent
Lake Major	33,198 <del>38</del> , 854_M <sup>3</sup>	<u>44,910</u> <del>51</del> , 250_M <sup>3</sup>	<u>1.351</u> <del>.32</del>		56,302 M <sup>3</sup>	1.70	
Lake Pockwock	<u>78,736</u> <del>80</del> , 270_M <sup>3</sup>	<u>97,040</u> <del>94</del> , 859_M <sup>3</sup>	<u>1.231</u> <del>.18</del>		145,415 M <sup>3</sup>	1.70	
Bennery Lake	<u>535</u> <del>885</del> _M <sup>3</sup>	<u>1,302</u> <del>2</del> , 0_M <sup>3</sup>	<u>2.432</u> <del>.40</del>		1,669 M <sup>3</sup>	1.70	
System	<u>112,469</u> <del>12</del> , 0,009_M <sup>3</sup>	<u>143,252</u> <del>14</del> , 8,229_M <sup>3</sup>	<u>1.271</u> <del>.24</del>	<u>7984</u> % / <u>2149</u> %	215,451 M <sup>3</sup>	1.70	<u>5256</u> %/ <u>1413</u> %/ <u>3434</u> %
* Halifax Water, Cost of Service Demand Analysis Report, prepared by M. E. Loudon Ltd., October 2009 – hereinafter, the Loudon Report – indicated a maximum-day factor of 1.22. This has been updated in 2014 by M.E. Loudon Ltd. Maximum-day factor is now 1.2 <u>97</u> . The Loudon report excludes Bennery Lake. The COS Manual includes Bennery Lake. The difference is not material as Bennery represents 0.7% of total production. ** Maximum hour production data is not available; the 1.70 maximum-hour factor based on the above-referenced Loudon report was applied uniformly for all water treatment plants.							

854 Halifax Water does not calculate and compile maximum hour production from the treatment plants  
 855 because there is a significant amount of storage in the distribution system such that maximum hour  
 856 production is not driven by variability in customer demand patterns. The plants are designed and  
 857 intended to operate at a constant rate on any given day with variations in consumption made up  
 858 from storage. As a result, and notably different from the cost causation relationships contemplated  
 859 in the AWWA M1, there is no significant relationship between plant operation and hourly variations  
 860 in system consumption. Moreover, the system does not experience significant variations in  
 861 demands. The Loudon Report concluded on page 19: “It is concluded that there is insufficient max  
 862 hour differentiation by customer class to be a factor in allocating costs for rate setting purposes”.

863 Halifax Water engaged R.M. Loudon to prepare an update to determine whether the 2009 findings  
 864 were still valid. R.M. Loudon’s 2014 Water Demand Analysis supports the findings in the 2009  
 865 report. Halifax Water engaged Raftelis in 2020/21 to complete a Water Demand Analysis using AMI  
 866 data. The 2021 work concludes there may be sufficient differentiation in daily peaking  
 867 characteristics by customer class now to warrant using max hour as a factor in allocating costs for  
 868 rate setting purposes, however the consumption data for the period under review was not normal



as customer consumption patterns were impacted by the COVID-19 pandemic. At this time Halifax Water is not proposing to do further allocations to functionalize costs to customer classes. Raftelis also notes that “there is enough differentiation between the daily peaking characteristics by customer class that class-based volumetric water rates could be supported, although would not necessarily be required”.

~~Halifax Water~~ HRWC has not conducted any additional studies to determine class peaking factors given the cost and effort involved, as there has been no material change in water use patterns (aside from decreased consumption across all customers types) or customer mix. Additional information used for classification and allocation of System costs includes:

- Design criteria for all water related infrastructure that is included in the ~~2020~~2014 Design and Construction Specifications. The document is available on line at <https://halifaxwater.ca/halifax-water-specifications-forms> ~~www.halifax.ca/hrwc/publications~~. The document includes a table of contents that clearly defines the document content.
- Fire flow requirements are designed using the “Water Supply for Public Fire Protection – 1999, Fire Underwriters Survey for CGI.” Typical fire flow requirements<sup>9</sup> are:
  - 880 usgpm for residential single family
  - 1,100 usgpm for townhouse developments
- Water Services and meters are sized using AWWA Manual of Supply Practices – M-22 - Sizing Water Service Lines and Meters.

Finally, data employed for allocation to customer classes includes information on the distribution of meters by size serving the class, billed usage, and measured or imputed maximum-day demand and maximum-hour demands based on estimated peaking factors. Provided in Table 8 below is an example format for presentation of these customer class usage characteristics:

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<sup>9</sup> Actual requirements must be calculated for each circumstance.

893 Table 8  
894 Customer Class User Characteristics

Water Accounts and Billed Usage by Customer Class (2013/14)					
		Residential		Non-Residential	
Meter Size		Accounts*	Billed Usage	Accounts*	Billed Usage
Unmetered		317	64,086		
5/8"	(15 MM)	77,425	13,717,256		
3/4"	(20 MM)	973	603,798		
1"	(25 MM)	1,517	1,803,057		
1.5"	(40 MM)	1,010	2,626,573		
2"	(50 MM)	746	4,713,842		
3"	(80 MM)	285	4,190,462		
4"	(100 MM)	72	3,288,608		
6"	(150 MM)	37	2,831,265		
8"	(200 MM)	19	1,277,596		
10"	(250 MM)	2	66,635		
Total		82,403	35,183,178		
Maximum-Day Peaking Factor**			1.24		1.24
Maximum-Day Demand					
Maximum-Hour Peaking Factor**			1.70		1.70
Maximum-Hour Demand					
* For cost allocation, account totals are used to allocate billing and other non-meter customer service costs; meter equivalencies based on account data by meter size are used to allocate meter-related costs.					
** Pending the potential development of class peaking factor estimates with implementation of new metering technologies, Louden Report estimates represent the best available data on class demand patterns. Maximum-day and maximum-hour demand factors based on the Louden report - , which did not indicate material differences across classes, are applied to determine respective class claims on extra-capacity.					

895

Water Accounts and Billed Usage by Meter Size and Customer Class (2020/21)				
		Billed Usage		
Meter Size	Accounts <sup>1</sup>	Residential	Non-Residential	Total
Unmetered	307	55,976	0	55,976
5/8" (15 MM)	80,973	13,673,987	185,667	13,859,654
3/4" (20 MM)	1,022	325,036	198,668	523,704
1" (25 MM)	1,563	978,447	595,033	1,573,480
1.5" (40 MM)	1,146	1,065,213	1,477,422	2,542,635
2" (50 MM)	818	2,221,729	2,431,751	4,653,480
3" (80 MM)	316	2,135,050	1,626,570	3,761,620
4" (100 MM)	77	597,942	842,276	1,440,218
6" (150 MM)	38	129,982	2,062,437	2,192,419
8" (200 MM)	26	12,724	1,511,705	1,524,429
10" (250 MM)	2	0	58,031	58,031
Total	86,288	21,196,086	10,989,560	32,185,646
Maximum-Day Peaking Factor <sup>2</sup>				1.24
Maximum-Day Demand				
Maximum-Hour Peaking Factor <sup>2</sup>				1.70
Maximum-Hour Demand				
<div>1 - For cost allocation, account totals are used to allocate billing and other non-metered customer service costs; meter equivalencies based on account data by meter size are used to allocate meter-related costs.</div> <div>2 - Pending the potential development of class peaking factor estimates with the implementation of new metering technologies, Louden Report estimates represent the best available data on class demand patterns. Maximum-Day and Maximum-Hour demand factors based on the Louden Report did not indicate material differences across classes, are applied to determine respective class claims on extra-capacity.</div>				

896 The Cost of Service Manual continues to rely on the Loudon report class demand projections.  
897 [Halifax Water engaged Raftelis in 2020 and most recently in 2021 to perform a water demand](#)  
898 [analysis. In both, Raftelis determined differentiation in peaking characteristics could be reported](#)

between customer classes however, given the relatively young age of the advanced metering infrastructure (AMI), compounded by the continued effects of the COVID-19 pandemic on consumption patterns, delaying the introduction of class-based rates would be prudent. This would provide greater confidence in the data, and ensure changes to the rate structure are as accurate and justifiable as possible, as there have been no material changes in system peaking factors or in customer usage patterns. The Loudon report did not provide estimates for class demand patterns but based the conclusions on actual consumption for representative samples for a full year.

## Water Systems Functions

Utilities incur varying levels of costs to perform the different system functions needed to meet customer demands and make services available. The functionalization process involves categorizing revenue requirements according to functions in order to more appropriately assign costs to customer classes. Water system cost functions and their definitions for both operating and capital are presented in Table 9.

Table 9  
Water System Cost Allocation – System Functions

Water System Function	Operating Costs Definition	Capital Cost Definition
<b>Watershed Management</b>	Includes labour, materials, and programs to ensure the watershed is maintained in optimal condition.	Includes all capital expenditures for watershed management.
<b>Dams</b>	Includes labour, materials, and programs to ensure dams are maintained in optimal condition and meet all safety regulations.	Includes all capital expenditures for dams.
<u>Water Quality</u>	<u>Includes labour, materials, and programs to ensure water quality is maintained pursuant to regulatory requirements.</u>	<u>Includes all capital expenditures related to water quality management.</u>
<b>Water Treatment</b>	Includes the cost centre for treatment plants (including raw water pumping, emergency standby, on-site storage, and water quality.	Includes all buildings, structures including storage that is part of the treatment process, mechanical and electrical equipment to make a complete operating treatment plant including wet well water storage.
<b>Transmission</b>	Includes the cost centres for all mains <u>355600 mm (1424 inch) or larger, as well as other mains clearly designed to serve as transmission mains.</u>	Includes the design and construction costs associated with all mains <u>355600 mm (1424 inch) or larger, as well as other mains clearly designed to serve as transmission mains, as any mains less than 600 mm (24 inch) that are clearly designed to serve</u>

		<del>as a transmission main and all associated valves and pressure regulating equipment.</del>
<b>Distribution</b>	Includes the cost centres for distribution and for <u>pressure reducing valves (PRV)</u> and control valves on the mains less than <u>355600</u> mm ( <u>1424</u> inch) in diameter.	Includes the design and construction costs associated with all mains less than <u>355600</u> mm ( <u>1424</u> inch) in diameter except for those designed to be transmission mains as identified and all associated valves and pressure regulating equipment.
<b>Service Laterals</b>	Includes the cost centre for water services.	Includes connection to the main and the piping from the main to the street line for water services.
<b><u>Operation &amp; Maintenance of Meters</u></b>	Includes the cost centre for operation and testing of meters (labour, <u>materials</u> , and programs).	Includes all capital expenditures for meters.
<b>Water Storage Tanks</b>	Includes the cost centre for reservoirs/storage tanks. Water storage tanks that are part of a treatment plant are maintained as part of the treatment plant.	Includes all buildings, structures, control chambers, mechanical and electrical equipment to make a complete operating reservoir. Storage that is part of the treatment process is included in the capital cost of the Water Treatment Plant.
<b>Hydrants</b>	Includes the cost centre for hydrants.	Includes all hydrants and associated fittings and valves in the water system that are for the purpose of providing water for fire protection.
<b>Regulatory Services</b>	Includes Environmental Engineering, Regulatory Compliance, Stormwater Engineering, Environmental Management and Development Approvals cost centres.	Cost centres within Regulatory Services <u>function as</u> operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
<b>Engineering and <u>Technology Services</u></b>	Includes the cost centres for Records Management; Energy <u>and Business Development</u> , and, Information Services.	Cost centres within Engineering and <u>Technology Services function as</u> operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
<b>Technical Services (SCADA)</b>	Operate the SCADA systems for water (both treatment and distribution).	Cost centres within Technical Services <u>function as</u> operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
<b><u>Corporate Services</u></b>	<u>Includes the cost centres for Accounting, Finance and Procurement.</u>	<u>Cost centres within Corporate Services function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles, etc.) are allocated as assets in proportion of the other costs through depreciation.</u>
<b>Customer Service</b>	Includes the cost centres for Customer <u>Care, Collecting, Supervision and Administration/Overheads.</u>	Cost centres within Customer Service function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings,

		intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
<b>Meter Reading and Billing</b>	Includes the cost centres for Meter Reading and Customer Billing.	Cost centres within Meter Reading and Billing function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
<b>Administration and General</b>	Includes the cost centres for: Administration and general, Communications, Legal, Human Resources, Employee Benefits and General, operation and maintenance of office	Cost centres within Administration and General function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.

## Cost Functionalization Considerations

The engineers and operators responsible for operation of the Water System review assignment of water assets and their associated operating and maintenance costs to system functions. Operating costs centres are set up to record financial information in categories that support functionalization.

The basis for the determination of functions is the operating cost centers that comprise the Water System from source of supply to delivery to the Customer. It includes the direct cost functions of providing the service as well as the common costs of providing support services across all utility Services that are assigned to Water Services. The following points are noted regarding the cost functions:

- Historically, there was no separation of transmission and distribution main operating costs as these operating cost centers were combined following municipal amalgamation in 1996. The cost-of-service model will separate these into two cost functions, one for transmission and one for distribution. The age of the system means that the role of mains has changed over time as new sources of supply were developed and the System expanded. For the purposes of cost functionalization, a designation between transmission and distribution costs is required. For the Halifax Water System, all mains 355600 mm (1424 inch) and greater in diameter may be designated as transmission mains, together with any mains less than this diameter which are clearly designed to be transmission mains. For instance the transmission main from the Bennery Water Treatment Plant to the Aerotech Industrial Park is less than 600 mm (24inch) but was designed, based on demand, to be a transmission main.

936 • Transmission and distribution functions are distinguished due to fundamental differences  
937 in the design and operation of these Water System network assets. These assets deliver  
938 services to a broad diversity of customer types – residential, multi-residential, [institutional](#),  
939 commercial, industrial – located across an array of physical configurations. These  
940 configurations are typically served by multiple feeds, providing redundancy that reinforces  
941 the security of water supply. Consistent with cost-of-service principles that call for  
942 distribution of costs based on cost causation, these functions do not recognize the density  
943 of customer concentrations. There is no evidence to suggest density of customer  
944 concentration will represent a material determinant of COS differentials across classes in  
945 that system redundancy and fire flow demand requirements almost certainly outweigh any  
946 potential density benefit, even in the event that such a benefit could be identified in light  
947 of the mix of land uses served across every sector of the Halifax Water service area. As  
948 noted, industry standard practices for cost-of-service analysis principles do not recognize  
949 the density of customer concentrations.

950 • Given that density of customer concentration is one of a variety of factors impacting costs  
951 to serve a particular subsection of Halifax Water's service area – and is arguably less  
952 important than other factors, for example fire flow requirements referenced in system  
953 design – the potential to isolate and define density-based cost differentials is limited at  
954 best. Accordingly, Halifax Water has not developed – nor received from other sources -  
955 any studies or reports that provide evidence of density-based cost differentials. The nature  
956 of its Customer base located within its service area, as well as system design protocols  
957 used by Halifax Water supports its conclusion.

958 The Technical Services (SCADA) budget has been allocated based on the number of data  
959 points monitored in each cost function. Functionalization of O&M expenses is shown in  
960 Worksheet W-6 in Rate Studies, which is based on Table 9 as shown in this Manual. The  
961 percentages reported in Worksheet W-6 are back-calculations, derived from actual dollar values  
962 included in the test year operating expenditures. Functionalization is shown with both  
963 percentage allocation and actual dollar values.

964 For Customer Service, input values (dollar costs) for the functions of meters and meter reading  
965 and billing are obtained from specific cost centres within Customer Service:

- 966 • Meters
- 967     Operation and Maintenance of Meters

- 968           • Meter Reading and Billing
- 969           Meter Reading
- 970           Customer Billing

971           Once costs have been identified for the above functions, costs applicable to the Customer  
972           Service function are merely the residual amount.

973           The concept for transmission is the same as Customer Service outlined above. Each region has  
974           a separate cost centre for transmission, and these combined costs were used to back-calculate  
975           the percentages allocations in the functionalization report. The percentages represent the  
976           prorated values for transmission costs compared to total transmission and distribution costs for  
977           each of the cost element groups.

978           The dollar value report for functionalization is the primary worksheet for input and balancing, the  
979           percentage report is supplemental in nature and useful to illustrate changes.

## 980   **Classification of Functional Costs**

981           Following the distribution of water system revenue requirements to designated functions, costs  
982           are distributed to Water System service characteristics. Following AWWA procedures outlined  
983           above, these service characteristics include water demand metrics, uses of system facilities, and  
984           customer service attributes. Water demand estimates include average-day, maximum-day and  
985           maximum-hour estimates; uses of facilities include fire protection (and potentially other  
986           standby/emergency) service; and customer service attributes relate to the numbers of equivalent  
987           meters and accounts served. Classification of system costs (by function) distributes costs to the  
988           characteristics of service that distinguish customer classes.

989           Halifax Water's functionalized costs are classified to the following Water Service characteristics:

Average Day Demand	- Customer Service
Maximum Day Demand	- Fire Protection
Maximum Hour Demand	- Indirect
Equivalent Meters	

## 990   **O&M Cost Classification**

991           Functionalized Water System costs are classified to service characteristics separately for O&M  
992           expenses and capital costs. O&M costs are classified as summarized in Table 10, explanations of



993 which are provided in the subsequent notes. Supporting calculations are documented in the final  
 994 section of the COS Manual section on Water System Allocations.

995 Table 10  
 996 Water System O&M Cost Classification Summary

O&M Cost Classifications								
Water System Functions	Average -Day Demand	Max-Day Demand	Max-Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Notes
Watershed Management	100%							1
Dams	100%							2
Water Quality	100%							3
Water Treatment	91%	9%						4
Transmission	91%	9%						5
Distribution	<u>2830</u> %	<u>1644</u> %	<u>2527</u> %			<u>3129</u> %		6
<u>Water</u> Storage Tanks	<u>5146</u> %	<u>544</u> %	14%			<u>3029</u> %		7
Hydrants						100%		9
Service <u>Laterals</u>				100%				8
Technical Services ( <u>SCADA</u> )	25%	25%	25%			25%		10
Customer Service					100%			11
<u>Operation &amp; Maintenance of</u> Meters				100%				12
Meter Reading and Billing					100%			13
Engineering and <u>Technology Services</u>							100%	15
Regulatory Services							100%	14
<u>Corporate Services</u>							<u>100%</u>	<u>15</u>
<u>Administration &amp; General</u>							100%	15

## Notes on Water System O&M Cost Classification

1. Watershed management is assigned 100% to base capacity or average day. Watersheds are designed and managed to provide average day flow, consistent with AWWA M1.
2. Dams are assigned 100% to base capacity or average day, the same as watershed management.
3. Water Quality is assigned 100% to base capacity or average day, the same as watershed management.
4. Water Treatment allocation is consistent with the methodology on page 52 of M1. This also includes the suggestion in M1 that variable costs which in this case are electricity, chemical and sludge management costs are allocated to base capacity or average day. Halifax Water used ~~2020/21~~2014 flows from the three large plants (Lake Major, Pockwock and Bennery Lake) and calculated the percentage that maximum day exceeds average day. While M1 suggests the electrical demand charge may be allocated to max day, Halifax Water did not do that because there is so little variability in the electrical demand charge (the difference in demand charge between the highest and lowest months is calculated to be \$400 out of a \$60,000 bill). Based on this review costs are assigned 91% to average day and 9% to max day.
5. Transmission is distributed the same as water treatment, 91% to average day and 9% to max day.
6. For distribution Halifax Water followed the method on page 52 of M1. To determine peak hour based on the factors developed in Exhibit 34 of the Loudon<sup>10</sup> Report. This resulted in the following distribution:
  1. Base Component (Average Day) = ~~28~~30%
  2. Max Day Component = ~~16~~44%
  3. Peak Hour Component = ~~25~~27%
  4. Fire Protection Component = ~~31~~29%
7. For water storage tanks Halifax Water took the total distribution storage of all 17 facilities and applied the formula for storage tank (reservoir) sizing found in the Atlantic Canada

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<sup>10</sup> Halifax Regional Water Commission, Cost of Service Demand Analysis Report, prepared by M. E. Loudon Ltd., October 2009

guidelines manual<sup>11</sup>. Fire demand in the service area varies from 800 to 5,000 igpm. Halifax Water calculated (see attached notes) the following distribution:

1. Base Component (Average Day) = 52.46%
2. Max Day Component = 5.44%
3. Peak Hour Component = 14%
4. Fire Protection Component = 29%

8. Service Laterals are assigned 100% to equivalent meters as services are totally dedicated to Customers.

9. Hydrants are to be assigned 100% to fire protection. Fire protection is to be divided between private fire protection service and public fire protection service. Private fire protection is to be recovered from the customers who benefit. The charge for public fire protection is to be recovered from HRM. This calculation<sup>12</sup> indicates 67% of the fire protection charge should be recovered from the public sector with the remaining 33% recovered from the private fire connections.

10. Technical Services operating costs are distributed based on the number of data points (tags) monitored in each activity. The result of this allocation is shown in the table below:

Table 11

Function	Number of Data Points Monitored	Allocation percentage
WW Treatment	24,3565,247	45.037%
WW Collection	11,9544,547	22.033%
SW CSOs	456410	0.83%
Water Distribution	5,2041,187	9.69%
Water Treatment	12,2652,492	22.648%
Total	54,23513,883	100.0%

Technical Services has been allocated equally between average day, max day, max hour, and fire protection.

11. Customer Service at Halifax Water is comprised of seven (7) cost centres, which include the six functions of customer care/contact (call center), as well as customer billing.

<sup>11</sup> Atlantic Canada Guidelines for Supply, Treatment, Storage, Distribution and Operation of Drinking Water Supply Systems, Atlantic Canada Water & Wastewater Association, September 2004

<sup>12</sup> Provided in final section of Water System Cost Allocations providing customer classification calculations.

1046 collections, meter reading, operation and maintenance of meters, supervision, and  
1047 administration/overheads. These functions are shared by the three Services: Water,  
1048 Wastewater, and Stormwater, with the exception that no meter related costs are allocated  
1049 to Stormwater. Meter related costs are distributed to Wastewater as billings are based on  
1050 water consumed and related meter size for base charges. The customer service costs  
1051 are assigned either on a Customer basis or an equivalent meter basis. Costs for  
1052 supervision, customer care, collections and administration/overheads are assigned on a  
1053 Customer basis. Meter reading and billing costs are included as a separate cost function  
1054 but assigned on a Customer basis while the costs for operation and maintenance of meters  
1055 are assigned on an equivalent meter basis as these costs are generally higher per meter  
1056 as the size of the meter increases.

1057 12. Operation and maintenance of meters is assigned 100% to equivalent meters.

1058 13. Meter reading and billing are the cost of meter reading and billing costs that are part of  
1059 Customer Service~~the customer service cost center~~. They are assigned 100% to Customer  
1060 Service.

1061 14. Regulatory Services are indirect costs that are distributed in proportion to direct costs.

1062 15. Engineering and Technology Services, Corporate Services and Administration~~and~~  
1063 ~~General~~ are indirect costs that are distributed in proportion to direct costs.

## 1064 **Capital Cost Classification**

1065 Functionalized Water System costs are classified to service characteristics separately for O&M  
1066 expenses and capital costs. Capital costs are classified as summarized in Table 12, explanations  
1067 of which are provided in the subsequent notes. Supporting calculations are documented in the final  
1068 section of the COS Manual section on Water System Allocations.

1069 Table 12

1070 Water System Capital Cost Classification Summary

Capital Cost Classifications								
Water System Functions	Average -Day Demand	Max-Day Demand	Max-Hour Demand	Equivalent Meters	Customer Service	Fire Protection	Indirect	Notes
Watershed Management	100%							1
Dams	100%							2
Water Quality	100%							3
Water Treatment	81%	19%						4
Transmission	81%	19%						5
Distribution	30%	14%	27%			29%		6
Water Storage Tanks	5246%	544%	14%			29%		7
Hydrants						100%		8
Service Laterals				100%				9
Technical Services (SCADA)								10
Customer Service					100%			11
Operation and Maintenance of Meters				100%				12
Engineering and Technology Services (excluding TS)							100%	13
Regulatory Services								14
Meter Reading and Billing					100%			15
Corporate Services							100%	16
Administration & General							100%	1645

1071 **Notes on Water System Capital Cost Classification**

- 1072 1. Watershed management assigned 100% to base capacity or average day. Watersheds  
1073 are designed and managed to provide average day flow, consistent with AWWA M1.
- 1074 2. Dams are assigned 100% to base capacity or average day, the same as watershed  
1075 management.
- 1076 3. Water Quality is assigned 100% to base capacity or average day, the same as watershed  
1077 management.
- 1078 4. Water Treatment: Halifax Water used ~~2013~~2020/1421 flows from the three large plants  
1079 (Lake Major, Pockwock and Bennery Lake) and calculated the percentage that maximum  
1080 day exceeds average day. The treatment plants have been designed with standby  
1081 capacity to treat water for the average day as well as the maximum day. Based on this  
1082 analysis the capital costs have been distributed 81% to average day and 19% to maximum  
1083 day.
- 1084 Halifax Water calculated the percentage of operating costs for average day and max day  
1085 which results in a distribution of 91% to average day and 9% to maximum day.
- 1086 5. Transmission is distributed the same as water treatment, 81% to average day and 19% to  
1087 max day.
- 1088 6. For distribution, Halifax Water followed the method on page 52 of M1. To determine peak  
1089 hour based on the factors developed in Exhibit 34 of the Loudon<sup>13</sup> Report. This resulted  
1090 in the following distribution:
- |      |                              |       |
|------|------------------------------|-------|
| 1091 | a. Base Component            | = 30% |
| 1092 | b. Max Day Component         | = 14% |
| 1093 | c. Peak Hour Component       | = 27% |
| 1094 | d. Fire Protection Component | = 29% |
- 1095 7. For water storage tanks, Halifax Water took the total distribution storage of all 16 facilities  
1096 and applied the formula for storage tank (reservoir) sizing found in the Atlantic Canada

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<sup>13</sup> Halifax Regional Water Commission, Cost of Service Demand Analysis Report, prepared by M. E. Loudon Ltd., October 2009

guidelines manual<sup>14</sup>. While fire demand in the service area varies Halifax Water utilized a design fire flows for each service area to determine the percentage of total storage and allocated that to fire protection. Halifax Water calculated balancing storage at 25% of max day and allocated that to peak hour. The remaining capacity was assumed to be emergency storage and was allocated to average and maximum day. From the attached calculations, the capital cost has been distributed based on ~~3029~~3029% to fire protection, 14% to peak hour, ~~5146~~5146% to average day and ~~544~~544% to maximum day.

8. Hydrants are assigned 100% to fire protection.

9. Service laterals are assigned 100% to equivalent meters as service laterals are totally dedicated to the customers.

10. Technical Services (SCADA) are charged directly assigned to the capital cost based on work performed of the works and are included in the capital items. There is no separate allocation for capital for this item.

11. Customer Service is assigned 100% to customer service

12. Operation and maintenance of meters are assigned 100% to equivalent meter

13. Engineering and Technology Services related with capital works are assigned to the capital cost of the works and are included in the capital items. All other costs such as databases and other intangibles are assigned to indirect costs.

14. Regulatory Services are assigned to the capital cost of the works and are included in the capital items. There is no separate assignment for capital for this item.

~~14.15.~~ Meter reading and billing costs are part of Customer Service. They are assigned 100% to customer service as meters are totally dedicated to the customers.

~~15.16.~~ Corporate Services and Administration are assigned to indirect costs that are distributed in proportion to direct costs.

## **Allocation to Customer Classes**

Costs are distributed to Customers (either by classes or individually) based on similarities and

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<sup>14</sup> Atlantic Canada Guidelines for Supply, Treatment, Storage, Distribution and Operation of Drinking Water Supply Systems, Atlantic Canada Water & Wastewater Association, September 2004

differences in their water demand patterns, fire protection requirements, and types/sizes of service connections. For Halifax Water, given the general similarities in water use patterns, customer classifications may be reasonably truncated based on an evaluation of potential classification options. This evaluation typically involves examination of metered billing-cycle usage data by Customer type and calculation of Customer class peaking factors. Applicable peaking factors include non-coincident factors that simply divide class maximum-month usage by average-day usage with selected adjustments. Alternatively, coincident peaking factors may be developed using imputation formulas as offered in the AWWA M1, Appendix A.

Costs by Service characteristic are simply divided by the projected level of service to be rendered to determine the unit costs of a given Service parameter. For example, the system-wide cost per cubic meter of maximum-day demand is calculated by taking the costs determined to meet maximum-day demands divided by projected maximum-day demands (based on system peaking factors). In this manner, costs are distributed to customers in proportion to their respective demands and uses of the System. If Customer classifications are homogenized, unit costs by Service characteristic may be combined to establish rates for Service (typically where demand related costs convert to the volumetric rate).

This procedure is illustrated in Tables 13 and 14 that offer example templates for these types of calculations. As noted, the distribution of costs by function, and subsequent classification of these costs by Service characteristic (e.g., average and maximum demands, fire flow requirements, equivalent meters and customer accounts) results in the expression of each component of the utility's revenue requirements in terms of these Service characteristics. Accordingly, in Table 13, Lines 1, 4 and 7 list the outcomes of the cost classification by each major revenue requirement component. Because some of these costs are distributed on an indirect basis, a calculation is made whereby the indirect costs are distributed to directly classified costs based on those costs share of total directly classified costs. So, for example, if average-day demand related O&M costs represent 40 percent of directly classified O&M costs, 40% of indirect O&M costs are apportioned to average-day demand related costs. This is the procedure employed in Lines 2, 5 and 8 – to yield complete cost classifications by cost component (Lines 3, 6, and 9) – that are summed (Line 10) to present total costs by Service characteristic.

Among other measures, determination of the total costs of fire protection provides the basis for determination of public fire protection costs to be billed to HRM as described in section 4 Water System Cost Allocations (p. 30), supporting calculations which are provided in the Water System



1155 Section Appendix. Application of the percentage of the fire protection costs to be distributed to  
 1156 public versus private connections is presented in Line 11. Lines 10 and 11 represent the costs  
 1157 by service characteristics to be recovered from Customers in proportion to their respective  
 1158 demands – their allocated COS – through COS based rates and charges as calculated using  
 1159 procedures outlined in Table 13.

1160 Table 13

1161 Water System – Unit COS Calculation Template

Line	Revenue Requirement Component	Average-Day Demand Related Costs	Maximum-Day Demand Related Costs	Maximum-Hour Demand Related Costs	Fire Protection Related Costs	Meter Equiv. Related Costs	Billing Related Costs	Indirect Costs
1	Operations & Maintenance	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$
2	Allocated Indirect O&M	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
3	Operations & Maintenance (Net)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
4	Depreciation	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$
5	Allocated Indirect Depr.	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
6	Depreciation (Net)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
7	Return on Rate Base	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$
8	Allocated Indirect Return	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
9	Return on Rate Base (Net)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
10	Total Revenue Requirements Lines (3,6,9)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
11	Private Fire Protection (% Share of Allocated Fire Protection)			\$\$	Public Fire Protection Share (xx%)		\$\$\$ (Billed to HRM)	



1162 The ultimate allocation of costs to Customer classes employs the service characteristic by customer  
1163 class data developed in the “System and Customer Use Data (for Cost Allocation) – Table 14.” Unit  
1164 COS by characteristic (Line 3) are calculated by dividing total revenue requirements by Service  
1165 characteristic (Line 1) by total system demands, capacity requirements, meter equivalents and  
1166 customer accounts served (Line 2). Costs are then allocated to Customer classes simply by  
1167 multiplying these unit costs by the demands, fire flows, meter equivalents and accounts served for  
1168 each Customer class. This is accomplished for residential customers in lines 4 & 5; for non-  
1169 residential customers in lines 7 & 8. The sum of line 5 (across service characteristics) is therefore  
1170 the fully allocated cost-of-service for the residential class; the sum of line 8 is that for the non-  
1171 residential. COS-based rates are those that recover these sums from respective Customer classes.  
1172 While many rate designs may accomplish these ends, a basic rate design option is to recover  
1173 volume-related costs, including average and maximum-demand related costs from volumetric rates  
1174 while fixed charges (graduated by meter size) recover metering related costs and customer account  
1175 related costs. Fire protection costs may be recovered from either volumetric rates or fixed charges.  
1176 This rate design calculation is presented in the template example in lines 6 & 9.

1177 Table 14  
1178 Water System – Allocation of Costs to Customer Classes and Uniform Volume with Fixed Charge  
1179 Rate Calculations (System and Customer Use Data for Cost Allocation)

Line	Revenue Requirement Component	Average-Day Demand Related Costs	Maximum-Day Demand Related Costs	Maximum-Hour Demand Related Costs	Fire Protection Related Costs	Meter Equiv. Related Costs	Billing Related Costs
1	Total Revenue Requirements Lines (3,6,9)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$
2	System Demands						
3	Unit Cost of Service Characteristic						
4	Residential Demands						
5	Residential Cost of						

	Service (Line 3 x 4)						
6	Residential Rates*						
7	Non-Residential Demands						
8	Non-Residential Cost of Service (Line 3 x 7)						
9	Non-Residential Rates**						
<p>* Residential rates (line 6) featuring uniform volume rates and fixed charges may be calculated by summing the first three columns of line 5 and dividing by projected billable residential water use (line 4, first column) to determine the volumetric rate. The fixed charge is the sum of meter equivalent costs (line 5, column 5) divided by residential meter equivalents (line 4, column 5) plus the billing and non-meter customer service costs (line 5, column 6) divided by residential accounts (line 4, column 6).</p> <p>**Similarly, non-residential rates (line 9) are calculated using the same procedures where line 7 is substituted for line 4, and line 8 is substituted for <u>line 5</u>.</p>							

1180 **Water System Appendix: Supplemental Cost Classification and Allocation**  
1181 **Calculations**

1182 **Water Treatment/Water Quality**

1183 For the purpose of distributing water treatment and water quality costs to demand related service  
1184 characteristics, first the cost of the three large water supply plants, plus the Water Quality (WQ)  
1185 section, plus Water Treatment (WT) Regional Administration.

1186 The total cost for WT and WQ includes the operating costs for the Lake Major (LM) WSP, the J.D.  
1187 Kline (JDK) WSP, Bennery Lake WSP, the WQ section, and WT Regional Administration costs.  
1188 The values are taken from SAP for the 2020/21 FY2013/2014 fiscal year.

WT Regional Administration & T, Admin & General (43413)	\$ <u>649,225,567,925</u>
WQ Section (43415)	\$ <u>1,050,347,631,700</u>
Lake Major WSP (23410)	\$ <u>3,732,138,886,214</u>
J.D. Kline WSP (13414)	\$ <u>3,900,955,906,403</u>
Bennery Lake WSP (33444)	\$ <u>599,171,642,364</u>
<b>Total</b>	<b>\$<u>9,931,836,634,606</u></b>

1189 The following costs are allocated to average day based on cost causation (as affirmed by  
1190 stakeholder discussions):

- 1191 • Dams  
1192 • WQ

1193 Similarly, consistent with the AWWA M1 manual, the following truly variable costs should be  
1194 allocated to average day. These include:

- 1195 • Chemicals  
1196 • Electricity (consumption charges) \*  
1197 • Sludge costs

1198 \*Consumption charges are, on average, 70% of the electricity bill.

1199 Determine amount to allocate directly to average day:

WQ <u>Section</u>	<u>\$1,050,347,631,700</u>
JDK Chemicals	<u>\$1,348,878,077,312</u>
JDK Electricity *	<u>\$695,092,570,831</u>
JDK Sludge <del>(from 2013/2014 Budget)</del> **	<u>\$150,000,48,000</u>
LM Chemicals	<u>\$1,421,483,885,571</u>
LM Electricity *	<u>\$575,159,573,630</u>
LM Sludge **	<u>\$100,000,90,748</u>
Bennery Chemicals	<u>\$53,532,51,507</u>
Bennery Electricity *	<u>\$53,552,24,077</u>
Bennery Sludge ***	<u>\$15,000,15,000</u>
Dams (estimated)	\$50,000
<b>Total to Allocate directly to Average Day</b>	<b><u>\$5,513,043,018,376</u></b>

1200 \* 70% of bill representing consumption.

1201 \*\* Average annual cost based on actual costs for the period 2018-2021.

1202 \*\*\* Budget contains \$150,000 but sludge has never been removed before: Assume costs are averaged over a ten-year  
1203 return cycle.

1204 \$5,513,043,018,376 is allocated directly to average day

1205 \$9,931,836 - \$5,513,043 = \$4,418,793,616,230 is allocated to base – extra capacity

1206 Base extra capacity portion: Treatment plant costs are classified to average day and max day

1207 Service characteristics.

1208 Average day is 7981% of max day (see System and Customer Use Data (for cost allocation))

1209 \$4,418,793,616,230 X 0.7981 = \$3,490,846,2,929,146 to average day

1210 \$4,418,793,616,230 - \$3,490,846,2,929,146 = \$927,947,687,084 to max day

1211 Percentage to average day, combining directly allocated and classified costs.

1212 (\$5,513,043,018,376 + \$3,490,846,2,929,146) / \$9,931,836,634,606 = 91% to

1213 average day

1214 = 98% to Max Day

1215     **Storage:**

1216     According to Atlantic Canada guidelines, tanks are sized as follows:

1217              $S = A + B + C$

1218             Where: A = Fire Storage

1219                 B = Peak Balancing Storage

1220                 C = Emergency Storage

1221     There may also be another component, D (Dead Storage), which is essentially water holding up the  
1222     other storage volume and in excess of S.

1223     A:     Fire Storage:

1224             - Allocate all this volume to fire protection

1225             - Fire demands can range from 800 – 5,000 IGPM

1226             - Each tank must supply the maximum fire demand in its area

1227                 - According to 1993 report by CBCL “Metropolitan area of Halifax County Regional Water  
1228     Supply Study – Engineering and Financing” storage is required as follows:

1229                 Halifax: 5,000 IGPM

1230                 Dartmouth: 3,500 – 4,000 IGPM – use 4,000

1231                 Bedford/Sackville: 3,000 – 3,500 IGPM – use 3,500

1232     That study did not consider the Bennery Lake/Airport System. Its fire demands are 5,000 IGPM .

1233     From Insurance Advisory Organization, fire durations are:

1234                 5,000 IGPM = 5 hours

1235                 4,000 IGPM = 4.5 hours

1236                 3,500 IGPM = 3.5 hours

1237     Calculation based on 16 tanks

1238             Total volume = 243,183 M<sup>3</sup>

1239     Of the 16 tanks

1240                 5 are Halifax + Airport: 5,000 IGPM = 1,362 M<sup>3</sup>/hr X 5hrs

1241  $5 \times 1,362 \times 5 = 34,050 \text{ M}^3$

1242 3 are Dartmouth:  $4,000 \text{ IGPM} = 1,090 \text{ M}^3/\text{hr} \times 4.5\text{hrs}$

1243  $3 \times 1,090 \times 4.5 = 14,715 \text{ M}^3$

1244 8 elsewhere (Bedford/Sackville):  $3,500 \text{ IGPM} = 953 \text{ M}^3/\text{hr} \times 3.5\text{hrs}$

1245  $8 \times 953 \times 3.5 = 26,684 \text{ M}^3$

1246 Total Fire Storage (A) =  $34,050 \text{ M}^3$

1247  $14,715 \text{ M}^3$

1248  $26,684 \text{ M}^3$

1249  $75,449 \text{ M}^3$

1250 B: Based on previous calculations:

1251 Max Day =  $1.274 \times \text{Avg Day}$

1252 Avg Day =  $\frac{33,198 + 78,736 + 53538,854 + 80,270 + 885}{5} \text{ M}^3$

1253  $= 112,469 \text{ M}^3$

1254 Max Day =  $1.274 \times 112,469 \text{ M}^3 = 142,836 \text{ M}^3$

1255 Balancing storage (B) is 25% of Max Day

1256  $\frac{148,811 - 142,836}{4} \text{ M}^3 \times 25\% = 37,655 \text{ M}^3$

1257 The 25% is based on the Atlantic Canada Guidelines for the Supply, Treatment, Storage,

1258 Distribution and Operation of Drinking Water Supply Systems.

1259 C: Emergency storage:

1260 This is system specific and there are no firm guidelines regarding the amount of storage designated

1261 as emergency or the treatment of back-up systems, of which Halifax Water has several. Given

1262 Halifax Water's System configuration, a reasonable metric of emergency storage is 24 hours at

1263 maximum day, which equals  $148,811 \text{ M}^3$

1264  $S = A + B + C$

1265 A = Fire Storage  $75,449 \text{ M}^3$  (29.27%)

1266 B = Balancing Storage  $37,655 \text{ M}^3$  (15.4%)

1267 C = Emergency Storage 142,836~~148,811~~ M<sup>3</sup> (56~~59~~%)

1268 S = 25,261~~5,940,463~~ M<sup>3</sup>

1269 S is greater than the total tank volume in the system (243,183M<sup>3</sup>) so there is no dead storage. The  
1270 calculation still serves as a sound basis for allocation.

1271 Allocate as follows:

1272 Fire Storage => 100% to Fire Protection

1273 Balancing Storage => 100% to Peak Hour

1274 Emergency Storage => To Avg Day and Max Day in same proportion as

1275 Base extra capacity

1276 Fire Protection = 30~~29~~%

1277 Max Hour = 14%

1278 Avg Day = 0.91 X 56~~59~~% = 51~~46~~%

1279 Max Day = 0.09 X 56~~59~~%                      = 5~~11~~%

1280 **Distribution:**

1281 Distribution system delivers max day and fire or peak hour.

1282 According to "Water Supply for Public Fire Protection" by the Fire Underwriters Survey, for  
1283 populations greater than 250,000 the system should be able to supply two simultaneous fires. Using  
1284 data from the Storage section consider one fire of 5,000 IGPM and one of 4,000 IGPM

1285 4,000 IGPM + 5,000 IGPM = 9,000 IGPM = 41,000 L/Min = 59,000 M<sup>3</sup>/Day

1286 Based on methodology on page 52 of M1

1287 Avg Day for 2020/21~~2013/14~~ = 33,198~~38,854~~ M<sup>3</sup> (Lake Major)

1288 78,736~~80,270~~ M<sup>3</sup> (Pockwock)

1289 535~~885~~ M<sup>3</sup> (Bennery)

1290 112,469~~120,009~~ M<sup>3</sup>



1291 Maximum Day and Maximum Hour Factor are 1.274.24 and 1.70 respectively.

1292 Maximum Day = 1.274.24 X 112,469,120,009 M<sup>3</sup> = 142,836,148,811 M<sup>3</sup>

1293 Maximum Hour = 1.7 X 112,469,120,009 M<sup>3</sup> = 191,197,204,015 M<sup>3</sup>

1294 Maximum Day plus Fire = 142,836,148,811 M<sup>3</sup> + 59,000 M<sup>3</sup> = 201,836,207,811 M<sup>3</sup>

1295 Fire Component 59,000 M<sup>3</sup>/ 191,197,204,015 M<sup>3</sup> = 3129%

1296 Base Component (Avg Day) = (112,469,120,009 M<sup>3</sup> - 59,000 M<sup>3</sup>) / 191,197,204,015 M<sup>3</sup> =

1297 2830%

1298 Maximum Day Component = 142,836,148,811 M<sup>3</sup> - 112,469,120,009 M<sup>3</sup> /

1299 191,197,204,015 M<sup>3</sup> = 1644%

1300 Maximum Hour Component = 191,197,204,015 M<sup>3</sup> - 142,836,148,811 M<sup>3</sup> /

1301 191,197,204,015 M<sup>3</sup> = 2527%

1302 **Summary:**

1303	Water Treatment	Avg Day	= 91%
1304		Max Day	= 9%
1305	Storage	Fire Protection	= 29%
1306		Max Hour	= 14%
1307		Max Day	= <u>544%</u>
1308		Avg Day	= <u>5246%</u>
1309	Distribution	Avg Day	= <u>2830%</u>
1310		Max Day	= <u>1644%</u>
1311		Max Hour	= <u>2527%</u>
1312		Fire Protection	= <u>3129%</u>

1313 Table 15

1314 Public versus Private Fire Protection Cost Distribution

<b>Calculation of % Split between Public and Private Fire Protection</b>						
(based on the diameter of the pipe)						
Description	Diameter		Cross Sectional Area (square mm)	Ratio of Area to Reference ( A )	Actual Number ( B )	Total Equivalents ( A ) x ( B )
	Inches	mm				
Reference Size	1	25	490.87	1	0	0.0
Reference Size	2	50	1,963.49	4	13	52.0
Reference Size	3	75	4,417.86	9	0	0.0
Reference Size	4	100	7,853.98	16	83	1,328.0
Public Hydrants	6	150	17,671.44	36	8404	302,544.0
Reference Size	6	150	17,671.44	36	1140	41,040.0
Reference Size	8	200	31,415.90	64	732	46,848.0
Reference Size	10	250	49,087.34	100	149	14,900.0
Reference Size	12	300	70,685.78	144	16	2,304.0
					<b>Total</b>	<b>409,016.0</b>
<b>Number of Equivalent Units</b>						
	<b>Public</b>	302,544.0	<b>74%</b>			
	<b>Private</b>	106,472.0	<b>26%</b>			
		409,016.0				

1315

<b>Calculation of % Split between Public and Private Fire Protection</b>						
(based on the diameter of the pipe)						
Description	Diameter		Cross Sectional Area (square mm)	Ratio of Area to Reference ( A )	Actual Number ( B )	Total Equivalents ( A ) x ( B )
	Inches	mm				
Reference Size	1	25	490.87	1	0	0
Reference Size	2	50	1,963.49	4	16	64
Reference Size	3	75	4,417.86	9	0	0
Reference Size	4	100	7,853.98	16	82	1,312
Public Hydrants	6	150	17,671.44	36	8,476	305,136
Reference Size	6	150	17,671.44	36	1,161	41,796
Reference Size	8	200	31,415.90	64	775	49,600
Reference Size	10	250	49,087.34	100	156	15,600
Reference Size	12	300	70,685.78	144	16	2,304
					<b>Total</b>	<b>415,812</b>
<b>Number of Equivalent Units</b>						
	<b>Public</b>	305,136	<b>73%</b>			
	<b>Private</b>	110,676	<b>27%</b>			
		415,812				

## SECTION 5 - WASTEWATER SYSTEM COST ALLOCATION

### General Review

Wastewater costs as used in this COS Manual are costs for the provision of Wastewater Service after the allocation of a portion of the combined sewer costs to Stormwater Service. Wastewater System COS analyses employs a multi-step procedure to assign revenue responsibilities to Customer classes in proportion to their respective shares of billable flows, allocated responsibility for wet weather-related expenses, and uses of System facilities. Service characteristics typically include (1) flows – often separated as dry and wet weather flows (2) pollutant loadings by constituent – biochemical oxygen demand (BOD), total suspended solids (TSS) and (3) customer costs - often segregated into metering and billing related costs.

- 1) **Dry Weather costs** are those that vary with the total quantity flows or are those O&M expenses and capital costs incurred to deliver services under average demand conditions.
- 2) **Wet Weather costs** are associated with handling flows in excess of dry weather flow volumes and include O&M expenses and capital costs for system capacity beyond dry weather flow levels.
- 3) **Pollutant Loading by Constituent costs** are treatment costs associated with removal of specific pollutant loadings including BOD and TSS.
- 4) **Customer costs** comprise those costs associated with serving Customers, irrespective of the amount or rate of water use. They include meter reading, billing, and customer accounting and collecting expense, as well as maintenance and capital costs related to meters and services.

Appropriate classification factors between dry and wet weather flows should be calculated using actual operating history or design criteria. The basic formulas are as follows:

$$\text{Dry Weather \%} = \text{Dry Weather Flow} / \text{Total Flow}$$

$$\text{Wet Weather \%} = \text{Wet Weather Flow} / \text{Total Flow}$$

For classification of costs to pollutant strength loadings (as well as customer service characteristics), the design and performance of system facilities are referenced to apportion costs between different service parameters. In general, operational performance is referenced in

classification of O&M expenses; design parameters govern classifications of capital costs.

## Wastewater System Data and Customer Use Data (for Cost Allocation)

A map of the Wastewater System is provided in the COS Manual Appendix II and general system information may be referenced from Halifax Water's Annual Report. Wastewater System plant influent data, similar to that provided in the example format below using Halifax Water data for the calendar year 2019, is used to develop cost classification percentages as outlined in Section 2 Methodology Review. Data for 2020 or 2021 was not used due to the continuing effects the COVID-19 pandemic on plant loadings.

Table 16

Wastewater Plant Influent

Development of Flow-Related Cost Classification Percentages

Wastewater Treatment Plant Loadings: January 1, 2019 - December 31, 2019							
WWTF	Dry Weather Flow (m3)	Wet Weather Flow (m3)	Total Flow (m3)	Annual Average TSS Loading (kg/d)	Annual Average BOD Loading (kg/d)	% Dry Weather Flow (m3)	% Wet Weather Flow (m3)
Halifax	28,474,141	4,315,150	32,789,291	14,578	14,985	87	13
Dartmouth	15,947,691	3,999,858	19,947,549	6,717	5,501	80	20
Herring Cove	3,129,113	876,656	4,005,769	1,191	660	78	22
Eastern Passage	4,329,168	1,019,014	5,348,182	2,680	2,884	81	19
Mill Cove	9,864,785	1,534,914	11,399,699	6,280	3,715	87	13
Lakeside/Timberlea	835,584	134,084	969,668	303	275	86	14
Lockview/MacPherson	49,116	8,522	57,638	29	40	85	15
North Preston	175,119	55,767	230,886	120	133	76	24
Springfield Lake	119,878	33,016	152,894	88	80	78	22
Middle Musquodoboit	30,716	7,421	38,137	22	20	81	19
Wellington	6,373	545	6,918	4	4	92	8
Frame	7,866	1,206	9,072	5	5	87	13
Uplands	23,325	13,523	36,848	21	19	63	37
Aerotech	295,707	34,212	329,918	335	211	90	10
<b>Totals</b>	<b>63,288,582</b>	<b>12,033,887</b>	<b>75,322,469</b>				

Wastewater Treatment Plant Loadings - April 1st, 2013 - March 31st, 2014					
WWTF	Dry Weather Flow (m3)	Wet Weather Flow (m3)	Total Flow (m3)	BOD Loading (kg/day)	TSS Loading (kg/day)
Halifax	28,272,649	8,445,077	36,717,726	12,273	14,184
Dartmouth	16,951,642	5,063,477	22,015,119	6,212	6,997
Herring Cove	3,540,071	1,057,424	4,597,495	894	1,221
Eastern Passage	4,818,927	1,439,420	6,258,347	2,332	1,595
Mill Cove	6,952,042	2,076,584	9,028,626	2,968	5,912
Lakeside/Timberlea	1,127,900	336,905	1,464,805	433	602
Lockview/MacPherson	50,072	14,957	65,029	39	28
North Preston	243,529	72,742	316,271	35	41
Springfield Lake	162,280	48,473	210,753	44	69
Middle Musquodoboit	61,468	18,361	79,829	39	42
Steeves (Wellington)	5,278	1,576	6,854	6	11
Frame	7,108	2,123	9,231	10	15
Uplands	15,329	4,579	19,908	18	35
Aerotech	280,732	83,855	364,587	151	168
<b>Total</b>	<b>62,489,026</b>	<b>18,665,553</b>	<b>81,154,580</b>	<b>25,455</b>	<b>30,918</b>

Data employed for assignment to Customer classes includes information on the distribution of meters by size serving the class, billable sewer flows, and measured or imputed pollutant strength loadings (e.g., BOD, TSS) - often based on industry reference values in the absence of available sampling data. Provided in Table 17 below is an example format for presentation of these Customer class usage characteristics by class:

Table 17

Wastewater Accounts and Billed Usage by Meter Size (2020/21)		
Meter Size	Accounts	Billed Usage
Unmetered	956	166,354
5/8" (15 MM)	76,706	13,091,414
3/4" (20 MM)	1,006	511,842
1" (25 MM)	1,547	1,542,339
1.5" (40 MM)	1,158	2,493,467
2" (50 MM)	816	4,374,824
3" (80 MM)	310	3,468,068
4" (100 MM)	77	1,427,278
6" (150 MM)	35	1,992,164
8" (200 MM)	24	1,506,125
10" (250 MM)	2	35,171
Total	82,637	30,609,046
BOD Concentration		220 <sup>1</sup>
BOD Loading		
TSS Concentration		220 <sup>1</sup>
TSS Loading		
1 - These values are hypothetical and are shown as common across residential and non-residential classes as HRWC does not presently have data to adequately differentiate strength loading concentrations across customer types. In the event that strength differentiated customer class rates are subject to consideration, HRWC rate analysis modeling provides for conduct of a plant balance analysis to reconcile plant influent loadings and strength loading assignments by source (i.e.industrial waste monitored users, septic tank hauls, billed general customer classes, inflow and infiltration).		

Wastewater Accounts and Billed Usage by Customer Class (2013/14)					
		Residential		Non-Residential	
Meter Size		Accounts*	Billed Usage	Accounts*	Billed Usage
Unmetered		988	189,577		
5/8"	(15 MM)	73,676	13,606,614		
3/4"	(20 MM)	964	595,803		
1"	(25 MM)	1,525	1,786,925		
1.5"	(40 MM)	1,050	2,593,011		
2"	(50 MM)	771	4,638,144		
3"	(80 MM)	298	3,900,024		
4"	(100 MM)	79	2,183,687		
6"	(150 MM)	37	2,822,383		
8"	(200 MM)	18	1,237,386		
10"	(250 MM)	2	66,635		
Total		79,408	33,620,189		
BOD Concentration		220*			220*
BOD Loading					
TSS Concentration		220*			220*
TSS Loading					
* These values are hypothetical and are shown as common across residential and non-residential classes as HRWC does not presently have data to adequately differentiate strength loading concentrations across customer types. In the event that strength differentiated customer class rates are subject to consideration, HRWC rate analysis modeling provides for conduct of a plant balance analysis to reconcile plant influent loadings and strength loading assignments by source (e.g. industrial waste monitored users, septic tank hauls, billed general customer classes, Inflow and Infiltration).					

1365

1366 The development of strength differentiated Customer class rates could be considered by Halifax  
1367 Water in the event that the resultant rate differentials would demonstrably and unambiguously  
1368 advance the equitable distribution of cost responsibilities across Customer classes – the  
1369 fundamental objective of COS analysis. These criteria will require substantial evaluation of strength



1370 loading attributes of Customer class sub-populations, an assessment of high-strength cost recovery  
1371 through Halifax Water industrial waste charges, and consideration of multi-use Non-Residential  
1372 user billing protocols.

1373 Rate analysis modeling referred to in Table 17 refers to Halifax Water's integrated collection of  
1374 spreadsheets presented in the COS Manual that was developed to conduct COS rate analyses for  
1375 Halifax Water using the proposed AWWA/WEF/NUSARB methodology. COS rate models have  
1376 been developed for water, Wastewater and Stormwater rate setting – each of which provide formats  
1377 for determination of rate revenue requirements, COS allocations, calculations of unit charges,  
1378 development of resultant rate schedules and calculation of sample bill impacts.

1379 A high-level plant balance analysis is provided in Halifax Water's rate application submission in  
1380 Worksheet WW-1: User Characteristics and Plant Balance Analysis. This form of analysis is useful  
1381 for ensuring that assigned strength loading attributes of individual customer classes result in overall  
1382 values for influent strengths that are consistent with actual plant influent values such that user rates  
1383 charged are based on actual system flow/loading characteristics. In the event that strength  
1384 differentiated classifications were considered, assigned strength loading differences would need to  
1385 maintain consistency with overall plant influent loading values to ensure resultant rates reflect true  
1386 costs of service.

## 1387 **Wastewater System Functions**

1388 Utilities incur varying levels of costs to perform the different system functions needed to meet  
1389 customer demands and make services available. The functionalization process involves  
1390 categorizing revenue requirements according to functions in order to more appropriately assign  
1391 costs to Customer classes. Wastewater System cost functions and their definitions for both  
1392 operating and capital are presented in Table 18.

1393 Table 18

1394 Wastewater System Cost Allocation – System Functions

Wastewater System Function	Operating Costs Definition	Capital Cost Definition
Mains including Sanitary Mains and Manholes	Includes cost centres for sanitary mains and sanitary manholes.	Includes the design and construction costs associated with all gravity mains, forcemains/pressure sewers, and manholes.
Pump Stations including Forcemains and Pressure Sewers	Includes cost centres for pump stations, forcemains and pressure sewers cost centres.	Includes all pumping, mechanical and electrical equipment, internal piping, buildings, and structures, forcemains pressure sewers including all associated valves and fittings.
Service Laterals	Includes the cost centres for wastewater services.	Includes connection to the main and the piping from the main to the street line for Wastewater Services.
Meters	Includes the cost centre for operation and maintenance of meters (labour, materials, and programs).	All capital expenditures for meters, including installation cost.
Advanced Primary Treatment	Includes cost centres for all the advanced primary treatment plants.	Includes all buildings, structures, mechanical and electrical equipment to make a complete, operating treatment plant.
Secondary Treatment	Includes cost centres for all the secondary treatment plants.	Includes all buildings, structures, mechanical and electrical equipment to make a complete, operating treatment plant.
Tertiary Treatment	Includes cost centres for all the tertiary treatment plants.	Includes all buildings, structures, mechanical and electrical equipment to make a complete, operating treatment plant.
Regulatory Services	Includes the Environmental Engineering, Regulatory Compliance, Pollution Prevention, Stormwater Engineering, Environmental Management System and Development Approvals cost centres.	Cost centres within Regulatory Services function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
Engineering and Technology Services	Includes the cost centres for Records Management, Energy and Business Development, and Information Services.	Cost centres within Engineering and Technology Services function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
Technical Services (SCADA)	Operate the SCADA systems for water (both treatment and distribution).	Cost centres within Technical Services function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
Corporate Services	Includes the cost centres for Accounting, Finance and Procurement.	Cost centres within Corporate Services function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles, etc.) are allocated as assets in proportion of the other costs through depreciation.
Customer Service	Includes the cost centres for Customer Care, Collecting, Supervision, and Administration/Overheads.	Cost centres within Customer Service function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
Meter Reading and Billing	Includes the cost centres for meter reading and Customer billing.	Cost centres with meter reading and billing function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
Administration and General	Includes the cost centres for Administration, Communications, Legal, and general; Human	Cost centres within Administration and General function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are

	Resources, Employee Benefits and General, <u>operation and maintenance of office.</u>	allocated as assets in proportion of the other costs through depreciation
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1395 The engineers and operators responsible for operation of the Wastewater System review  
1396 assignment of wastewater assets and their associated operating and maintenance costs to  
1397 system functions. Operating costs centres are set up to record financial information in categories  
1398 that support functionalization.

1399 Forcemains and pressure sewers are typically connected to pump stations, have similar operating  
1400 characteristics, and are maintained by the same operational staff. Costs are budgeted and recorded  
1401 in a common cost centre. The costs associated with forcemains and pressure sewers are tracked  
1402 under pump stations cost centres.

1403 The capital costs associated with forcemains and pressure sewers are tracked under the pump  
1404 stations cost centre for mains within the pump stations and outside the pump stations as force mains  
1405 and pressure sewers. The only difference is the force mains and pressure sewers outside the pump  
1406 stations which are recorded separately as capital assets due to the nature of capital asset  
1407 accounting but included with the pump stations for operational cost accounting.

## 1408 **Cost Functionalization Considerations**

1409 The basis for the determination functions is the operating cost centres that comprise the  
1410 Wastewater System from collection to discharge to the receiving environment. It includes the  
1411 direct cost functions of providing the service as well as the common costs of providing support  
1412 services across all utility services that are assigned to Wastewater Service. The following points  
1413 are noted in regard to the cost functions:

- 1414 • Mains include cost centres for sanitary mains and sanitary manholes of the collection  
1415 system.
- 1416 • Forcemains and pressure sewers, excluding Combined Sewer Overflows (CSOs) are  
1417 included with pump stations for budgeting and reporting purposes. CSOs are a function  
1418 of the Stormwater System, found in Section 6 of the COS Manual.
- 1419 • Pump stations costs that are part of a Wastewater treatment facility are included with the  
1420 treatment plant costs for budgeting and reporting purposes.

1421 Functionalization of O&M expenses is shown in Worksheet WW-6 in Rate Studies, which is based  
1422 on Table 18 as shown in this COS Manual. The percentages reported in Worksheet WW-6 are  
1423 back-calculations, derived from actual dollar values included in the test-year operating  
1424 expenditures. Functionalization is shown with both percentage allocation and actual dollar values.  
1425 Generally, inputs in the dollar value report drive back-calculations in the percentage report.  
1426 Rounding on the percentage report would be expected compared to the dollar value report, since  
1427 the dollar values are absolute and balance to revenue requirements.

1428       • For Customer Service, input values (dollar costs) for the functions of meters and  
1429       meter reading and billing are obtained from specific cost centres within Customer  
1430       Service:

1431       • Meters  
1432       Operation and Maintenance of Meters

1433       • Meter Reading and Billing  
1434       Meter Reading  
1435       Customer Billing

1436       Once costs have been identified for the above functions, costs applicable to the Customer  
1437       Service function is merely the residual amount.

### 1438 **Classification of Functional Costs**

1439 Following the distribution of Wastewater System revenue requirements to designated functions,  
1440 costs are distributed to Wastewater System service characteristics. Following WEF procedures  
1441 outlined above, these service characteristics include flow and pollutant loading metrics, and  
1442 customer service attributes. Wastewater estimates include dry weather and wet weather  
1443 estimates, pollutant loadings include BOD and TSS, and customer service attributes relate to the  
1444 numbers of equivalent meters and accounts served. Classification of system costs (by function)  
1445 distributes costs to the characteristics of service that distinguish Customer classes.

1446 Halifax Water functionalized costs are classified to the following Wastewater Service  
1447 characteristics:

Dry weather flow  
Wet weather flow  
BOD  
TSS  
Equivalent meters  
Customer service  
Indirect

1448 **General Assumptions for Cost Classification**

1449 The following cost classifications for annual operating cost and capital cost have been prepared  
1450 for the three treatment systems used by Halifax Water, namely advanced primary treatment,  
1451 secondary treatment and tertiary treatment.

1452 The calculations and assignment of "contributors" to the annual operating budget were based on  
1453 specific representative Wastewater treatment facilities currently in operation within Halifax Water,  
1454 namely:

- 1455 • Advanced primary treatment - Halifax WWTF (this facility was selected as it is the largest  
1456 of the three advance primary treatment plants);
- 1457 • Secondary treatment - Mill Cove WWTF (this facility was selected as it is the largest  
1458 secondary treatment facility operated by Halifax Water); and
- 1459 • Tertiary treatment - Fall River WWTF (this facility was selected as representative of the  
1460 tertiary treatment plants operated by Halifax Water).

1461 The calculations and assignment of "contributors" to capital costs were based on specific  
1462 representative Wastewater treatment facilities currently in operation within Halifax Water,  
1463 namely:

- 1464 • Advanced primary treatment – The Halifax Wastewater Treatment Facility (WWTF) was  
1465 selected as it is the largest of the three advance primary treatment plants ~~and was recently~~  
1466 ~~constructed with good records of the costs of the system components~~);
- 1467 • Secondary treatment – The Eastern Passage WWTF was selected as it was the most  
1468 recent facility to be ~~currently being constructed and construction costs were recent and~~  
1469 ~~good records were available~~; and

- Tertiary treatment – Aerotech was selected as it was completed in 2018, with costs adjusted to remove treatment of external flows and loads (lagoon, septage and external sludge dewatering). This was estimated by HRWC Halifax Water staff as the records available were not considered adequate.

- 

Wet weather conditions were determined to exist at all treatment plants approximately 1823% of the time based on the average from the three (3) Halifax Harbour Solution treatment plants after reviewing the flow data.

## O&M Cost Classifications

Functionalized Wastewater System costs are classified to service characteristics separately for O&M expenses and capital costs. O&M costs are classified as summarized in Table 19, explanations of which are provided in the subsequent notes. Supporting calculations are documented in the final section of the COS Manual section on Wastewater System Allocations.

Table 19

Wastewater System O&M Cost Classification Summary

O&M Cost Classifications								
Wastewater System Functions	Dry Weather Flow	Wet Weather Flow	BOD	TSS	Equivalent Meters	Customer Service	Indirect	Notes
Treatment								
Advanced Primary	<u>30.939</u> %	<u>19.147</u> %	<u>25.022</u> %	<u>25.022</u> %				1
Secondary	<u>54.054</u> %	<u>16.046</u> %	<u>12.042</u> %	<u>18.048</u> %				1
Tertiary	<u>45.250</u> %	<u>12.846</u> %	<u>16.844</u> %	<u>25.220</u> %				1
Collection								
Mains	<u>95.0</u> %	<u>5.0</u> %						2
Pump Stations	<u>90.0</u> %	<u>10.0</u> %						2
Service Laterals					<u>100.0</u> %			3

Technical Services (SCADA)	82.080%	18.020%						5
Customer Service						100.0%		6
Meters					100.0%			4
Meter Reading and Billing						100.0%		7
Engineering and Technology Services							100.0%	409
Regulatory Services							100.0%	89
Corporate Services							100.0%	11
Administration & General							100.0%	4410

#### Capital Cost Classifications

Functionalized Wastewater System costs<sup>15</sup> are classified to service characteristics separately for O&M expenses and capital costs. Capital costs are classified as summarized in Table 20, explanations of which are provided in the subsequent notes. Supporting calculations are documented in the final section of the COS Manual section on Water System Allocations.

Table 20

Wastewater System Capital Cost Classification Summary

Capital Cost Classifications								
Wastewater System Functions	Dry Weather Flow	Wet Weather Flow	BOD	TSS	Equivalent Meters	Customer Service	Indirect	Notes
Treatment								
Advanced Primary	37.538%	12.542%	25.0%	25.0%				1
Secondary	29.0%	21.0%	25.0%	25.0%				1
Tertiary	25.0%	15.0%	30.0%	30.0%				1
Collection								
Mains	75.0%	25.0%						2
Pump Stations	75.0%	25.0%						2
Service Laterals					100.0%			3

<sup>15</sup> The primary treatment category has not been included as the only primary treatment plant, Eastern Passage is in the process of being upgraded to secondary and will be completed when the rate structure from this COS Manual will be implemented.

Technical Services (SCADA)								5
Customer Service						100.0%		6
Meters					100.0%			4
Meter Reading and Billing						100.0%		7
Engineering and Technology Services (excluding TS)S							100.0%	9
Regulatory Services							100.0%	8
Corporate Services							100.0%	11
Administration & General							100.0%	10

## 1492 Notes on Wastewater Cost Classification (O&M and Capital)

### 1493 1. Treatment

#### 1494 Advanced Primary Treatment

1495 Halifax Water did a review of the percentage of the costs for the four main contributors (chemicals,  
1496 contract services, power and staffing) of the advanced primary treatment plant operation and used  
1497 these percentages with the dry weather/wet weather flow information to calculate percentage of  
1498 operating costs required for dry weather flow, wet weather flow, TSS removal and BOD removal as  
1499 follows:

- 1500 • Dry weather flow 30.939%
- 1501 • Wet weather flow 19.117%
- 1502 • TSS removal 25.022%
- 1503 • BOD removal 25.022%

1504 For assignment of capital costs Halifax Water used data from the ~~recently constructed~~ Halifax  
1505 WWTF to arrive at the following assignment.

- 1506 • Dry weather flow 37.5%
- 1507 • Wet weather flow 12.5%
- 1508 • TSS removal 25.0%
- 1509 • BOD removal 25.0%

1510 Detailed calculations are included in the Wastewater System Appendix within Section 5.



1511     **Secondary Treatment**

1512     Halifax Water did a review of the percentage of the costs for the four main contributors (chemicals,  
1513     contract services, power and staffing) of the [advanced primarysecondary](#) treatment plant operation  
1514     and used these percentages with the dry weather/wet weather flow information to calculate  
1515     percentage of operating costs required for dry weather flow, wet weather flow, TSS removal and  
1516     BOD removal as follows:

1517	• Dry weather flow	<a href="#">54.054</a> %
1518	• Wet weather flow	<a href="#">16.046</a> %
1519	• TSS removal	<a href="#">18.012</a> %
1520	• BOD removal	<a href="#">12.048</a> %

1521     For assignment of capital costs Halifax Water used data from the Eastern Passage WWTF to arrive  
1522     at the following assignment:

1523	• Dry weather flow	29.0%
1524	• Wet weather flow	21.0%
1525	• TSS removal	25.0%
1526	• BOD removal	25.0%

1527     Detailed calculations are included in the Appendix to this section.

1528     **Tertiary Treatment**

1529     Halifax Water did a review of the percentage of the costs for the four main contributors (chemicals,  
1530     contract services, power and staffing) of the tertiary treatment plant operation and used these  
1531     percentages with the dry weather/wet weather flow information to calculate percentage of operating  
1532     costs required for dry weather flow, wet weather flow, TSS removal and BOD removal as follows:

1533	• Dry weather flow	<a href="#">45.250</a> %
1534	• Wet weather flow	<a href="#">12.846</a> %
1535	• TSS removal	<a href="#">25.244</a> %
1536	• BOD removal	<a href="#">16.820</a> %

1537     For assignment of capital costs Halifax Water used data prepared by Halifax Water staff to arrive at  
1538     the following assignment

1539	• Dry weather flow	25.0%
1540	• Wet weather flow	15.0%
1541	• TSS removal	30.0%
1542	• BOD removal	30.0%

1543 Detailed calculations are included in the Wastewater System Appendix within Section 5.

## 1544 **2. Mains and Pump Stations**

1545 To arrive at assignment of operating costs Halifax Water did a review of the rain data verses  
 1546 overflow events together with the duration of the selected pump stations. Typically, Halifax Water  
 1547 experiences overflows at specific locations whenever rain events exceed 25 mm. From this Halifax  
 1548 Water identified the number of staff hours required for selected events and compared this to the  
 1549 overall staff hours worked and determined the following.

1550	Mains	– 95% dry weather flow / 5% wet weather flow
------	-------	--

1551	Pump stations	– 90% dry weather flow / 10% wet weather flow
------	---------------	---

1552 Capital costs are assigned based on design flow that is calculated from Halifax Water's Design  
 1553 and Construction Standards. These formula result in the following:

1554	Mains	– 75% dry weather flow / 25% wet weather flow
------	-------	---

1555	Pump stations	– 75% dry weather flow / 25% wet weather flow
------	---------------	---

## 1556 **3. Service Laterals**

1557 Assigned 100% to equivalent meters for both operating and capital as services are dedicated to  
 1558 Customers.

## 1559 **4. Meters**

1560 Meters are assigned 100% to equivalent meter for both operating and capital.

## 1561 **5. Technical Services (SCADA)**

1562 Assigned to the capital cost of the works and are included in the capital items.

1563 Operating costs are assigned based on the number of data points (tags) monitored in each activity.

1564 The result of this allocation is TS has been allocated based on the split between dry weather and

wet weather flows (8280% to dry and 1820% to wet) based on the average flows for all

Function	Number of Data Points Monitored	Allocation percentage
WW Treatment	<u>24,356</u> <u>5,247</u>	<u>45.0</u> <u>37%</u>
WW Collection	<u>11,954</u> <u>4,547</u>	<u>22.0</u> <u>33%</u>
SW CSOs	<u>456</u> <u>410</u>	<u>0.8</u> <u>3%</u>
Water Distribution	<u>5,204</u> <u>1,187</u>	<u>9.6</u> <u>9%</u>
Water Treatment	<u>12,265</u> <u>2,492</u>	<u>22.6</u> <u>18%</u>
<u>Total</u>	<u>54,235</u> <u>13,883</u>	100.0%

Wastewater treatment facilities.

Table 21

Please note that Table 21 does not relate to the 8280%/1820% split. The table was included to demonstrate how much of the TS budget was allocated to Wastewater treatment, Wastewater collection, Stormwater CSOs, water distribution and water treatment. The reference to the 8280%/1820% is how the Wastewater items (treatment and collection) are further apportioned and assigned.

## 6. Customer Service

Assigned 100% to Customer Service for both operating and capital as these services are all customer related.

## 7. Meter Reading and Billing

Meter reading and billing costs are part of the Customer Service group of cost centres. They are assigned 100% to Customer Service as meters are totally dedicated to Customers.

## 8. Regulatory Services

For operating costs, and capital costs not assigned to specific assets, these costs are classified ~~as this service is assigned to~~ indirect costs ~~that and~~ are allocated in proportion to directly allocated costs.

~~For capital this item is assigned to the capital cost of the works and is included in the capital items.~~  
~~There is no separate assignment for capital for this item~~

## **9. Engineering and TechnologyInformation Services**

For operating costs, and capital costs not assigned to specific assets, these costs are classified  
as this service is assigned to indirect costs and that are allocated in proportion to directly allocated costs.

~~For capital this item is assigned to the capital cost of the works and is included in the capital items.~~  
~~All other capital costs such as data bases and other intangibles are assigned to indirect costs.~~

## **10. Administration ~~and General~~**

For operating costs, and capital costs not assigned to specific assets, these costs are classified  
as this service is assigned to indirect costs and that are allocated in proportion to directly allocated costs.

## **11. Corporate Services**

For operating costs, and capital costs not assigned to specific assets, these costs are classified as indirect costs and allocated in proportion to directly allocated costs.

## **Allocation to Customers Classes**

Costs are distributed to Customers (either by classes or individually) based on similarities and differences in their Wastewater flow patterns, pollutant loadings, and types/sizes of service connections. For Halifax Water, given that Customer accounts are generally not distinguished by land use type facilitating strength-differentiation across Customer types, Customer classifications are effectively limited to residential, non-residential, and industrial waste Customers pending further evaluation of Customer classification options. This evaluation would require examination of Customers by land use type and use of industry reference data regarding strength characteristics of different Customer types.

Costs by service characteristic are simply divided by the projected level of service to be rendered to determine the unit costs of a given service parameter. For example, the system-wide cost per cubic meter of wet weather flow is calculated by taking the costs determined to handle weather flows divided by projected system wet weather flows (based on system flow factors). In this manner, costs are allocated to Customers in proportion to their respective demands and uses of

1612 the system. If Customer classifications are homogenized, unit costs by service characteristic may  
 1613 be combined to establish rates for service (typically where demand related costs convert to the  
 1614 volumetric rate).

1615 This procedure is illustrated in Tables 22 and 23 that offer example templates for these types of  
 1616 calculations. As noted, the distribution of costs by function, and subsequent classification of these  
 1617 costs by service characteristic (e.g., dry-weather and wet-weather flows, BOD and TSS strength  
 1618 loadings, equivalent meters and accounts) results in the expression of each component of the  
 1619 utility's revenue requirements in terms of these service characteristics. Accordingly, in Table 22,  
 1620 Lines 1, 4 and 7 are listed the outcomes of the cost classification by each major revenue  
 1621 requirement component. Because some of these costs are allocated on an indirect basis, a  
 1622 calculation is made whereby the indirect costs are distributed to directly classified costs based on  
 1623 those costs share of total directly classified costs. So, for example, if dry-weather flow related  
 1624 O&M costs represent 40% of directly classified O&M costs, 40% of indirect O&M costs are  
 1625 apportioned to dry-weather flow related costs. This is the procedure employed in Lines 2, 5 and  
 1626 8 – to yield complete cost classifications by cost component (Lines 3, 6, and 9) – that are summed  
 1627 (Line 10) to present total costs by service characteristic.

1628 Table 22

1629 Wastewater System – Unit Costs of Service Calculation

Line	Revenue Requirement Component	Dry-Weather Flow Related Costs	Wet-Weather Flow Related Costs	BOD Related Costs	TSS Related Costs	Meter Equiv. Related Costs	Billing Related Costs	Indirect Costs
1	Operations & Maintenance	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$
2	Allocated Indirect O&M	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
3	Operations & Maintenance (Net)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
4	Depreciation	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$
5	Allocated Indirect Depr	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
6	Depreciation	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	

7	Return on Rate Base	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$ (%)	\$\$
8	Allocated Indirect Return	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
9	Return on Rate Base (Net)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	
10	Total Revenue Requirements Lines (3,6,9)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$	

The allocation of costs to Customer classes employs the service characteristic by Customer class data developed in the "System and Customer Use Data (for Cost Allocation) – Table 23. Unit COS by characteristic (Line 3) are calculated by dividing total revenue requirements by service characteristic (Line 1) by total system flows, pollutant loadings (BOD, TSS), meter equivalents and accounts served (Line 2). Costs are then allocated to Customer classes simply by multiplying these unit costs by the flows, pollutant loadings, meter equivalents and accounts served for each Customer class. This is accomplished for Residential customers in Lines 4 and 5; for Non-Residential customers in Lines 7 and 8. The sum of Line 5 (across service characteristics) is therefore the fully allocated COS for the Residential class; the sum of Line 8 is that for the Non-Residential. COS based rates are those that recover these sums from respective Customer classes. While many rate designs may accomplish these ends, a basic rate design option is to recover volume-related costs; including dry- and wet-weather flow costs and pollutant loading related costs from volumetric rates while fixed charges (graduated by meter size) recover metering related costs and Customer account related costs. This rate design calculation is presented in the template example in Lines 6 and 9.

1645 Table 23

1646 Wastewater System – Allocation of Costs to Customer Classes and Uniform Volume with Fixed  
1647 Charge Rate Calculations (System and Customer Use Data for Cost Allocation)

		1	2	3	4	5	6
Line	Revenue Requirement Component	Dry-Weather Flow Related Costs	Wet-Weather Flow Related Costs	BOD Related Costs	TSS Related Costs	Meter Equiv. Related Costs	Billing Related Costs
1	Total Revenue Requirements Lines (3,6,9)	\$\$	\$\$	\$\$	\$\$	\$\$	\$\$
2	Wet Weather Flow Allocation (%)	%		%	%	%	%
3	Wet Weather Flow Allocation	\$\$		\$\$	\$\$	\$\$	\$\$
4	Total Revenue Requirements Allocated to Billing Parameters (Row 1+3)	\$\$		\$\$	\$\$	\$\$	\$\$
5	Billable Flows & Loading						
6	Unit Cost of Service Characteristic						
7	Residential Flows & Loading						
8	Residential Cost of Service						
9	Residential Rates*						
10	Non-Residential Flows & Loadings						
11	Non-Residential Cost of Service						
12	Non-Residential Rates**						
<div><div></div><div><div><div>• Residential rates (Line 9) featuring uniform volume rates and fixed charges may be calculated by first distributing wet weather-related costs to dry weather flow, equivalent meter and Customer related costs (as shown in Rows 2 and 3). The resulting unit costs by billing parameter are calculated by dividing the allocated revenue requirements (Line 4) by billable flows and loadings (Line 5) to determine unit costs of service by characteristic (Line 6). Residential costs of service (Line 8) are then calculated by multiplying the unit costs of service (Line 6) by the billable residential flows and loadings (Line 7). Residential rates are derived by summing Columns 1,3, and 4 of Line 8 and dividing by projected billable residential sewer flows (Line 7, Column 1) to determine the volumetric rate. The fixed charge is the sum of meter equivalent costs (Line 8, Column 5) divided by residential meter equivalents (Line 4, column 5) plus the billing and non-meter customer service costs (Line 8, Column 6) divided by residential accounts (line 7, column 6).</div><div>• Non-Residential volumetric rates (Line 12) are calculated using the same procedures where Line 10 is substituted for Line 7 and Line 11 is substituted for Line 8.</div><div>• Note – fixed charges for meter sizes with meter equivalencies greater than 1, the fixed charge is calculated by the unit cost per equivalent meter times the relevant meter unit equivalency plus the per account customer charge.</div></div></div></div>							

1648 Wet weather-related costs are allocated to dry weather flow, equivalent meter, and customer – to  
1649 determine unit costs by billing parameter. Wet weather, or Inflow and Infiltration (I&I) allocations  
1650 have not changed since the first COS Manual and 2013 rate application as there have been no  
1651 significant changes in the past two years that would support proposing a change to the allocation  
1652 which the NSUARB had previously approved. The nature, amount, and causes of I&I have not  
1653 changed.

1654 I&I is allocated 10% to dry weather flow, 45% to the meter equivalent charge, and 45% to Customer  
1655 connections. Halifax Water recommended this option based on the premise that some portion of  
1656 the I&I (10%) is related to flows in the system and should be recovered as a flow-related charge  
1657 regardless of the number of Customers connected. The second allocation to the meter equivalent  
1658 charge (45%) recognizes that larger diameter pipes increase the risk of leakage due the increased  
1659 surface area of joints in larger pipes. The final allocation, 45% to Customer connections relates to  
1660 leakage that is associated with the connections to the service pipe to Halifax Water's collection  
1661 network and the potential for the Customer to discharge other flows from sump pumps and roof  
1662 drains to the system.

1663



## Wastewater System Appendix: Supplemental Cost Classification and Allocation Calculations

Based on a review of data from several representative treatment plants updated to ~~2019~~2014, Halifax Water determined that, on average, the Wastewater treatment facilities are in wet weather conditions approximately ~~18~~20% of the time. A review of flow data from a representative sample of the plants operated by Halifax Water including Halifax, Mill Cove, Fall River and North Preston was conducted in order to confirm this estimate, the criteria used was percentage of the flow that the respective facilities were above design average daily flow. The data is as follows:

- North Preston - ~~24~~30%
- Fall River - ~~15~~13%
- Mill Cove - ~~13~~15%
- Halifax - ~~13~~20%

The Fall River sewershed is very tight and not affected by ~~Inflow and Infiltration (I&I)~~, the North Preston sewershed is the opposite and other sewersheds are also highly variable so a representative value of ~~15~~20% was arrived at for these facilities.

Halifax Water used a sample operating cost of \$5,000,000/ year for the purpose of this cost classification and for calculating the percentages for the three Wastewater treatment functions:

Advanced primary treatment

Secondary treatment

Tertiary treatment

### 1. Advanced Primary Treatment:

Assumed Annual Operating Cost - \$5,000,000

Based on averages from the three (3) Halifax Harbour Solution plants, ~~80~~82% of the time these facilities experience dry weather conditions, an ~~estimated~~ ~~20~~18% of the time wet weather conditions. If there was no impact to the operating budget that could be attributed to wet weather conditions, Halifax Water could assign ~~82~~80% of the yearly operating budget to dry weather flows and ~~18~~20% of the assumed annual operating cost for wet weather flows. However, there is an impact to the operating cost that can be directly attributed to wet weather flows, and this impact is based on an increase in power consumption, and an increase in chemical demand.

1693 For the advanced primary treatment facilities, the four main contributors to the annual operating  
 1694 budgets, and the associated percentages of the overall budgets, assigned to each of these  
 1695 contributors are as follows:

- |      |                               |                |
|------|-------------------------------|----------------|
| 1696 | 1) Chemicals                  | - <u>1923%</u> |
| 1697 | 2) Contract services          | - 35%          |
| 1698 | 3) Power                      | - <u>1445%</u> |
| 1699 | 4) Staffing and miscellaneous | - <u>3227%</u> |

1700 For the advanced primary treatment facilities, considering these four contributors, only chemical  
 1701 addition (1923%), power, pumping costs and UV disinfection costs, (1445%), increase  
 1702 significantly during wet weather flows versus dry weather flows.

1703 Contract services, which mainly consists of biosolids transportation and biosolids processing, is  
 1704 not impacted significantly by wet weather flow, and accounts for approximately 35% of the overall  
 1705 cost. Staffing and miscellaneous costs are not impacted significantly by wet weather flows and  
 1706 account for 3227% of the overall budget.

1707 Halifax Water calculated the amount of the assumed annual operating cost that would be  
 1708 assigned to power (1445%) and chemicals (1923%) would be: \$5,000,000 x 3338 % =  
 1709 \$1,650,000~~1,900,000~~.

1710 If wet weather did not impact power and chemical consumption, Halifax Water would calculate  
 1711 that, \$1,650,000~~1,900,000~~ x 8280% = \$1,353,000~~1,520,000~~ would be spent during dry weather  
 1712 and the remaining 1820% (or \$297,000~~380,000~~) would be spent during wet weather. However  
 1713 wet weather does impact these contributors.

1714 Based on wet weather flows being experienced 1820% of the time, Halifax Water calculated  
 1715 \$1,650,000~~1,900,000~~ x 1820% = \$297,000~~380,000~~ to be the amount spent from the operating  
 1716 budget to cover chemical and power costs during wet weather flow. Because these two  
 1717 components are impacted by wet weather an additional 1820% has been added to this number  
 1718 to account for the extra power and chemicals consumed during wet weather periods  
 1719 (\$297,000~~380,000~~ + (\$297,000~~380,000~~ x 1820%) = \$350,460~~456,000~~). Of this,  
 1720 1923/(1923+1445) X \$350,460~~456,000~~ = \$201,780~~276,000~~ is chemicals and 1445/(1923+1445)  
 1721 X \$350,460~~456,000~~ = \$148,680~~180,000~~ is for power.

This increase ( $\$350,460,456,000 - \$297,000,380,000 = \$53,460,76,000$ ) must be subtracted from the dry weather portion of the annual budget assigned to chemicals and power. ( $\$1,353,000,1,520,000 - \$53,460,76,000 = \$1,299,540,1,444,000$ ).

The assumed annual operating cost (\$5,000,000) excluding power and chemicals is (\$5,000,000 -  $\$1,650,000,1,900,000 = \$ 3,350,000,3,100,000$ ).

Based on an 8280% dry weather versus 1820% wet weather

Dry weather flow

$$\$3,350,000,3,100,000 \times 8280\% = \$2,747,000,2,480,000$$

$$\$2,747,000,2,480,000 + \$1,299,540,1,444,000 = \$4,046,540,3,924,000$$

$$\text{Dry weather flow} - \$4,046,540,3,924,000 / \$5,000,000 \times 100\% = 8178\%$$

$$\text{Wet weather flow} - 100\% - 8178\% = 1922\%$$

Based on the above calculation 8178% of yearly budget can be attributed to dry weather flow, and 1922% of the overall budget can be attributed to wet weather flow. Of these two functions, the amount attributed to TSS and BOD removal must be allocated from these amounts based on the percentage of the budget attributed to TSS and BOD removal.

The two main contributors to costs for TSS and BOD removal are: chemicals (1923%), and contract services (biosolids transportation and treatment) (35%). The costs for chemicals are expended both during dry weather and wet weather conditions. The level of BOD and TSS removal achieved during wet weather conditions is minimal in most instances. However, the additional chemicals and power used is accounted for where a deduction is made to the dry weather component. Contract services is primarily for transporting and treatment of biosolids produced during dry-weather.<sup>16</sup>

The amount spent for chemicals during dry weather is the total amount of  $\$950,000,1,150,000$  ( $\$5,000,000 \times 1923\%$ ) less the  $\$201,780,276,000$  assigned to wet weather, or  $\$748,220,874,000$ .

This is added to the amount paid for contract services 100% of the \$1,750,000 or ( $\$5,000,000 \times 35\%$ ) paid for Contract Services.

$$\$748,220,874,000 + \$1,750,000 = \$2,498,220,2,624,000$$

$$\$2,498,220,2,624,000 / \$5,000,000 \times 100\% = 5052\%$$

<sup>16</sup> Exhibit MCI-1 from Mr. Whalen's Direct Evidence 2013 general rate application

For advanced primary treatment the cost for TSS and BOD removal are equal. Based on this Halifax Water will assign 2526.2% for TSS removal and 2526.2% for BOD removal.

The 8178% of the assumed operating cost assigned to dry weather flow must be adjusted for the amount assigned to TSS and BOD removal with a corresponding adjustment in the wet weather flow percentage. The assigning of a portion of costs of BOD and TSS removal requires an adjustment to wet weather flow costs to account for the fact that BOD and TSS removal costs are all dry weather-related costs. If the adjustment was not made, then wet weather flow would be receiving a portion of the BOD and TSS removal costs.

$$\frac{8178\%}{(8178\% - \text{adjusted wet weather flow portion})} = \frac{2526.2\%}{(\text{adjusted wet weather flow portion})}$$

The formula above lowers the portion of costs assigned to wet weather flow to account for the fact that BOD and TSS removal costs are dry weather flow costs based on the proportion of costs in the example related to the removal of TSS and BOD.

Therefore, adjusted wet weather flow portion = 19.145%

Conclusion:

- Dry weather flow accounts for 100% - (19.145% + 25.026.2% + 25.026.2%) = 30.932.6%
- Adjusted wet weather flow portion = 19.145% (from calculation above)
- TSS removal accounts for = 25.026.2% (see above)
- BOD removal accounts for = 25.026.2% see above)

## 2. Secondary Treatment:

Assumed annual operating cost - \$5,000,000

Based on the Eastern Passage wastewater treatment facility, 8180% of the time this facility experiences dry weather conditions, and;— 1920% of the time they experience wet weather conditions. The secondary treatment facility operating budget is not significantly impacted by wet weather flows versus dry weather flows (no additional Chemicals required, no additional pumping (power costs) on site, and no additional BOD or TSS loadings, etc.).

Therefore the total assumed annual operating budget can be broken down based on 8180% dry weather and 1920% wet weather or \$5,000,000 x 8180% = \$4,050,000 dry weather, and \$5,000,000 x 1920% = \$950,000 wet weather.

For the secondary treatment facilities, the four contributors to the annual operating budgets, and the associated percentages of the overall budgets, assigned to each of these contributors are as follows:

1) Chemicals	- 844%
2) Contract services (biosolids costs)	- 2744%
3) Power	- 1520%
4) Staffing and miscellaneous	- 55%50%

Total power consumption for the plant accounts for 1520% of the overall operating cost. Of this 1520%, Halifax Water analysis attributes 54% of the power consumption (based on a review of the power consumption) for the equipment used for the treatment process. Additional equipment in the plant would relate to items such as heating and ventilation, air scrubbing, disinfection, etc.) to TSS and BOD removal, therefore Halifax Water assigns 844% (1520% x 54% = 844%) to power consumption directly related to TSS and BOD removal.

For the secondary treatment process the main contributors from the operating costs for TSS and BOD removal are: biosolids costs (2744%), power (844%), and heating fuel (Digester heating) (2%) = total 3738% (These are percentages of total operating budget for secondary treatment.)

~~BOD and TSS are only effectively removed during dry weather conditions. The level of BOD and TSS removal achieved during wet weather conditions is minimal in most instances.~~ The calculated cost for TSS and BOD removal based on the dry weather flow portion of the total yearly operating cost as follows:

Cost of TSS and BOD removal - \$4,050,000 X 3738% = \$1,498,500/year.  
\$1,498,500/\$5,000,000 X 100% = 30% (of estimated-assumed annual operating cost)

For secondary treatment the amount for TSS removal and BOD removal are not equal because additional process equipment required for biological treatment (IE: secondary clarifiers, aeration basins, blowers etc., RAS-sludge pumps, etc.) is required. To account for this, the amount assigned for TSS removal and BOD removal has been changed from advanced primary at 50/50 split to a 60/40 split based on operator experience and professional judgment.

-Therefore  $30\% \times 60\% = 18\%$  is assigned to TSSBOD removal, and  $30\% - 18\% = 12\%$  to BOD-TSS removal.

~~The 80 % of the operating budget assigned to Dry Weather Flow (see above), must be adjusted (by a factor of "X") because of the amounts assigned to TSS & BOD removal.~~

-The ~~8180~~ % of the assumed operating cost assigned to dry weather flow must be adjusted for the amount assigned to TSS and BOD removal with a corresponding adjustment to the wet weather flow percentage.

$\frac{8180\%}{(8180\% - \text{adjusted wet flow portion})} = \frac{1920\%}{(\text{adjusted wet weather flow portion})}$

Therefore, the adjusted wet weather flow portion = 16%

Conclusion:

- Dry weather flow accounts for  $100.0\% - (18.0\% + 12.0\% + 16.0\%) = 54.0\%$
- Wet weather flow accounts for 16.0% (from calculations above)
- TSS removal accounts for ~~4218.0~~ % (see above)
- BOD removal accounts for ~~12.048~~ % (see above)

### 3. Tertiary Treatment:

Assumed annual operating cost - \$~~35~~,000,000

~~8580~~ % of the time these facilities experience dry weather conditions, and ~~1520~~ % of the time ~~they experience~~ wet weather conditions. The tertiary treatment facility operating budget is not significantly impacted by wet weather flows versus dry weather flows (no additional chemicals required, no additional pumping (power costs) on site, and no additional BOD or TSS loadings, etc.).

Therefore the total assumed operating cost can be broken down based on ~~8580~~ % dry weather and ~~1520~~ % wet weather or  $\$35,000,000 \times \frac{8580}{100} = \$2,550,000$  ~~4,000,000~~ dry weather, and  $\$35,000,000 \times \frac{1520}{100} = \$450,000$  ~~1,000,000~~ wet weather.

For the tertiary treatment facilities, the four contributors to the annual operating budgets, and the associated percentages of the overall budgets, assigned to each of these contributors are as follows:

1) Chemicals ~~- 118.3~~ %

- 1834 2) Contract services (Biosolids costs) - 3328.6%  
 1835 3) Power - 944%  
 1836 4) Staffing and miscellaneous -47%

1837 Total power consumption for the plant accounts for 944% of the overall operating budget. Of this  
 1838 944%, we can attribute 54% of the power consumption to TSS and BOD removal, therefore we  
 1839 can assign (944% x 54% = 56%) to power consumption directly related to TSS and BOD removal

1840 For the tertiary treatment process the main contributors from the operating budgets for TSS and  
 1841 BOD removal are: biosolids costs (3328.6%), power (56%), chemicals (118.3%) = total 4942.9%  
 1842 (These are percentages of total operating budget).

1843 The calculated cost for TSS and BOD removal based on the dry weather flow portion of the total  
 1844 yearly operating costs as follows:

1845 Cost of TSS and BOD removal -  $\$2,550,000 / 4,000,000 \times 4942.9\% = \$1,249,500 / 1,716,000 / \text{yr} / \text{year}$ .  
 1846  $\$1,249,500 / 35,000,000 \times 100\% = 4234\%$  (of ~~estimated~~ assumed annual operating  
 1847 budget)

1848 For tertiary treatment the amount for TSS and BOD removal are not equal because additional  
 1849 process equipment (*i.e.*, secondary clarifiers, aeration basins, blowers, RAS-sludge pumping,  
 1850 sand filters, chemical feed systems, equalization etc.) ~~is~~ are required. To account for this, we have  
 1851 adjusted the amount assigned for TSS removal and BOD removal from a 50/50 split to a 60/40  
 1852 split.

1853 Therefore 4234% x 60% = 25.220% is assigned to TSS removal, and 4234% - 25.220% =  
 1854 16.814% BOD removal.

1855 The 8580% of the assumed operating cost assigned to dry weather flow must be adjusted for the  
 1856 amount assigned to TSS and BOD removal with a corresponding adjustment in the wet weather  
 1857 flow percentage.

1858  $8580\% / (8580\% - \text{adjusted wet flow portion}) = 1520\% / (\text{adjusted wet weather flow portion})$

1859 ~~Therefore~~ Therefore, the adjusted wet weather flow portion = 12.846%

1860 Conclusion:

- 1861 • Dry weather flow accounts for 100% - (12.846% + 16.814% + 25.220%) = 45.250%

- Wet weather flow accounts for 12.846% (from calculation above in Step #11)
- TSS removal accounts for 25.244% (see above)
- BOD removal accounts for 16.820% (see above)

## Notes on Wastewater Capital Cost Classification

1. Based on a review of data from several representative treatment plants, Halifax Water determined that, on average, the Wastewater treatment facilities are in wet weather conditions approximately 2018% of the time. A review of flow data from a representative sample of the plants operated by Halifax Water including Halifax, Mill Cove, Fall River and North Preston was conducted in order to confirm this estimate, the criteria used was percentage of the flow that the respective facilities were above design average daily flow. The data is as follows:

- North Preston - 2430%
- Fall River - 1543%
- Mill Cove - 1345%
- Halifax - 1320%

The Fall River sewershed is very tight and not affected by I&I, the North Preston sewershed is the opposite, other sewersheds are also highly variable so an average value of 1523% was arrived at for these facilities.

2. Mains are designed based on a design flow that is calculated from an established formula in Halifax Water's Design and Construction Standards. The formulas were revised in 2012 and will result in a ratio of 75% dry weather flow and 25% wet weather flow for an average size and density development which will be used in the COS allocation. The calculation of the 75% is derived from the Design and Construction Standards and is shown below.

The flow Q, in the Wastewater sewer system used for pipe sizing shall be as follows:

$Q = [\text{dry weather}] + \text{wet weather (I/I)}$

$Q = [1.25 \times (a \times M)] + (b \times \text{area}) / 86.4$

where:

1.25 is a safety factor;

M is Harmon Peaking Factor



a is identified here as the average dry weather flow. The allowance is ~~0.300-33~~ m<sup>3</sup> per person per day for residential development;

b is the future degradation of pipe long-term I/I allowance. The allowance is 24 m<sup>3</sup> per gross hectare/day;

Using the formula above and assuming a 1% slope on the pipes, the dry weather and wet weather components of the pipe capacity were determined.

Table 1 illustrates the dry weather versus wet weather flows for a development density of 45 people/ha (ppha). Typical greenfield development is 45 ppha, and constitutes 17% of non-infill development.

Table 1

Pipe Diameter (mm)	Dry Weather (m3/day)	Wet Weather (m3/day)	Total (m3/day)	Dry Weather %
250	3710	1428	5138	72
300	5933	2422	8355	71
350	8800	3803	12603	70
400	12350	5642	17993	69
450	16624	8009	24633	67
Average				70

Using the above methodology, the dry weather flows were determined for other development densities and the relative percentages are shown in Table 2:

Table 2

Pipe Diameter (mm)	60 ppha (14% of non-infill Development)	100 ppha (9% of non-infill Development)	200 ppha (5% of non-infill Development)
250	77%	85%	92%
300	76%	84%	91%
350	75%	83%	91%
400	74%	82%	90%
450	73%	82%	90%
Average	75%	83%	<del>91</del> 95%

Using the relative percentage of each density, the weighted average of dry weather flow is 77%, for rounding purposes, Halifax Water used 75%.

**3. Pump stations** are allocated similar to mains resulting in an allocation to dry weather of 75% and to wet weather is 25%.

#### 1908 4. Advanced Primary Treatment

1909 Wastewater treatment plants are designed for dry weather flow based on plant loadings and are  
1910 oversized-hydraulically sized for wet weather flow. In the case of the three Halifax Harbour  
1911 Solution plants that are advanced primary they were designed to handle four times dry weather  
1912 flow based on regulatory approval. The plants treat the flow up to four times the dry weather flow  
1913 with the flow in excess of that being directed to the overflow at the treatment plant or to one of  
1914 several Combined Sewer Overflows (CSO) located throughout the collection system. The plants  
1915 are designed on a design criteria three-times average dry weather flow to account for daily peaks  
1916 during dry weather conditions and four-times average day for wet weather flow based on  
1917 regulatory requirements. Based on that ratio, 75 % of design flow is related to dry weather flow  
1918 and 25% to wet weather flow. BOD and TSS are all related to dry weather flow as there is no  
1919 addition treatment provided for BOD and TSS removal during wet weather flows. Therefore, the  
1920 allocation to BOD and TSS are allocated from the dry weather flow component.

1921 A review of the capital costs for the Harbour Solutions Plants indicates that approximately 66% of  
1922 capital costs are related to the treatment process. Applying the 66% to the 75% allocated to dry  
1923 weather flow indicates that approximately 50% of capital costs should be allocated to BOD and  
1924 TSS and would be deducted from the dry weather flow portion. The 50% is allocated equally  
1925 between BOD and TSS thus providing an allocation for advanced primary treatment is as follows:

1926	Dry weather flow	= 37.5% (50%*75%)
1927	Wet weather flow	= 12.5% (50%*25)
1928	BOD	= 25.0% (66%*75%)/2
1929	TSS	= 25.0% (66%*75%)/2

1930 As previously noted, BOD and TSS are all related to dry weather flow. There is no additional  
1931 BOD and TSS removal during wet weather flows.

#### 1932 5. Secondary Treatment

1933 The Eastern Passage WWTF ~~has recently been upgraded from primary to secondary which~~  
1934 ~~requires that a new plant be built. The plant~~ was designed based on a regulatory approval for a  
1935 dry weather flow of 25,000 m<sup>3</sup> per day with a peak daily flow of 75,000 m<sup>3</sup> per day and a bypass  
1936 flow with screening and grit removal of 120,000 m<sup>3</sup> per day. Using an estimated peak of 2.5 times  
1937 dry weather flow would result in an estimated peak daily flow of 62,500 (2.5 x 25,000). The  
1938 estimated peak daily flow would then yield an allocation of 83% for dry weather flow

1939 (62,500/75,000) and 17% to wet weather flow. This amount was adjusted by 4% to recognize the  
1940 wet weather flow bypass that is being built into the plant to handle wet weather flows. This amount  
1941 was transferred from dry weather flow to wet weather flow to allow for the cost of the head works.  
1942 Therefore, the adjusted allocation was dry weather flow = 79% (83%-4%) and wet weather flow  
1943 = 21% (17%+4%).

1944 The contract cost of the treatment portion of the Eastern Passage Treatment Plant was  
1945 determined to be \$33 M of the total construction cost of \$52 M or 63% (33/52). This relates to the  
1946 allocation of BOD and TSS and all relates to dry weather flow. Therefore 63% of the total cost  
1947 allocated to dry weather flow (79%) is allocated to BOD and TSS (63% X 79%) = 50%. The 50%  
1948 are equally allocated to BOD and TSS and therefore the revised allocations for Secondary  
1949 Treatment are:

1950	Dry weather flow	= 29%
1951	Wet weather flow	= 21%
1952	BOD	= 25%
1953	TSS	= 25%

1954 As previously noted, BOD and TSS are all related to dry weather flow. There is no additional  
1955 BOD and TSS removal during wet weather flows.

## 1956 6. Tertiary Treatment:

1957 The Aerotech WWTF was designed based on a regulatory approval for a dry weather flow of 3,000  
1958 m<sup>3</sup> per day with a peak daily flow of 6,000 m<sup>3</sup> per day. The contract cost of the treatment portion of  
1959 the facility was determined to be \$16 M of the total construction cost of \$24 M or 67% (16/24). This  
1960 relates to the allocation of BOD and TSS and all relates to dry weather flow. Therefore 67% of the  
1961 total cost allocated to dry weather flow (90%) is allocated to BOD and TSS (67% X 90%) = 60%.  
1962 The 60% is equally allocated to BOD and TSS and therefore the revised allocations for tertiary  
1963 treatment are:

1964 ~~There is no current capital cost design information on a Tertiary Treatment Facility and as this is a~~  
1965 ~~very small portion of HRWC's treatment facilities experience and professional judgement was used~~  
1966 ~~to allocate the classifications as follows:~~

1967		
1968	Dry weather flow	= 25%
1969	Wet weather flow	= 15%
1970	BOD	= 30%
1971	TSS	= 30%

1972 As previously noted, BOD and TSS are all related to dry weather flow. There is no additional  
1973 BOD and TSS removal during wet weather flows.

## 1974 SECTION 6 - STORMWATER SYSTEM COST ALLOCATION

### 1975 General Review

1976 Pursuant to the 2007 Transfer Agreement with HRM, Halifax Water owns municipal stormwater  
1977 systems in ~~and near~~ municipal HRM streets and roads and off-street drainage easements located  
1978 within the Stormwater Boundary as defined in the Transfer Agreement. There are other  
1979 stormwater systems within the Stormwater Boundary that are not owned by Halifax Water,  
1980 including systems owned by the Province of Nova Scotia, bridges owned by HRM, and stormwater  
1981 systems owned by private property owners, including Canadian National Railways, the  
1982 Department of National Defense and others.

1983 The operation of the Water and the Wastewater Systems are financed from revenues based on  
1984 water consumption. This methodology clearly would not be representative of the amount of  
1985 stormwater discharged from properties and managed by Halifax Water-owned infrastructure.  
1986 Halifax Water is financing its Stormwater System by implementing new cost of service-based rates.

1987 Stormwater is defined within the Halifax Water Regulations as “water from precipitation of all kinds,  
1988 and includes water from the melting of snow and ice, groundwater discharge and surface water”.  
1989 Halifax Water’s Stormwater Charge is comprised of two parts - a Right-of-Way Charge and a Site  
1990 Related Flow Charge both on the basis of Impervious Area measures. Impervious Area is defined  
1991 within the Halifax Water’s ~~Rules and~~ Regulations as “an area or surface which prevents or limits the  
1992 entrance or passage of stormwater, including asphalt, concrete, bricks, roofs and gravel surfaces if  
1993 they are hard packed, and all which are denoted as impervious by the satellite imagery utilized by  
1994 the Commission in that determination”. Impervious surfaces generate a much higher rate and  
1995 volume of stormwater runoff than do pervious surfaces. Examples of land surfaces that are typically  
1996 considered to be impervious are asphalt, concrete, brick, roofs, rock, and compacted sand or gravel  
1997 surfaces. Impervious Area is defined in the Halifax Water Regulations. While some municipalities  
1998 and utilities impose stormwater charges based upon both impervious and pervious surfaces, doing  
1999 so is substantially more complex and costly from an administrative perspective. Accordingly,  
2000 Halifax Water will charge stormwater rates on the basis of Impervious Area associated with street  
2001 right-of-way and individual parcels.

2002 Halifax Water is responsible for the Stormwater Systems located in and associated with all HRM  
2003 streets within the Stormwater Service Boundary. All owners and users of properties located within  
2004 the Stormwater Service Boundary benefit from Halifax Water's Stormwater System through their

2005 ability to access their property using HRM streets which are drained by Halifax Water's Stormwater  
2006 System. Stormwater management within the street network helps enable safe transportation of  
2007 people and goods, and provision of services. Most of the properties within the Stormwater Service  
2008 Boundary receive one or both of the following services from Halifax Water:

- 2009 • Processing and/or management of any amount of S Stormwater from the property entering  
2010 into Halifax Water's Stormwater System.
- 2011 • The property is accessed directly by a driveway which crosses over a Halifax Water owned  
2012 and maintained culvert within the road right-of-way.

2013 To allow for some recognition of differentiation of the service provided, the rate is divided into two  
2014 parts; one for street right-of-way related flows; and one for site related flows.

2015 "Site Related Flow Charge" refers to the charge for the services and benefits the customer is  
2016 receiving including, access to a property over a Halifax Water owned culvert, and management of  
2017 stormwater, of any amount, from a property that enters any part of Halifax Water's Stormwater  
2018 System.

2019 "Right-of-Way Charge" refers to the charge to HRM for the Impervious Area in the street right-of-  
2020 way.

2021 In the first COS Manual and associated Stormwater rate application, Halifax Water proposed that  
2022 all Stormwater Customers pay the right-of-way charge based on the Impervious Area of their  
2023 property regardless of where they discharge their Stormwater. In doing so, this rate would recover  
2024 revenues based on the respective benefit provided by Stormwater management in the rights-of-  
2025 way. The NSUARB decision<sup>17</sup> determined that HRM as the owner of the streets receives the benefit  
2026 of the service and must pay for the cost that it imposes for Halifax Water's services, like any other  
2027 Customer.<sup>18</sup>

2028 Halifax Water uses the provincial property tax authority administered by Property Valuation Services  
2029 Corporation's (PVSC) assessment data to determine if a property should be billed as Residential or

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<sup>17</sup> M05463 2013 NSUARB 127

<sup>18</sup> Feb. 2014 HRM Council passed a motion imposing a per lot charge of \$39 per property for properties receiving Halifax Water's Site Related Flow Charge and asked Halifax Water to collect it on HRM's behalf. In June 2015 Halifax Council passed a motion to bill a \$41 per property charge to all taxable properties within the Stormwater Service Boundary effective April 1, 2016 (replacing the \$39 charge currently billed by Halifax Water on behalf of Halifax). Effective July 1, 2018, the charge is \$40 per year.

Non-Residential. PVSC identifies every property using an assessment number (AAN). PVSC regularly reviews property use and assesses which category properties fit into, such as residential, commercial, resource or a combination of commercial and residential and/or resource (mixed use). In addition, Halifax Water uses HRM's building use data, which provides the number of dwelling units in a building.

A property is identified as Residential for Stormwater purposes if it meets any of the following criteria:

- Any property that has been assessed by PVSC as residential only and has three or less dwelling units.
- Any property that has been assessed by PVSC with a combination of residential and resource and has three or less dwelling units.

~~Multi-Residential, Institutional, Commercial, and Industrial (MICI) properties are included within non-residential properties.~~ A property is identified as Non-Residential for Stormwater billing purposes if it meets any of the following criteria:

- Any property that has any commercial assessed value by PVSC.
- Any property considered as mixed use (having commercial assessment along with residential and/or resource assessment).
- Any property having more than three dwelling units.
- Any property having more than three residential assessments associated with it.
- Any property having a multi-residential, institutional, commercial and/or industrial (MICI) use commercial building use.

Any property identified categorized by Halifax Water as unknown or resource is not billed for Stormwater services.

Residential properties shall pay a Site Related Flow Charge based on the tier amount of Impervious Area in which the property falls into on tiering of Residential Properties. If part of a property is located outside Halifax Water's Stormwater Service Boundary (Boundary), the Impervious Area located outside the Boundary is not used in determining the tier amount of the Impervious Area. However, if part of the property is located outside the Stormwater Catchment Boundary, the entire Impervious Area of the property is used in determining the relevant tier amount of the impervious area. The full charge is required to be paid, even if a part of the property is located outside the HRWC's

~~Stormwater Service Boundary.~~ As Residential properties are generally ~~smaller, and~~ smaller and are not charged on the basis of the actual Impervious Area, billing on the basis of an average or a tier, based upon “Equivalent Residential Units” (ERUs) provides sufficient equity in cost effective manner.

Non-Residential customers pay the Site Related Flow Charge based on site specific measurement of the Impervious Area. Non-Residential customers include ~~multi-unit residential, institutional, commercial and industrial properties~~ MICI properties. If part of a property is located outside Halifax Water’s Stormwater Service Boundary and/or the Stormwater Catchment Boundary, that part of the property located outside either Boundary is exempt from the charge. ~~In addition, if part of a property is located outside the Stormwater Catchment Boundary, only that part of the impervious area that drains into the Halifax Stormwater System is subject to the charge.~~ As Non-Residential Customers are billed on the basis of actual Impervious Area and the properties in question are often large, this mechanism enhances equity.

### **System Data (for Allocation of Costs to Customers)**

In 2012 and 2014, Halifax Water retained the services of EXELIS-VIS (formerly ITT) ~~a company~~ to provide satellite imagery for the stormwater billing project, including delineation ~~identification~~ of impervious surfaces on lands within the Stormwater Service Boundary. The impervious areas delineated ~~identified by the EXELIS-VIS (formerly ITT)~~ using the imagery ~~were have been~~ used as the basis for developing the rates for both the ~~Street~~ Right-of-Way Charge and the Site Related ~~Generated~~ Flow Charge in past rate applications. Updated high-resolution satellite imagery was acquired in May 2020 from Maxar, with the imagery processed/classified by Applied Geomatics Research Group (AGRG). This updated satellite imagery is currently being used for billing purposes and will form the basis used for Right-of-Way and Site Related Flow Charges in the rate application.

### **Stormwater System Functions**

Utilities incur varying levels of costs to perform the different system functions needed to adequately manage stormwater flows to keep street rights-of-way accessible and mitigate impacts of flood waters. The functionalization process involves categorizing revenue requirements according to functions to assign costs more appropriately to individual served parcels. Stormwater System cost functions and their definitions for both operating and capital are presented in Table 24.



Stormwater System Function	Operating Costs Definition	Capital Cost Definition
Pipes, Manholes and Retention Ponds	Includes the cost centres for stormwater pipes, manholes and retention ponds.	Includes the design and construction costs associate with all gravity mains, manholes and retention ponds.
Combined Sewer Overflows	Includes all costs associated with maintaining the combined sewer overflows.	Includes the design and construction costs associated with all combined sewer overflows.
Ditches and Culverts	Includes the cost centre for ditches and culverts.	Includes the design and construction costs associated with all ditches and culverts.
Catchbasins	Includes the cost centre for catchbasins.	Includes the design and construction costs associated with all catchbasins.
Regulatory Services	Includes the Environmental Engineering, Regulatory Compliance, <del>Pollution Prevention</del> , Stormwater Engineering, <u>Environmental Management System</u> and Development Approvals cost centres.	Cost centres within Regulatory Services function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
Engineering and <u>Technology Services</u>	Includes the cost centres for Records Management; Energy and Business Development, <u>Engineering Information</u> , <del>Management</del> Information Services.	Cost centres within Engineering and <u>Technology Services function as</u> <del>IS is an</del> operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
Technical Services (SCADA)	Operate the SCADA systems for water <u>and wastewater</u> (both treatment and distribution)	Cost centres within Technical Services <u>(SCADA) function as</u> operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of other costs through depreciation.
<u>Corporate Services</u>	<u>Includes the cost centres for Accounting, Finance and Procurement.</u>	<u>Cost centres within Corporate Services function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles, etc.) are allocated as assets in proportion of the other costs through depreciation.</u>
Customer Service	Includes the cost centres for Customer Care and Collecting.	Cost centres within Customer Service function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.
Administration <u>and General</u>	Includes the cost centres for Administration, <u>Communications</u> , <u>Legal, Human Resources</u> , <u>Employee Benefits</u> , and <u>General</u> . <del>and general; human resources; employee benefits; and,</del>	Cost centres with Administration function as operating cost centres. Any capital costs related to the provision of this service (equipment, buildings, intangibles etc.) are allocated as assets in proportion of the other costs through depreciation.

	operation and maintenance of office	
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2090 Stormwater System Cost Allocation – System Functions

## 2091 Cost Functionalization Considerations

2092 The engineers and superintendents, responsible for the Stormwater System review assignment  
 2093 of Stormwater assets and their associated operating and maintenance costs to System functions.  
 2094 Operating costs centres are set up to record financial information in categories that support  
 2095 functionalization.

2096 The basis for the determination of functions is the operating cost centres that comprise the  
 2097 Stormwater Service from collection to discharge to the receiving environment. It includes the direct  
 2098 cost functions of providing the service as well as the common costs of providing support services  
 2099 across all utility Services that are assigned to Stormwater Service. The following point is noted in  
 2100 regard to the cost functions:

2101 Retention ponds are budgeted and reported with pipes as the maintenance costs have historically  
 2102 been minimal. These are combined with pipes and manholes for COS reporting.

2103 Functionalization of O&M expenses are shown in Worksheet SW-6 in Rate Studies, which is based  
 2104 on Table 24 as shown in this COS Manual. The percentages reported in Worksheet SW-6 are  
 2105 calculated based on back-calculations, derived from actual dollar values included in the test year  
 2106 operating expenditures. Functionalization is shown with both percentage allocation and actual  
 2107 dollar values. Generally, inputs in the dollar value report are used to drive back- calculate in the  
 2108 percentages used in the report. Rounding on the percentage report would be expected compared  
 2109 to the dollar value report, since the dollar values are absolute and balance to revenue requirements.

## 2110 Classification of Functional Costs

2111 Following the distribution of Stormwater System revenue requirements to designated functions,  
 2112 costs are distributed to Stormwater System service characteristics. Following WEF procedures  
 2113 outlined above for Wastewater Service applied in the Stormwater Service context, these service  
 2114 characteristics include flows from street rights-of-way and individual parcels and customer service  
 2115 attributes. Classification of system costs (by function) distributes costs to the characteristics of  
 2116 service that distinguish customer classes.

2117 Halifax Water functionalized costs are classified to the following stormwater service  
 2118 characteristics:

- 2119 - Street right-of-way flow
- 2120 - Site related flow
- 2121 - Customer Service
- 2122 - Indirect

## 2123 O&M Cost Classification

2124 Functionalized Stormwater System costs are classified to service characteristics separately for  
 2125 O&M expenses and capital costs. O&M costs are classified as summarized in Table 25,  
 2126 explanations of which are provided in the subsequent notes. Supporting calculations are  
 2127 documented in the final section of the COS Manual section on Wastewater System Allocations.

2128 Table 25

2129 Stormwater System O&M Cost Classification Summary<sup>19</sup>

Stormwater System Functions	Street Right-of-Way Flow	Site Related Flow	Customer Service	Indirect	Notes
Pipes, Manholes and Retention Ponds	<u>33.630%</u>	<u>66.470%</u>			2
Combined Sewer Overflows	<u>33.630%</u>	<u>66.470%</u>			3
Ditches and Culverts	<u>33.630%</u>	<u>66.470%</u>			4
Catchbasins	<u>100.0%</u>				5
Technical Services <u>(SCADA)</u>	<u>33.630%</u>	<u>66.470%</u>			6
Customer Service (less Metering Costs)			<u>100.0%</u>		7
Regulatory Services				<u>100.0%</u>	8
Engineering and <u>Technology Services</u> <u>(excluding Technical Services (SCADA))</u>				<u>100.0%</u>	8
<u>Corporate Services</u>				<u>100.0%</u>	<u>8</u>
<u>Administration and General</u>				<u>100.0%</u>	8

<sup>19</sup> The cost and reduction in revenues associated with the implementation of a credit program would be added to revenue requirements and allocated 100% to site related flow.

## Notes on Stormwater O&M Cost Classification

- 1) ~~The street right-of-way flow and the site related flow percentages have been developed based on the measured impervious area of each as prepared for HRWC from satellite imagery for billing purposes. This information was prepared by EXELIS-VIS (FORMERLY ITT) Information Solutions who used a hybrid mapping approach that utilized both unsupervised (automated) and supervised (semi-automated) classification algorithms to identify three classifications, pervious, impervious and no-data (cloudy).~~ Updated high-resolution satellite imagery was acquired in May 2020 from Maxar, with the imagery processed/classified by AGRG. This updated satellite imagery resulted in a further refinement of This data was further refined to identify street right-of-way and the billable Impervious Area as follows:

Street Right-of-Way Area = 33.630%

Impervious Area of Developed Lots = 66.470%

- 2) Pipes, manholes and retention ponds are allocated 2930% to street right-of-way and 7170% to site related flow. This allocation reflects the source of the Stormwater to be directed to the pipes, manholes and retention ponds.
- 3) Combined Sewer Overflows are allocated 2930% to street right-of-way and 7170% to site related flow. This allocation reflects the source of the Stormwater to be directed to the combined sewer overflows.
- 4) Ditches and Culverts are allocated 2930% to street right-of-way and 7170% to site related flow. This allocation reflects the source of the Stormwater to be directed to the ditches and culverts.
- 5) Catchbasins are allocated 100% to street right-of-way. This allocation reflects the fact that catchbasins are generally designed with an inlet capacity that matches the flow generated in the street.
- 6) Technical Services (SCADA) operating costs are allocated based on the number of data points (tags) monitored in each activity. The result of the allocation is summarized in Table 26.

Table 26

Function	No. of Data Points Monitored	Allocation percentage
WW Treatment	<u>24,3565,247</u>	<u>45.037%</u>
WW Collection	<u>11,9544,547</u>	<u>22.033%</u>

SW CSOs	456410	0.83%
Water Distribution	5,2041,187	9.69%
Water Treatment	12,2652,492	22.618%
Total	54,23513,883	100.0%

Technical Services has been allocated 2930% to street right-of-way and 7170% to site related flow.

7) Customer Service less metering costs is allocated 100% to Customer Service as these services are all Customer related.

8) Regulatory Services, Engineering and TechnologyInformation Services, Corporate Services and ~~Administration and General~~ are allocated to indirect costs which are allocated in proportion to direct costs.

### Capital Cost Classification

Functionalized Stormwater System costs are classified to service characteristics separately for O&M expenses and capital costs. Capital costs are classified as summarized in Table 27, explanations of which are provided in the subsequent notes. Supporting calculations can be found in the final section of the COS Manual section on Stormwater System Allocations.

2173 Table 27

2174 Stormwater System Capital Cost Classification Summary

Stormwater System Functions	Right-of-Way Flow	Site Related Flow	Customer Service	Indirect	Notes
Pipes, Manholes and Retention Ponds	33.6 <u>30</u> %	<u>66.470</u> %			2
Combined Sewer Overflows	<u>33.630</u> %	<u>66.470</u> %			3
Ditches and Culverts	<u>33.630</u> %	<u>66.470</u> %			4
Catchbasins	100. <u>0</u> %				5
Technical Services ( <u>SCADA</u> )					6
Customer Service (less Metering Costs)			100. <u>0</u> %		7
Regulatory Services					8
Engineering and <u>Technology Services</u> (excluding Technical Services (SCADA))				100. <u>0</u> %	9
<u>Corporate Services</u>				<u>100.0</u> %	<u>10</u>
<u>Administration</u>				100. <u>0</u> %	10

2175

## 2176 Notes on Stormwater Capital Cost Classification

2177 1) The street right-of-way flow and the site related flow percentages has been developed  
 2178 based on the measured Impervious Area of each as prepared for Halifax Water from  
 2179 satellite imagery for billing purposes. ~~This information was prepared by EXELIS-VIS~~  
 2180 ~~(FORMERLY ITT) Information Solutions who used a hybrid mapping approach that utilized~~  
 2181 ~~both unsupervised (automated) and supervised (semi-automated) classification~~  
 2182 ~~algorithms to identify three classifications, pervious, impervious and no data~~  
 2183 ~~(cloudy). Updated high-resolution satellite imagery was acquired in May 2020 from Maxar,~~  
 2184 ~~with the imagery processed/classified by AGRG. This updated satellite imagery resulted~~  
 2185 ~~in a further refinement of the This data was further refined to identify street right-of-way~~  
 2186 ~~and billable Impervious Area as follows:~~

2187 Street Right-of-Way Area = 2930%

2188 Impervious Area of Developed Lots = 7170%

- 2) Pipes, manholes and retention ponds allocated 2930% to street right-of-way ~~away~~ and 7170% to site related flow. This allocation reflects the source of the Stormwater to be directed to the pipes, manholes and retention ponds.
- 3) Combined Sewer Overflows are allocated 2930% to street right-of-way ~~away~~ and 7170% to site related flow. This allocation reflects the source of the Stormwater to be directed to the combined sewer overflows.
- 4) Ditches and culverts allocated 2930% to street right-of-way and 7170% to site related flow. This allocation reflects the source of the Stormwater to be directed to the ditches and culverts.
- 5) Catchbasins allocated 100% to street right-of-way. This allocation reflects that catchbasins are generally designed with an inlet capacity that matches the flow generated in the street.
- 6) Technical Services (SCADA) are charged directly to capital cost based on work performed~~of the works and are included in the capital items~~. There is no separate allocation for capital for this item.
- 7) Customer Service is allocated 100% to Customer Service.
- 8) Regulatory Services are charged directly~~allocated~~ to capital cost based on work performed~~of the works and are included in the capital items~~. There is no separate allocation for capital for this item.
- 9) Engineering and Technology~~Information~~ Services (excluding Technical Services (SCADA)) are charged to capital cost based on work performed~~related with capital works are allocated to the capital cost of the works and are included in the capital items~~. Other costs such as databases and other intangibles are allocated to indirect costs.
- 10) Corporate Services and Administration ~~and General~~ are allocated to indirect costs that are allocated in proportion to direct costs.

### **Allocation to Parcel Owners (Customers)**

The Stormwater Charge proposed by Halifax Water is comprised of two parts - a Site Related Flow Charge, and a Right-of-Way Charge.

- Halifax Water's Site Related Flow Charge is a charge for the services and benefits the Customer is receiving including access to a property over a Halifax Water owned culvert, and management of Stormwater from a property that enters any part of Halifax Water's Stormwater System.
- The Right-of-Way Charge has been developed using the Impervious Area associated with

all the municipal streets within the Stormwater Service Boundary. Per the NSUARB's 2013 rate application decision, the Right-of-Way Charge is billed to HRM who then determine how it is collected from residents. This procedure is illustrated in Table 28 that offers an example template for these types of calculations. As noted, the distribution of costs by function, and subsequent classification of these costs by service characteristic (e.g., site related and right-of-way flows, and customer service related and indirect costs) results in the expression of each component of the utility's revenue requirements in terms of these service characteristics. Accordingly, in Table 28, Lines 1-3 list the outcomes of the cost classification by each major revenue requirement component. Because some of these costs are allocated on an indirect basis, calculations are made to distribute these costs to directly classify site related and right-of-way flow related costs based on those costs' share of total directly classified costs (for indirect costs) and the number of parcels billed (for Customer account related costs). So, for example, if site related flow costs represent 55% of directly classified costs, 55% of indirect costs are apportioned to site related flow costs. This is the procedure employed in Lines 1, 2 and 3 to yield complete cost classifications by cost component (Line 4) – that are summed (Line 5) to present total cost by service characteristic.

Table 28

Line	Revenue Requirement Component	Street Right-of-Way Flow Related Costs	Site Related Flow Related Costs	Customer Service Related Costs	Indirect Costs
1	Operations and Maintenance	\$\$ (%)	\$\$ (%)	\$\$	\$\$
2	Depreciation	\$\$ (%)	\$\$ (%)	\$\$	\$\$
3	Return on Rate Based	\$\$ (%)	\$\$ (%)	\$\$	\$\$
4	Allocated Customer Service and Indirect Costs*	\$\$\$	\$\$\$		
5	Total Cost-of-Service by Service Type	\$\$\$	\$\$\$		
6	Billable Impervious Area	XXX	XXX		
7	Charges per Unit <u>10 Square Meter (Unit cost)</u>	\$\$	\$\$		
8	Assigned Residential Tiers based on Square Metre / Lot	XX	XX		



9	Residential Parcel Bills		
<ul style="list-style-type: none"> <li>Indirect Costs in the column to the far right are distributed to site related and right-of-way flow related costs in proportion to their respective shares of directly allocated costs (exclusive of Customer Service-related costs). Customer Service-related costs are distributed to site related and right-of-way flow related costs in proportion to the respective numbers of parcels billed.</li> </ul>			

2239 The respective rate calculations are then simply these costs (Line 5) divided by the amount of  
2240 billable Impervious Area associated with site related or right-of-way flows (Line 6) to determine  
2241 the charges per unit Square Meter (Line 7). Residential bills are then determined based on a tier.  
2242 The tiered rate structure is based upon an Equivalent Residential Unit, or “ERU”. This concept is  
2243 very similar to how “Equivalent Metres” are used in water and wastewater cost of service. The ERU  
2244 is established based on the average residential impervious area and is calculated based on the  
2245 Impervious Area associated with Residential Properties divided by the number of residential  
2246 parcels. The tiers are based on the ERU, and the threshold limits established in a similar manner  
2247 to those adopted by other entities. The example below shows tiers based on an ERU of 200 m<sup>2</sup>  
2248 as the representative median value for the typical Residential Property or the ERU.

Tier	From	To
1	less than	5 units
2	5 units	20 units
3	21 units	40 units
4	41 units	80 units
5	81 units	or more
Each units equals 10 m <sup>2</sup>		

2249 Table 29

Tier	From	To
1	<del>Less than 0</del>	<del>5 units — 5*10 = 50 m<sup>2</sup></del>
2	<del>5 units — 5*10 = 50 m<sup>2</sup></del>	<del>20 units — 20*10 = 200 m<sup>2</sup></del>
3	<del>21 units — 21*10 = 210 m<sup>2</sup></del>	<del>40 units — 40*10 = 400 m<sup>2</sup></del>
4	<del>41 units — 41*10 = 410 m<sup>2</sup></del>	<del>80 units — 80*10 = 800 m<sup>2</sup></del>
5	<del>81 units — 81*10 = 810 m<sup>2</sup></del>	Or greater

2250  
2251 Properties with Impervious Area falling within a tier are billed the assigned charge for that tier, with  
2252 Customers billed based on Impervious Area rounded to the nearest 10 m<sup>2</sup>.

2253 The revenue requirement Rate per ERU or standard median charge billing unit is the total revenue  
2254 requirement allocated to site related flow, divided by the total ERUs for the System, both  
2255 Residential and Non-Residential Properties. ERUs for Residential Properties are those as  
2256 described above using the tiered methodology, whereby the number of properties in each tier are  
2257 assigned an equivalency factor as outlined in Table 30, which is then multiplied by the ERU to  
2258 determine total ERUs for Residential Properties. Non-Residential Properties ERUs are calculated  
2259 by dividing the total Impervious Area for Residential and Non-Residential Properties divided by  
2260 the median Impervious Area ERU of 200 m<sup>2</sup>.

2261

2262 Table 30

Line	Tier	Equivalent Residential Unit "ERU"	Revenue Requirement (RR) per ERU	Rate Adjustment	Tier Rate	Standard Annual Charge
1	1	X m <sup>2</sup>	\$X per m <sup>2</sup>	0%	RR per ERU X Rate Adjustment	\$0X
2	2	X m <sup>2</sup>	\$X per m <sup>2</sup>	50%	RR per ERU X Rate Adjustment	\$.5X
3	3	X m <sup>2</sup>	\$X per m <sup>2</sup>	100%	RR per ERU X Rate Adjustment	\$1X
4	4	X m <sup>2</sup>	\$X per m <sup>2</sup>	200%	RR per ERU X Rate Adjustment	\$2X
5	5	X m <sup>2</sup>	\$X per m <sup>2</sup>	300%	RR per ERU X Rate Adjustment	\$3X

2263  
 2264 The standard median charge, when divided by the ERU determines the billing rate per ERU. For  
 2265 Non-Residential Properties this billing rate becomes the rate charged per square meter of billable  
 2266 Impervious Area. For Residential Properties this billing rate, multiplied by the ERU, multiplied by  
 2267 the rate adjustment associated with each individual tier within the Residential grouping,  
 2268 determines the annual charge for properties falling within each respective tier.

2269 ~~Properties with impervious area falling within a tier are billed the Standard Annual Charge~~  
 2270 ~~for that tier. Customers are billed based on impervious area rounded to the nearest 10 m<sup>2</sup>.~~

## 2271 Stormwater Service Delivery Via Ditches

2272 The Stormwater Service area is a mixture of urban, suburban, and rural properties. The primary  
 2273 service objective of a Stormwater System is to manage Stormwater so as to protect municipal  
 2274 roads and streets and nearby private properties. The Stormwater System intercepts or diverts  
 2275 flows from a property, enables access to a property over a Halifax Water owned culvert, and/or  
 2276 manages stormwater from a property if it enters any part of Halifax Water's Stormwater System.  
 2277 This level and nature of service provided by Halifax Water infrastructure varies depending on the  
 2278 location, the amount of stormwater generated and the surrounding properties. In some cases,  
 2279 Stormwater Service is provided by ditches and culverts and in others, pipes and in still others, a  
 2280 combination of pipes and ditches.

## 2281 **Special Considerations for Rural Areas**

2282 Rural properties are different than urban properties in the context of Stormwater Service. Rural  
2283 properties tend to have: larger Impervious Area often characterized by longer driveways, lower  
2284 overall Impervious Area, and a higher proportion of Stormwater cost related directly to roadway  
2285 related drainage. ~~Thus the types of service may differ even while the level of service remains the~~  
2286 ~~same as in urban areas.~~

## 2287 **Cost of Providing Service to Rural Customers**

2288 The cost of providing Stormwater Services on a per-person or per-unit of revenue generated basis  
2289 is significantly higher in rural areas than in urban areas. While the density of drainage system is far  
2290 less, the density of revenue generation is even less. The revenue generated from rural areas is less  
2291 than the cost to Halifax Water to service those areas.

2292 Halifax Water typically provides Stormwater Service using either a piped storm sewer system or a  
2293 Ditch and culvert system. Properties in rural areas typically are served by an open ditch  
2294 configuration and have a driveway culvert. Currently the majority of operating costs for Stormwater  
2295 Service pertain to providing service in rural areas – cleaning and repairing Ditches and replacing  
2296 driveway culvert or cross culverts in the street. Ditches and culverts are the largest functions when  
2297 Halifax Water's Stormwater O&M expenses are functionalized<sup>20</sup>. Given that Stormwater-only  
2298 Customers represent ~~18.43~~18.43% of Stormwater Customers, this illustrates that currently the revenue  
2299 generated in rural areas does not match the cost of providing Service in those areas. The majority  
2300 of service requests and work orders for Stormwater Service pertain to Customers served by a ditch  
2301 and culvert, thereby attracting a higher allocation of customer service costs.

2302 Halifax Water does not calculate rates for piped storm sewer systems versus ditch and culvert  
2303 systems, as the rates for Service for rural Customers would be higher than the rates for Customers  
2304 on a piped storm sewer system, and this would be contrary to the regional approach the utility  
2305 employs, and akin to calculating different COS for different types of water production and distribution  
2306 or wastewater treatment and collection.

2307

---

<sup>20</sup> 28.5% of O&M costs (M07147 Exhibit H-1 page 250)

## 2308 Stormwater System Appendix: Site Related Flow and Credit Calculations

### 2309 Calculation of Site Related Flow

2310 To arrive at the percentage of flow to be allocated to site related verses street right-of-way, Halifax

2311 Water retained a professional company to scan satellite images of the area and provide data on

2312 impervious area. The most current impervious area data is:

Halifax Water Stormwater Rate Study			
Service Area and Customer Balancing			
Customer Data			
System Data			
Total Impervious Area within the Stormwater Boundary (in square meters)			98,809,690
Less:			
Non-qualifying impervious area in parcels flagged as "Excluded"			
Parcels outside the stormwater catchment		3,225,460	
SRF Exempted parcels		2,245,350	
Parcels identified as resource inside catchment		1,357,670	
Parcels identified as unknown inside catchment		452,110	
Non-qualifying impervious area in parcels flagged as "MICI"			
Parcels over 50m <sup>2</sup>		3,724,430	
Parcels under 50m <sup>2</sup>		394,265	
Parcels under 50m <sup>2</sup> , having a culvert		14,500	
SRF Exempted Parcels within stormwater catchment having a culvert		7,030	
Parcels outside the stormwater catchment, having a culvert		4,460	
Non-qualifying impervious area in parcels flagged as "Not Applicable"			
Road parcel - arbitrary		20,200,900	
Road parcel		8,695,070	
Railroad Parcel		994,050	
Water lot		113,820	
Interim parcel		24,510	
Water parcel		9,310	
Unresolved parcel PID		4,910	
Non-qualifying impervious area in parcels flagged as "Residential"			
SRF Exempted Parcels within stormwater catchment having a culvert		109,270	
Parcels outside the stormwater catchment, having a culvert		65,940	
Interim parcel		1,390	(41,644,445)
<b>Qualifying impervious area associated with Site Related Flow (SRF)</b>			<b>57,165,245</b>
Qualifying impervious area associated with street rights-of-way, consists of:			
Road parcel - arbitrary		20,200,900	
Road parcel		8,695,070	
			28,895,970
Less: impervious area of the following stakeholders			
Other			(14,780)
<b>Billable impervious area associated with Right-of-Way (ROW)</b>			<b>28,881,190</b>
Billable impervious area breakdown as follows:			
Halifax (HRM)		23,564,330	
Province of Nova Scotia		5,243,630	
Halifax Dartmouth Bridge Commission		73,230	28,881,190

2313

Service Area and Customer Balancing			
Customer Data			
System Data			
Total Impervious Area within the Stormwater Boundary (in square meters)			95,161,500
Less:			
* Road parcel - Arbitrary			(17,672,160)
* Road parcel			(7,307,860)
* Railroad parcel			(1,068,750)
* Interim Road parcel			0
Water parcel			(961,790)
Water lot			(309,250)
Sundry			
Resource, vacant or unknown			(8,188,570)
Previously billed, now not being billed			0
Customers exempted: appealed and determined to have no service (watershed/ culvert)			(1,102,710)
Customers pre-exempted: have no service (watershed/ culvert)			(962,410)
Unresolved parcel			(8,480)
Parcels under 50 square meters			(35,270)
Billable Impervious Area associated with Site Related Flow (SRF)			57,544,250
* Impervious Area associated with Street Right-of Way (ROW)			
Road parcel - Arbitrary			17,672,160
Road parcel			7,307,860
Total Street Right of Way (ROW)			24,980,020

This data was then used to calculate the percentage that street right-of way and site related flow represented of the total of billable Impervious Area.

- $$\frac{28,881,190}{24,980,020 + 57,544,250} = 33.630.27\%$$

right-of-way allocation
- $$\frac{57,165,245}{57,544,250 + 28,881,190} = 66.469.73\%$$

site related flow allocation

The Impervious Area data is based on satellite imagery from April 2020 ~~early in May 2014~~ during “leaf-off” conditions and represents an improvement in accuracy because a) it reflects new development and additional Impervious Area since the original data, and b) it is “leaf off”, therefore there is less vegetation obscuring the measurements. The Impervious Area has increased by 435.5% since the previous update, with the Impervious Area in the street right-of-way increasing by 1633.4% and the site related Impervious Area ~~decreasing~~ increasing by 134.1%.

Given the large number of Residential Properties and the relatively small variation in the Impervious Area for these properties Halifax Water will develop a system wide median residential Impervious Area which will be used as the ERU to develop residential tiers that will recognize some differentiation between properties so that properties with less Impervious Area pay less than properties with more Impervious Area.

2332 The table below and the information contained therein, including rates, is for illustrative purposes  
2333 only. Revenue requirements, Impervious Area and number of parcels will change each time Halifax  
2334 Water applies to adjust rates for Stormwater Service in the future.

							Worksheet SW-11
							October 26, 2016
Halifax Regional Water Commission							
Stormwater Rate Study							
Residential Charges and Revenue Reconciliation							
Calculation of Rates for Residential Customers							
	Tier Parameters (in units)		Equivalent Residential Unit (ERU)	Rate per Billing Unit	Rate Adjustment	Tier Rate	Standard Annual Charge
Tier	Each unit equals 10 square meters						
Label			A	B	C	B X C	A X B X C, rounded to the nearest \$
1	less than	5 units	200	\$0.135	0%	\$0.000	\$0.000
2	6 units	20 units	200	\$0.135	50%	\$0.068	\$14.000
3	21 units	40 units	200	\$0.135	100%	\$0.135	\$27.000
4	41 units	80 units	200	\$0.135	200%	\$0.270	\$54.000
5	81 units	or more	200	\$0.135	300%	\$0.405	\$81.000
Reconciliation of Revenue Requirement							
				Impervious Area	Number of Parcels	Billing Rate	Revenue Requirement
Street Right-of Way (ROW), levied to HRM							\$3,835,012
Site Related Flow (SRF)							
Industrial, Commercial, Institutional (ICI)				34,748,200		\$0.135	\$4,691,007
Residential							
Tier 1				33,330	2,326	\$0.000	\$0
Tier 2				6,695,740	44,710	\$14.000	\$625,940
Tier 3				8,409,710	31,041	\$27.000	\$838,107
Tier 4				4,201,480	7,768	\$54.000	\$419,472
Tier 5				3,489,120	2,123	\$81.000	\$171,963
Preliminary Revenue Total							\$10,581,501
Less: Revenue Requirement							(\$10,663,017)
Excess (deficiency) compared to Revenue Requirement							(\$81,516)

## 2335 Exemptions

2336 The Impervious Area associated with any properties deemed to be exempt from Stormwater  
 2337 charges pursuant to the Halifax Water Regulations is deducted in the calculation of billable  
 2338 Impervious Area and rates. Properties with an Impervious Area less than 50 m<sup>2</sup> are exempt.<sup>21</sup>

2339 All properties are treated the same, with exemptions only considered based on specific  
 2340 circumstances on or near the property, including when part of a Non-Residential Property is outside  
 2341 of the Stormwater Service Boundary.<sup>22</sup>

## 2342 Credits

2343 Any customer who pays charges for Non-Residential Properties may be eligible for a credit not less  
 2344 than 30% but not exceeding 50% of the Site Related Flow Charge if they are undertaking certain  
 2345 qualified Stormwater best management practices that detain peak stormwater flow on an on-going  
 2346 basis in accordance with the parameters and application process set out in the Commission's  
 2347 Stormwater Credit Manual<sup>23</sup> (COS Manual Appendix III).

Halifax Regional Water Commission														
Utility System														
Depreciation/ Continuity Schedule														
Test Year														
	Funded Utility Plant in Service	Contributed Portion	Total Utility Plant in Service	Work in Process approved in Previous Years	Utility Plant in Service Additions in	Contributed in	Projected Retirements	Projected Utility Plant in Service	Accumulated Depreciation	Accumulated Depreciation on funded assets	Accumulated Depreciation on donated assets	Projected Retirement of Accumulated Depreciation	Projected Net Book Value before Depreciation	Calculated Depreciation including Retirements
	Opening Balance	Opening Balance	Opening Balance	Test Year	Test Year	Test Year	Test Year	Test Year	Opening Balance	Opening Balance	Opening Balance	Test Year	Test Year	Test Year
<b>INTANGIBLE PLANT</b>														
Organization and Working Capital														
<b>LAND AND LAND RIGHTS</b>														
System Specific - Land														
System Specific - Right of Ways														
System Specific - Other Rights														
System Specific - Other														
<b>STRUCTURES AND IMPROVEMENTS</b>														
System Specific - Structures														
General														
Office Building														
<b>Equipment</b>														
System Specific - Pumping Equipment														
System Specific - Tools and Equipment														
System Specific - Transportation														
System Specific - Office Furniture														
System Specific - Computer Equipment														
System Specific - Other														
<b>Mains</b>														
System Specific - Mains & Laterals														
<b>Other</b>														
<b>TOTAL</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<sup>21</sup> M07147 NSUAR Decision May 12, 2016, page 17, paragraph [55]

<sup>22</sup> M07147 NSUAR Decision May 12, 2016, page 19, paragraph [64]

<sup>23</sup> M07731 NSUAR Decision April 12, 2017 , page 24, paragraph [19]



**Schedule A****Table of explanatory notes for proposed amendments to the  
Halifax Water Cost of Service Manual - 2022 Rate Application**

Section/Line	Explanation
Section 1-6 Various lines	<p>Housekeeping and cleanup of typographical errors and formatting. Adjustment of line numbers and spacing.</p> <p>Adjustment of Table of Contents, links for content placeholders.</p> <p>Defined HRWC to Halifax Water, Halifax Regional Municipality to HRM, Cost-of-Service to COS, Nova Scotia Utility and Review Board to NSUARB.</p> <p>Revision of dates related to previous submission and evaluation study from 2013/14 to 2019/20.</p> <p>Abbreviated terms such as, AWWA, IPOANS</p> <p>Updated Engineering &amp; IS to: Engineering &amp; Technology Services, Administration &amp; Pension to: Administration</p>
Line 128-140	<p>Updated information regarding AMI Technology and meters.</p> <p>Defined meter technology corresponding to Customer Connect portal.</p> <p>Utilizing the services of Raftelis, noted the productive changes this new system provides.</p>
Line 137	Updated graphic to show industry standard manuals of practice.
Line 328-356	<p>Removal of language referencing internal systems.</p> <p>Addition of language consistent with internal systems.</p> <p>Updated information regarding new payroll system.</p>
Line 434-474	<p>Adjusted language to explain the financial relationship between all services.</p> <p>Updated percentages and fiscal year information to current.</p>
Line 483-503	<p>Adjusted language to explain the financial relationship between Engineering &amp; TS.</p> <p>Updated percentages and fiscal year information to current.</p>
Line 504-517	<p>Adjusted language to explain the financial relationship between Regulatory Services.</p> <p>Updated percentages and fiscal year information to current.</p>
Line 504-517	Adjusted language to explain the financial relationship between Customer Services (a department in Corporate Services).
Line 537-548	<p>Adjusted language to explain the financial relationship between Corporate Services.</p> <p>Updated percentages and fiscal year information to current.</p>
Line 549-625	<p>Adjusted language to explain the financial relationship between Administration.</p> <p>Updated percentages and fiscal year information to current.</p>

Line 678-721	Adjusted language to explain the financial relationship between Capital Assets.  Updated percentages and fiscal year information to current.
Line 752-762	Updated formulas for each function.
Line 854-861	Provided updated information relating to various functions and each operating cost and capital cost definition.
Line 935-1006	Adjusted metrics and formulas to show method of formulas for water system costs characterized separately from O&M expenses and capital costs.
Line 1121-1253	Updated formulas, percentages and fiscal year information, to current.
Line 1409-1587	Adjusted metrics and formulas to show method of formulas for Cost Classification (O&M/Capital) for Wastewater.
Line 1589-1881	Adjusted metrics and formulas to show method of formulas for cost of service relating to Wastewater.
Line 1882-1986	Updated formulas, percentages and fiscal year information, to current.
1987-2097	Updates to metrics and descriptions of system functions.
Line 2098-2145	Description and details pertaining to the allocation to parcel owners.
Line 2124-2153	Updates to explanation regarding the ERU billing details for the standard median charges.
Line 2190-2226	Updates based on rate study showing the calculation of site related flow and the formulas to reach this result.
Various Lines, Tables	Updated percentages and fiscal year information to current information for each table.

# HALIFAX WATER

## Water Demand Analysis Summary

FINAL

January 28, 2022

January 28, 2022

Mr. Louis de Montbrun  
Director of Corporate Services  
Halifax Water  
450 Cowie Hill Road  
Halifax, NS B3K 5M1

**Subject: Water Demand Analysis Summary - Final**

Dear Mr. de Montbrun,

Raftelis is pleased to provide this summary to Halifax Water which outlines our methods, findings, and recommendations associated with the recently completed water demand analysis and development of a water demand model.

The major elements of our analysis included the following:

- Review of available water demand data;
- 10-year trend analysis of water consumption by customer class;
- Daily peaking analysis by customer class;
- Hourly peaking analysis by customer class;
- Stormwater units summary.

Based on the results of these data analyses, the report provides recommendations with regard to potential cost of service and volumetric rate structure options to be considered during Halifax Water's upcoming cost of service study and rate filing with the Nova Scotia Utility and Review Board.

We would like to take this opportunity to thank you and all other Halifax Water staff, especially Allan Campbell and Shiju Mathew, for the support provided during the course of this study. We appreciate the ability to provide consulting services to you and look forward to continuing our working relationship together.

Sincerely,



Dave Fox  
Senior Manager

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# 1. Introduction

## 1.1. Overview of the Analysis

Halifax Water is a municipal water, wastewater, and stormwater utility serving the residents of Halifax, Nova Scotia, and is regulated by the Nova Scotia Utility and Review Board. Halifax Water operates three main water supply plants and six smaller community supply plants.

Halifax Water engaged Raftelis to develop a water demand analysis model and also complete a water demand analysis in order to inform direction for potential cost of service and volumetric rate structure options to be considered during Halifax Water's upcoming cost of service study and rate filing with the Nova Scotia Utility and Review Board. The water demand analysis could have two potential implications on how Halifax Water structures its rate filing application. First and foremost, the demand analysis will allow Halifax Water to justifiably forecast rate-year consumption, which will be used as the basis for determining adjustments to rate-year revenue, and subsequently the rate increases required to alleviate a revenue deficiency. Secondly, Halifax Water may choose to calculate and file for class-based volumetric rates. This will be discussed in greater detail in Section 3 of this report. In order to justify the differentiation of rates by customer class, a demand peaking analysis is required to indicate the differentiation in excess demand placed on Halifax Water's system by the various classes of customers. Those customer classes which place a greater demand through peaking will be allocated a greater portion of peaking, or extra-capacity, related costs, and as such will be assessed comparatively higher volumetric rates. Although a cost of service analysis is required to finalize this process, the demand analysis performed and outlined in this report is a key component to calculating and justifying class-based rates.

In order to accomplish the aforementioned goals, Raftelis completed the following major data related tasks:

- Review of available water demand data;
- Completion of a 10-year trend analysis of water consumption by customer class;
- Assessment of daily peaking analysis by customer class;
- Assessment of hourly peaking analysis by customer class.
- Review of stormwater and wastewater customer data

Ultimately, the results of these analyses suggest that sufficient differentiation exists between customer demand characteristics, specifically with regard to peak demands. As such, Halifax Water may want to analyze the cost of service and rate implications of differentiating its volumetric rate between customer classes or groups.

## 1.2. Data Provided

In order to successfully complete a comprehensive water demand analysis, Halifax Water provided the following data to Raftelis:

- Historical monthly and quarterly water consumption by premise, customer class, and meter size, for the last 11 fiscal years. Halifax Water's fiscal year is from April to March, and as such Raftelis was provided data from April 2010 through March 2021, or fiscal year (FY) 2011 through FY 2021;
- Hourly water consumption from July 2020 through June 2021 by class;

As described in Section 1.2, Halifax Water's demand data can be summarized by various groupings of customers. Our analysis focused on the groupings of customer class, and meter size. Table 1 below presents the number of customers by meter size and customer class, respectively in FY 2021.

**Table 1: Customers by Meter Size and Customer Class**

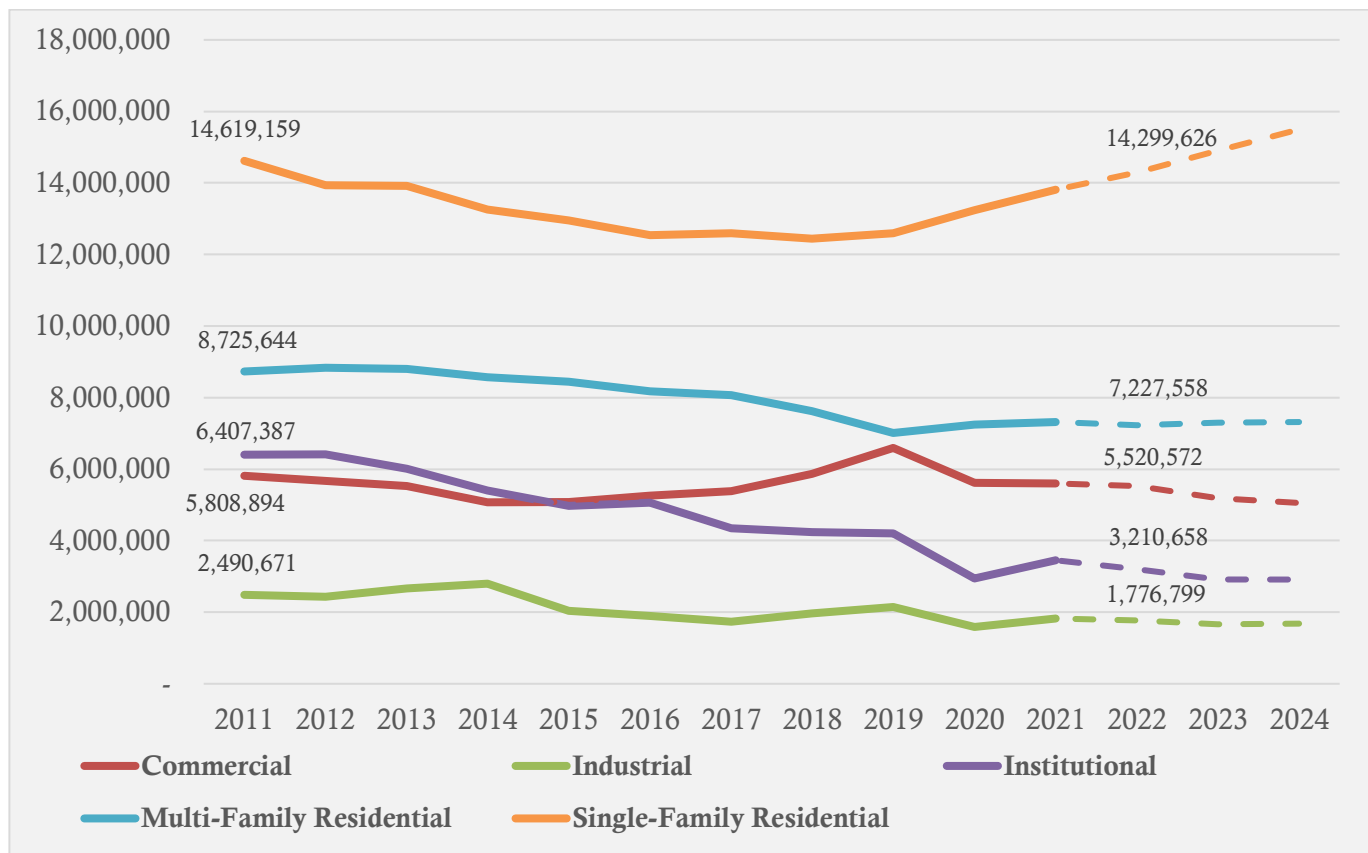
Meter Size	Residential	Multi-Unit	Commercial	Institutional	Industrial	Total
5/8"	78,249	2,345	722	111	3	81,430
3/4"	290	317	385	40	1	1,033
1"	269	599	629	75	2	1,574
1.5"	51	265	757	70	3	1,146
2"	30	257	470	69	1	827
3"	0	160	81	65	12	318
4"	0	28	32	13	4	77
6"	0	5	4	18	11	38
8"	0	1	4	14	7	26
10"	0	0	1	0	0	1
Total	78,889	3,977	3,085	475	44	86,470



## 2. Demand Analysis

One key element of completing a revenue sufficiency and cost of service analysis for Halifax Water, to be included in its filing with the Nova Scotia Utility and Review Board, is the forecast of customer demand. As such, an analysis of 10 years of water consumption by customer class was completed in order to understand consumption trends and patterns. Annual consumption by customer class, and as a total system, was summarized for fiscal year (FY) 2011 through FY 2021. Annual consumption by customer class was then projected through FY 2024. Figure 1 presents the annual consumption, in cubic meters, by customer class.

**Figure 1: Annual Consumption by Customer Class (cubic meters)**



As can be seen in Figure 1, water consumption has generally trended downward since FY 2011. The overall historical downward trend in consumption is consistent with recent trends throughout the water industry as per capita water consumption continues to decline due to high-efficiency fixtures, conservation initiatives, and household demographic trends<sup>1</sup>. Unsurprisingly, the past 2 recent years have produced deviations from those trends due to the COVID-19 pandemic. Although consumption continued to decrease for the commercial, industrial, and institutional classes, the single-family residential class has notably seen an upward trend in

<sup>1</sup> Public Supply and Domestic Water Use in the United States, 2015. United States Geological Survey.

consumption since 2019, due to the ensuing pandemic lockdowns. These responses in consumption are similar to those observed elsewhere in the water utility industry.

Our prospective statistical analyses do not factor in any adjustments for COVID-19 related anomalies. Given the apparent fluctuations in consumption from year to year, it will be imperative to forecast consumption as accurately as possible during Halifax Water's cost of service and revenue sufficiency analysis in order to ensure appropriate and accurate rate and revenue projections. If these projections are to be used for future rate setting, it is recommended that the years 2020 and 2021 are removed from the analysis, or a COVID-19 related consumption factor is applied to the historical data.

Utilizing the past 11 fiscal years of consumption data, water consumption amounts can be predicted into the future to support completion of a cost of service and revenue sufficiency analyses. As a mechanism for determining an appropriate way to forecast future consumption, four statistical analyses have been completed to understand their historical predictive fit to actuals. The four statistical analyses are as follows:

- A simple average of the prior 5-years (as available) of consumption (Avg5);
- An exponential forecast based on a 3-year natural log (Ln3);
- An exponential forecast based on a 6-year natural log (Ln6);
- A linear forecast based on prior 5-years consumption (Linear).

To further explain the statistical analyses, the simple average model analyzed the average of the prior five years' consumption values as its predictive consumption amount. The exponential forecasts based on either a 3-year or 6-year natural log both represent reasonable approximations for percentage change over time. Generally, small changes in the natural log from one analyzed period to another can be interpreted, with accurate approximation, as percentage changes, representing a prediction of the percentage change of customer demand. Contrary to utilizing the natural log exponential forecasting which takes into consideration annual fluctuations, the 5-year linear forecast is a more simplistic prediction model based on a simple time series.

For each of the four statistical analyses, predicted water consumption values over the 11-year period from 2011 to 2021 were compared to the actual consumption values for each year, as applicable. That is, the statistical models were utilized to calculate what the prediction of consumption would have been for a given year. The prediction was then compared against actual consumption for that year. In the table below, a green upward arrow reflects overprediction of greater than 2.0%, a downward red arrow reflects underprediction of greater than 2.0%, and a yellow bar reflects over or under consumption of less than 2.0%. An average over the number of comparative years available was then calculated for each statistical model. For example, the exponential forecast based on a 3-year natural log predicted an absolute average deviation from actual total consumption of 0.3%.

Table 2 presents the annual fit analysis by statistical model, customer class, and for total system consumption.

**Table 2: Historical Fit Analyses of Statistical Consumption Forecasting**

	Residential				Multi-Unit Residential				Commercial			
	Avg5	LN3	LN6	Linear	Avg5	LN3	LN6	Linear	Avg5	LN3	LN6	Linear
2010												
2011	▲ -0.6%				▲ 1.0%				▲ 3.7%			
2012	▲ 4.6%			▲ 5.6%	▲ -0.7%			▼ -2.2%	▲ 4.2%			▲ -1.5%
2013	▲ 3.2%			▲ -1.1%	▲ -0.2%			▲ 0.0%	▲ 5.7%			▲ -0.5%
2014	▲ 7.4%	▲ 3.4%		▲ 2.7%	▲ 2.6%	▲ 2.8%		▲ 2.9%	▲ 13.5%	▲ 5.6%		▲ 5.4%
2015	▲ 8.4%	▲ -1.0%		▲ 0.9%	▲ 3.5%	▲ 0.8%		▲ 2.1%	▲ 10.7%	▼ -4.6%		▼ -2.2%
2016	▲ 9.6%	▲ 0.9%		▲ 0.1%	▲ 6.2%	▲ 1.9%		▲ 3.2%	▲ 3.2%	▼ -7.1%		▼ -8.5%
2017	▲ 5.7%	▼ -4.0%	▼ -3.0%	▼ -3.2%	▲ 6.1%	▲ -1.4%	▲ -0.1%	▲ -0.2%	▲ -1.0%	▼ -3.8%	▼ -4.4%	▼ -8.2%
2018	▲ 4.9%	▲ -0.5%	▲ -1.2%	▼ -3.2%	▲ 10.5%	▲ 4.0%	▲ 4.7%	▲ 3.2%	▼ -10.4%	▼ -6.7%	▼ -9.6%	▼ -10.9%
2019	▲ 1.4%	▼ -2.5%	▼ -3.0%	▼ -3.4%	▲ 16.6%	▲ 4.8%	▲ 5.9%	▲ 6.8%	▼ -19.1%	▼ -6.5%	▼ -10.4%	▼ -10.4%
2020	▼ -4.6%	▼ -4.8%	▼ -6.5%	▼ -6.5%	▲ 8.4%	▼ -8.3%	▼ -7.0%	▼ -5.8%	▲ 0.2%	▲ 26.0%	▲ 20.7%	▲ 19.7%
2021	▼ -8.2%	▼ -2.6%	▼ -4.2%	▼ -5.2%	▲ 4.1%	▼ -4.5%	▼ -3.7%	▼ -7.7%	▲ 2.5%	▲ 1.8%	▲ 2.0%	▲ 12.9%
Average	2.9%	-1.4%	-3.6%	-1.3%	5.3%	0.0%	0.0%	0.2%	1.2%	0.6%	-0.3%	-0.4%
Absolute	2.9%	1.4%	3.6%	1.3%	5.3%	0.0%	0.0%	0.2%	1.2%	0.6%	0.3%	0.4%

	Institutional				Industrial				Total			
	Avg5	LN3	LN6	Linear	Avg5	LN3	LN6	Linear	Avg5	LN3	LN6	Linear
2010												
2011	▲ -0.6%				▲ 37.9%				▲ 2.9%			
2012	▲ -0.4%			▲ 0.5%	▲ 21.5%			▼ -36.6%	▲ 3.5%			▲ -1.0%
2013	▲ 6.4%			▲ 7.2%	▲ 4.9%			▼ -32.6%	▲ 3.4%			▲ -1.7%
2014	▲ 16.6%	▲ 9.1%		▲ 11.7%	▲ -1.6%	▼ -13.2%		▼ -22.9%	▲ 7.8%	▲ 3.1%		▲ 2.5%
2015	▲ 23.3%	▲ 2.7%		▲ 9.2%	▲ 35.4%	▲ 42.4%		▲ 19.1%	▲ 11.4%	▲ 2.1%		▲ 3.1%
2016	▲ 15.4%	▼ -10.3%		▼ -7.7%	▲ 31.0%	▲ 1.2%		▲ 22.5%	▲ 9.9%	▲ -1.8%		▲ -0.4%
2017	▲ 28.1%	▲ 9.7%	▲ 11.9%	▲ 2.2%	▲ 36.1%	▼ -3.2%	▲ -1.7%	▲ 6.8%	▲ 9.3%	▲ -1.4%	▲ -0.4%	▼ -2.0%
2018	▲ 21.7%	▼ -4.8%	▼ -4.0%	▼ -4.2%	▲ 13.2%	▼ -25.6%	▼ -16.8%	▼ -28.5%	▲ 6.2%	▼ -2.6%	▼ -2.7%	▼ -4.8%
2019	▲ 14.2%	▼ -4.5%	▼ -6.2%	▼ -6.8%	▼ -2.9%	▼ -9.8%	▼ -11.9%	▼ -30.4%	▲ 1.9%	▼ -2.5%	▼ -3.6%	▼ -4.9%
2020	▲ 55.0%	▲ 34.1%	▲ 34.4%	▲ 31.2%	▲ 23.3%	▲ 41.2%	▲ 30.7%	▲ 28.8%	▲ 6.5%	▲ 6.2%	▲ 4.2%	▲ 3.9%
2021	▲ 20.7%	▼ -25.7%	▼ -23.2%	▼ -17.4%	▲ 2.5%	▼ -15.5%	▼ -21.1%	▲ -0.8%	▲ 0.2%	▼ -5.5%	▼ -6.0%	▼ -3.7%
Average	18.2%	1.3%	2.6%	2.6%	18.3%	2.2%	-4.2%	-7.5%	5.7%	-0.3%	-1.7%	-0.9%
Absolute	18.2%	1.3%	2.6%	2.6%	18.3%	2.2%	4.2%	7.5%	5.7%	0.3%	1.7%	0.9%

Avg5 5-Year average  
 LN3 Exponential forecast, based on 3-year natural log  
 LN6 Exponential forecast, based on 6-year natural log  
 Linear Linear forecast

In general, the exponential forecast (based on a 3-year natural log) produced the best fit for most customer classes, and for overall system consumption. There is no one industry best practice for predicting water consumption, other than to utilize an approach that is most relevant and best-fitting for a given utility. Given the relatively close fit associated with utilizing the 3-year natural log exponential forecast, it is recommended that Halifax Water utilize this approach for forecasting water consumption for Halifax Water's upcoming cost of service study and rate filing. This statistical method, in total, slightly underpredicted consumption on average, resulting in conservative yet justifiable predictions of consumption. Thus, it is also recommended that this methodology be used for customer class consumption prediction. Of course, special considerations should always supplement statistical analyses, such as the knowledge of customers or consumption being added or removed from Halifax Water's system, or anomalous adjustments for the COVID-19 pandemic.

In order to prepare for Halifax Water's upcoming rate application, forecasts for FY 2022, FY 2023, and FY 2024 are required to calculate rate year revenues, revenue deficiency calculations, and ultimately new proposed rates. Table 3 presents FY 2021 customer demand by customer class and in total, as well as FY 2022, FY 2023, and FY 2024 demand based on our prediction utilizing an exponential forecast based on a 3-year natural log. As can be seen in Table 3, our best-fit prediction methodology forecasts an increase in demand (5.85%) from FY 2021 to FY 2022, and a minor reduction in FY 2023. Since our prediction utilizing a statistical analysis for FY 2023 would be based, to some degree, on an estimate of FY 2022 demand rather than actuals, it is recommended that Halifax Water exercise caution when calculating new rates. It is strongly suggested that FY 2020 and FY 2021 either be ignored or adjusted for predicting future customer demand. However, it should be understood that Raftelis did not adjust data or take the pandemic into account for these statistical analyses.

**Table 3: Consumption Forecast by Customer Class Utilizing Ln3**

Fiscal Year	Forecast Type	Residential	Multi-Unit	Commercial	Institutional	Industrial	Total	% Change
2021	Actual	13,456,689	6,993,724	5,708,686	2,561,202	1,540,772	30,261,073	
2022	Ln3	14,299,626	7,227,558	5,520,572	3,210,658	1,776,799	32,035,213	5.85%
2023	Ln3	14,906,693	7,300,640	5,193,738	2,921,543	1,663,212	31,985,825	-0.15%
2024	Ln3	15,496,225	7,316,423	5,055,698	2,750,496	1,688,571	32,470,870	1.52%

Actual = Actual customer demand; Ln3 = 3-year natural log exponential forecast

### 3. Peaking Analyses

Halifax Water currently assesses its volumetric water rates on a uniform basis and does not distinguish based on customer class or any other grouping. It is common in the water industry to assess different volumetric rates for different customer classes where the usage of the capacity of the system varies by customer class. Although the magnitude of the differences between the volumetric rates by class is sometimes policy driven, and used to achieve certain pricing objectives, the appropriate methodology utilized to justify a differentiation in volumetric rates by customer class is largely based on customer class peaking characteristics. Peaking characteristics refer to the variation in water consumption over specific periods of time, typically monthly, daily, and hourly. A greater variation in consumption over those periods of time results in higher peaking factors. Water utility assets are typically constructed with oversized capacity to not only be able to provide an average level of water demand, but also the demand over peak periods which is referred to as extra-capacity. There are costs associated with providing water systems with extra-capacity, and it is reasonable to recover proportionately more cost from the customer classes or groups which contribute more to the need for extra-capacity, by exhibiting higher peaking factors. By attributing a varying level of extra-capacity costs between customer classes, different volumetric rates are calculated. In other words, those customers with higher relative peaking will be assessed higher relative volumetric rates.

In order to determine if it would be appropriate for Halifax Water to study differentiated rates between customer classes as part of its upcoming cost of service study, historical peaking characteristics by day and hour for each of its customer classes were studied. For the daily peaking factor analysis, the ratio of the highest daily consumption to the average daily consumption for each customer class was calculated from July 1, 2020 through June 30, 2021.

Table 4 below presents the maximum day to average day ratio by customer class. For example, on June 21, 2021 the industrial consumption peaked at a yearly high of 7,206 cubic meters of water. The average daily consumption over the entire year period was 4,353 cubic meters. By dividing the average consumption into the maximum daily consumption, a daily peaking factor of 1.66 was calculated.

**Table 4: Maximum Day to Average Day Ratio by Customer Class**

Fiscal Year	Residential	Multi-Unit	Commercial	Institutional	Industrial	System-wide
2021	1.43	1.12	1.29	1.66	1.66	1.24

The peaking factors calculated in Table 4 suggest that there is enough differentiation between the daily peaking characteristics by customer class that class-based volumetric water rates could be supported, although would not necessarily be required. At the very least, these data warranted an analysis of hourly peaking characteristics by customer class.

Similar to the analysis performed for daily peaking, the maximum hour consumption by customer class was analyzed and compared to the average hourly consumption by customer class over a specific time period. As analyses of hourly demands are incredibly data intensive, only the most recent twelve consecutive months of water consumption was used in the analysis. Table 5 below presents the maximum hour peaking factors by customer class from July 2020 through June 2021.

**Table 5: Maximum Hour to Average Hour Ratio by Customer Class**

Fiscal Year	Residential	Multi-Unit	Commercial	Institutional	Industrial	System-wide
<b>2021</b>	2.81	2.09	2.26	2.86	3.26	1.88

Similar to the daily peaking data presented in Table 4, the hourly peaking data also supports enough differentiation in hourly peaking characteristics among Halifax Water’s customer classes. Given the variances between classes, particularly the comparatively high peaks in the Residential, Institutional, and Industrial classes, a cost of service analysis by customer class may be warranted in order to study the appropriateness of assessing volumetric rates by customer class. In order to do so, revenue requirements would need to be functionalized and allocated to determine those costs which can be attributed to extra-capacity, or max-day and peak-hour.

It should be noted that due to the fluctuations in water consumption associated with the COVID-19 pandemic, changing future water rates based on pandemic-affected consumption behaviors may lead to rates that do not reflect typical historical usage characteristics and thus result in anomalous and inequitable rates. Given this, it would be prudent of Halifax Water to delay implementation of class-based rates until a more recent and normalized dataset can be analyzed and relied upon for rate-setting purposes.

# 4. Stormwater Analyses

## 4.1. Overview of the Stormwater Analysis

In addition to water demand, Halifax Water was also interested in understanding the impacts of changes in its stormwater fee assumptions and associated customer impacts. As such, Raftelis analyzed Halifax Water's impervious area data and provided, as part of the aforementioned demand model, a mechanism for adjusting the stormwater fee structure assumptions and providing the resulting distribution of impervious area and customers.

## 4.2. Stormwater Data Provided

In order to successfully complete the stormwater analysis, Halifax Water provided the following data to Raftelis:

- List of active stormwater customers by account, rate category, and impervious area, for 2020 and 2021.
- Residential and non-residential property owner stormwater rates.

Our analysis focused on the grouping of rate category, and impervious area. Raftelis summarized the data by calculating the number of accounts per rate category (tiers) based on impervious area, by year. For future revenue sufficiency analyses, Raftelis provided a model for Halifax Water which allows Halifax to readjust the tiers based on impervious area. The following figures represent Halifax Water's existing distribution of accounts and impervious area, by tier, respectively.

**Figure 2: Number of Active Stormwater Accounts in 2021**

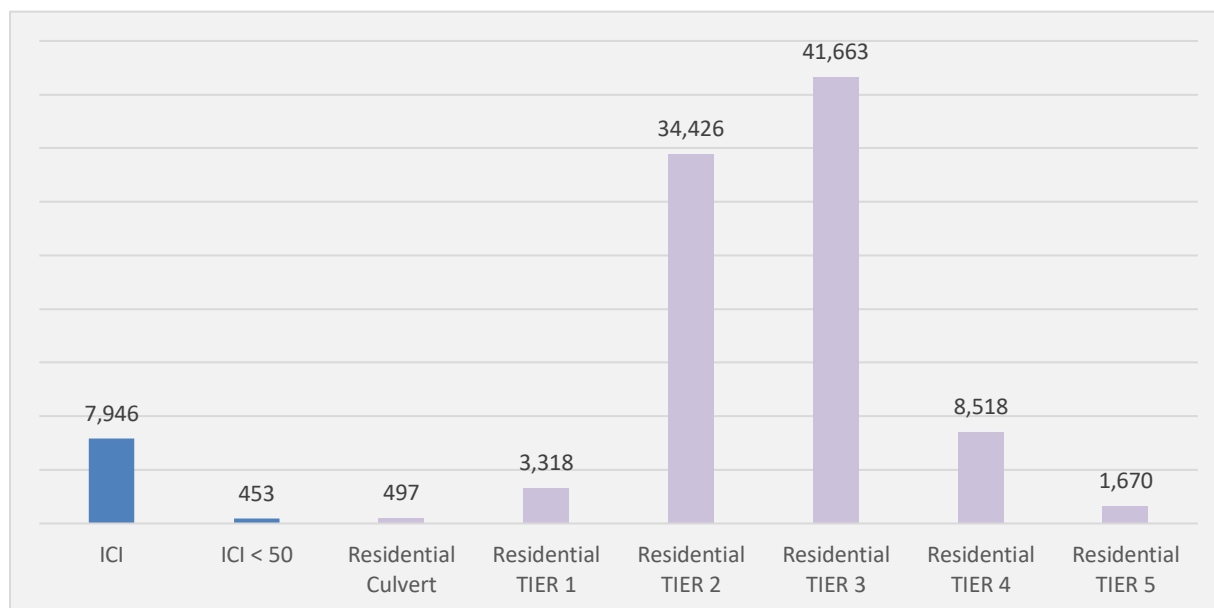
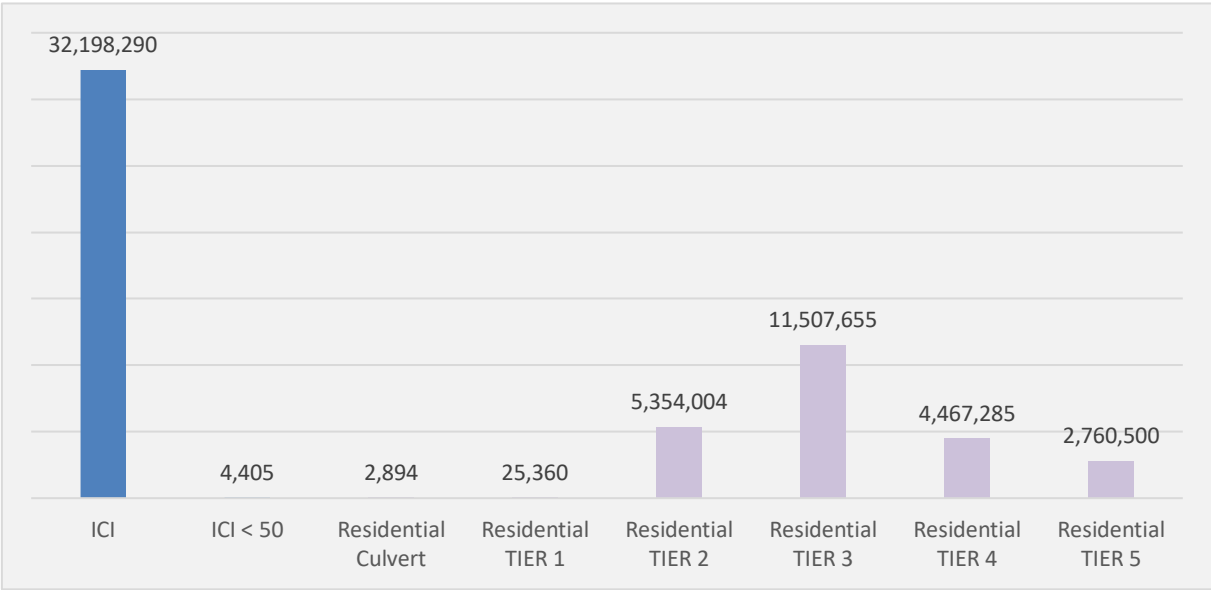


Figure 3: Total Impervious Area by Customer Class in 2021





## 5. Wastewater Analysis

Raftelis performed a review of Halifax Water's wastewater flow and high-strength loadings data to determine whether it was sufficient to provide a basis for wastewater rates differentiated by customer class or modified high-strength surcharges. The data provided to Raftelis did not allow for identification of which customer classes contributed wastewater flow or loadings of key parameters such as Total Suspended Solids or Biological Oxygen Demand. The data only allowed for identification of which wastewater treatment plant had more or less flow and loadings on certain dates. Because not all users of any particular wastewater treatment plant contribute equally to the flow and loadings received by that plant, it is difficult to assign costs to one class of customers with this data. Should Halifax Water begin collecting data sufficient to track wastewater flows and loadings to individual customers or to customer classes, a more accurate cost-of-service analysis can be completed that would lead to differentiated wastewater rates and high-strength surcharges based on the cost responsibility of each customer type on the wastewater system.

## 6. Conclusions and Recommendations

Based on the review of Halifax's Water consumption data as presented in this report, Raftelis has arrived at the following conclusions and recommendations:

1. Halifax Water should utilize an exponential forecast based on a 3-year natural log in order to forecast customer demand for FY 2022, FY 2023, and FY 2024. However, given that the 2020 and 2021 consumption data are likely skewed due to COVID-19, special considerations should be taken into account if Halifax Water chooses to use these projections for its upcoming cost of service study and rate filing with the Nova Scotia Utility and Review Board. It is recommended that the years 2020 and 2021 are either adjusted or removed from the analysis, or that a COVID-19 related consumption factor is applied to the historical data to normalize the statistical forecasting.
2. A detailed cost of service analysis should be completed to understand the magnitude of extra-capacity related revenue requirements. By first functionalizing and then allocating revenue requirements to extra-capacity components, extra-capacity related revenue requirements can then be proportionately distributed to customer class based on their relative peaking characteristics. Taking this into consideration will allow Halifax Water to understand the magnitude of costs which could be distributed by customer class, which in addition to differentiation in peaking factors by customer class is a point of discussion to help in deciding whether there is enough justification to implement class-based rates. However, it would be prudent of Halifax Water to delay this analysis until consumption behaviors stabilize to mitigate the fluctuations occurring during the COVID-19 pandemic. This would help avoid implementing rates and a rate structure which do not accurately reflect normalized consumption characteristics and the corresponding relative demand placed on Halifax Water's system.
3. Although not required, Halifax Water's customer classes exhibit enough differentiation in peaking characteristics, both daily and hourly, to support class-based volumetric water rates. It should be noted though, that given Halifax Water's advanced metering infrastructure (AMI) is relatively young, and data anomalies are still being resolved, it may be prudent of Halifax Water to delay the implementation of class-based rates until its next rate application. This would give Halifax Water and its consultants plenty of time to ensure all data, assumptions, and corresponding analyses are vetted as fully as possible prior to the implementation of a completely new rate structure. This coupled with the recommended delay due to COVID abnormalities leads Raftelis to believe that Halifax Water should not make a rate structural change at this time, but revisit once reliable and accurate data are available.

# 2022-23 Annual Business Plan



Working together with mutual trust, respect and shared values that focus on our commitment to customers, community, and the environment.



**People**



**Health, Safety  
& Environment**



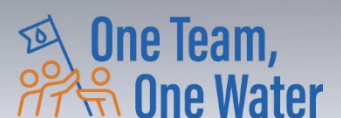
**Financial &  
Regulatory Accountability**



**Operational  
Excellence**

Approved by the Halifax Water Board  
January 27, 2022

Presented to Halifax Regional Council  
February 15, 2022



## GLOSSARY

AM	Asset Management	SMS	Safety Management System
AMI	Advanced Meter Infrastructure	SSES	Sanitary Sewer Evaluation Survey
AMP	Asset Management Plan	SSO	Sanitary Sewer Overflow
BCP	Business Continuity Plan	UV	Ultraviolet
BPF	Biosolids Processing Facility	WRWIP	West Region Wastewater Infrastructure Plan
CAD	Computer Aided Drafting	WSEP	Water Supply Enhancement Program
CAP	Climate Action Plan	WSER	Wastewater System Effluent Regulations
CBS	Corporate Balanced Scorecard	WSP	Water Supply Plant
CCC	Capital Cost Contribution	WWMP	Wet Weather Management Program
CCME	Canadian Council Minister of the Environment	WWTF	Wastewater Treatment Facility
CPI	Consumer Price Index		
CSF	Critical Success Factor		
CSO	Combines Sewer Overflow		
DEI	Diversity, Equity, and Inclusion		
DES	District Energy System		
DFO	Department of Fisheries and Oceans		
DLS&I	Department of Labour, Skills & Immigration		
DOE	Department of Energy		
EMAP	Energy Management Action Plan		
EMP	Emergency Management Plan		
EMS	Environmental Management System		
ERM	Enterprise Risk Management		
ERP	Enterprise Resource Planning		
ETS	Engineering and Technology Services		
GHG	Green House Gas		
GIS	Geographic Information System		
H2O	Help to Others (Program)		
HHSP	Halifax Harbour Solutions Plant		
HRWC	Halifax Regional Water Commission		
I&I	Inflow and Infiltration		
IC&I	Industrial, Commercial & Institutional		
ICIP	Investing in Canada Infrastructure Program		
IFRS	International Financial Reporting Standards		
IMP	Integrated Master Plan		
INFC	Infrastructure Canada Fund Programs		
IRP	Integrated Resource Plan		
IS	Information Services		
IT	Information Technology		
LED	Light-emitting Diode		
LOS	Level of Service		
NOM	Natural Organic Matter		
NSECC	Nova Scotia Environment and Climate Change		
NSERC	Natural Sciences and Engineering Research Council		
NSPI	Nova Scotia Power Incorporated		
NSPW	Nova Scotia Public Works		
NSUARB	Nova Scotia Utility and Review Board		
OI	Organizational Indicator		
RDA	Regional Development Area		
RDC	Regional Development Charge		
RDII	Rain Derived Inflow and Infiltration		
RDP	Regional Development Plan		
RF	Radio Frequency		
RFP	Request for Proposal		
RFQ	Request for Qualifications		
SCADA	Supervisory Control and Data Acquisition		

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## INTRODUCTION

Halifax Water is an integrated water, wastewater and stormwater utility that serves more than 106,000 customers and an estimated population of 383,000.

This document outlines the utility's business plan for fiscal 2022/23, which officially begins on April 1 of 2022.

For 2022/23, Halifax Water has developed a plan that addresses the challenges of growth, aging infrastructure, and the increasing demands of customers. In addition to addressing these challenges, this plan focuses on ensuring Halifax Water customers continue to receive quality service and that the utility's employees are supported and empowered with the resources needed to achieve this.

## MISSION

To provide world-class services for our customers and our environment.

## VISION

We will provide our customers with high quality water, wastewater, and stormwater services. Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment. We will fully engage employees through teamwork, innovation, and professional development.

## VALUES

*Relationships* - We nurture relationships with our customers, our team members, and the environment. We are engaged in the neighbourhoods we serve, and we support continual learning across our team.

*Innovation* - We are among the top utilities across the continent and we are known on the global stage. We always ask, "how can we improve efficiency, sustainability, creativity and the customer experience?"

*Accountability* - We refuse to cut corners. We check in with our excellence standards regularly and look to one another for support. Safety steers our decision-making. We are driven to make our policies, decisions, and projects as clear as our drinking water.

*Protection* - Halifax Water protects the health and well-being of our population. We exist to guard natural resources, finding ways to sustain our communities and environment.

## EXECUTIVE SUMMARY

For 2022/23, Halifax Water will focus on our overall sustainability to improve our financial position and organizational capacity to ensure that we can meet the service demands of our current and future customers. The key drivers include the challenges caused by growth, aging infrastructure, as well as the costs of environmental compliance and protection.

For this fiscal year, Halifax Water will also increase its focus on environmental sustainability. This includes the implementation of a corporate-wide Environmental Management System (EMS), the completion of a Climate Action Plan (CAP) and continuing to ensure that major initiatives anticipate future environmental requirements and changing environmental conditions. For 2022/23, these major initiatives will include the Water Supply Enhancement Program, Water Safety Plan, Wastewater Treatment Facility Study, and Biosolids project.

Many of these are multi-year initiatives, but 2022/23 will be an important year of finalizing plans, studies and programs that will impact the utility and better serve customers for years to come.

We will be increasing the sustainability and capacity of our workforce by adding several new positions in areas that support capital project delivery, climate change, and stormwater service delivery. In addition to increasing our staffing complement, we will continue to focus on the physical and psychological health of Halifax Water employees as we continue to adjust to changing risks and public health requirements related to COVID-19.

For Halifax Water, the vast majority of our activities require cooperation and collaboration from multiple business units and workgroups. This is why this year we are approaching the business plan in a more collaborative way that is more reflective of who we are and what we are trying to achieve. Instead of focusing on departments or departmental and individual goals, we are now concentrating on corporate goals that clarify what we need to work on together - as a team.

These goals are now included in our strategic initiatives and programs under four pillars:

- People
- Health, safety, and environment
- Financial and regulatory accountability
- Operational excellence

We have set ambitious goals that are designed to bring immediate and long-term value to our customers. By working as one team, with a unified approach, we are looking forward to a successful year.

Cathie O'Toole

General Manager and CEO

## STRATEGIC INITIATIVES AND PROGRAMS

### People

We attract and retain high-quality team members in an inclusive and respectful work environment. We are committed to our customers and the communities where we live and work, determined to provide a high level of service and sustainable future through ongoing engagement.



Enhance workforce planning (talent management, meeting staff resource requirements, training, etc.)

Goal(s)	<ul style="list-style-type: none"> <li>• Increase capacity by filling new positions budgeted in 2022/23.</li> <li>• Ensure people moving into new roles are properly oriented and set for success by revising the onboarding process by the end of Q2.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>• Halifax Water currently does not have the staffing capacity to deliver the annual capital program and planned new initiatives. Some areas of the organization are struggling to meet required service levels or experiencing poor work-life balance. To ensure new employees, and existing employees moving into new roles are successful, we need to properly orient them, provide reference materials and virtual tools, to support their professional growth in their position.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>• Increasing staffing capacity will help mitigate several organizational risks such as critical infrastructure failure, environmental and regulatory risks. A risk that may prevent achievement of this goal is the competitiveness of the labour market for some technical/specialized positions and the capacity of Human Resources to hire and onboard newly established positions while keeping up with regular workforce turnover caused by internal movements, terminations and retirements.</li> </ul>





Build a positive and diverse workplace

Goal(s)	<ul style="list-style-type: none"> <li>Halifax Water will complete initiatives outlined in the Diversity, Equity, and Inclusion (DEI) framework for 2022/23 and establish performance measures for DEI reporting by the end of Q2.</li> <li>All employees at Halifax Water will continue to receive unconscious bias training. This was initiated in 2021/22 but delayed due to COVID-19 public health restrictions.</li> <li>The 2021 Employee Survey results will be discussed with employees and an action plan developed to address areas for improvement by the end of Q1.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Halifax Water is committed to a workforce reflective of the customers we serve. Creating a diverse workforce that values equity and inclusion also helps create an organizational culture where respect and civility are valued; and psychological health and safety is promoted. High-performing organizations typically exhibit high employee satisfaction and engagement.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>Strong employee engagement and satisfaction will mitigate risk across the business by building a committed workforce and reducing complacency and presenteeism.</li> </ul>



Increase stakeholder and customer engagement

Goal(s)	<ul style="list-style-type: none"> <li>Develop a comprehensive stakeholder engagement plan that is mapped to key priorities for 2022/23 by April 30.</li> <li>Formalize and schedule ongoing stakeholder engagement opportunities by the end of Q1.</li> <li>Benchmark status of advancing relationships at the end of each quarter in 2022/23.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>As we continue to meet the needs of our customers and our community, it is essential that we engage with our various stakeholders. It helps establish a more collaborative framework of engagement that leads to positive and productive dialogue. Staying attuned to stakeholder/customer preferences and responding to them cultivates loyalty and fosters greater trust that in turn helps Halifax Water maintain the freedom to operate and enable continued innovation.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>As a community-owned utility, we operate based on financial, regulatory, and implicit social licenses that are provided based on the services we provide. To protect</li> </ul>

		these licenses and mitigate the associated risks attached to each, it is essential that we proactively engage stakeholders. Apart from the continuing pandemic as a risk, communication is key to the success of these goals.
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Support effective governance by the Halifax Water Board

Goal(s)	<ul style="list-style-type: none"> <li>Ensure orientation of new members or members changing roles on Board subcommittees and help these subcommittees develop workplans for 2022/23 by end of Q1.</li> <li>Review and refresh the Halifax Water mission, vision, and values in Q2 and Q3 through a collaborative process involving employees and the Board.</li> <li>Arrange spring (Q1) and fall (Q3) visits of Board members to a selection of Halifax Water facilities.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>It is important that the Halifax Water Board provide effective governance oversight and strategic direction on mission, vision, values, and levels of service.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>Effective governance by the Halifax Water Board helps mitigate governance risk, and risks in all other areas. The Halifax Water Board has a key role in Enterprise Risk Management (ERM) through establishing corporate risk frameworks and risk tolerance levels.</li> </ul>



Ensure that major initiatives have communication and stakeholder engagement plans

Goal(s)	<ul style="list-style-type: none"> <li>Develop communications and engagement workplans for each major initiative, project and/or issue at least 60 days prior to execution. Based on our overarching communications framework, these workplans will address capital projects, annual service programs, stakeholder work, and other internal and external initiatives as planned for 2022/23.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>By proactively developing strategic plans that allow us time to prepare and communicate early, it allows us to understand and adapt as required to ensure our audience is fully informed and understands the work the utility is undertaking to help serve the community and customers better.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>Proactively engaging and communicating helps the utility mitigate the risk of slowdowns and or stoppage due to</li> </ul>

		concerns from one or more groups. Without preplanning, the ability to identify and mitigate stakeholder/community risks is eroded.
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Enhance information available to customers through Customer Connect and bill redesign

Goal(s)	<ul style="list-style-type: none"> <li>• Hold customer focus groups to provide insight into the redesign of the customer bill by the end of Q1.</li> <li>• Develop a strategy to increase utilization of Customer Connect portal and its adoption rate by the end of Q2.</li> <li>• Develop a customer survey that will gather metrics on a quarterly basis by the end of Q4.</li> <li>• Based on customer feedback from focus groups and bill redesign, develop a strategy to enhance the Halifax Water website to create a more customer-friendly experience by the end of Q4.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>• Halifax Water must continually balance the demands of customers with providing value through the products and services it provides. The most effective way to understand the customer is to engage and seek input on a regular basis. By using customer data and feedback, Halifax Water can adapt to address the changing needs of customers in a more cost-effective way.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>• These goals allow the organization to stay connected with customers. By working towards longer-term communication and engagement strategies for customers, we reduce the risk of customers losing trust in Halifax Water.</li> </ul>



**STRAIGHT from  
the SOURCE**



## Health, Safety & Environment

We are focused on a safety-first culture, working to provide healthy, safe, sustainable, and reliable services for our community.



Continue to enhance safety and security culture, starting with Safety Leadership training

Goal(s)	<ul style="list-style-type: none"> <li>Introduce and commence Health and Safety Leadership Training 101 in Q2.</li> <li>Begin the transition of the current Occupational Health Safety Program Manual into a formalized Safety Management System (SMS) in Q2, as updates to the Occupational Health and Safety Program Manual are completed.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Halifax Water is on a journey to become an industry leader in optimizing the health and safety of its employees. This includes the belief that health and safety is more than just a priority. It is a way of life, both at work and at home every day.</li> <li>A positive work culture contributes to employee health and safety, job satisfaction and engagement, while enabling employees to contribute most effectively in their role of delivering high-quality service to our customers.</li> <li>As we progress on this journey, we will focus on continuous improvement. This Safety Leadership training is a solid step in updating the Health and Safety Program. It will provide the foundation for future enhancements throughout Halifax Water by supplementing the culture of "Safely Working Together"</li> </ul>
Impact	<ul style="list-style-type: none"> <li>The formalization of an SMS will help keep safety at the forefront of Halifax Water employees as they work to minimize complacency, which is often a contributing factor to workplace incidents. The appropriate resourcing and ensuring the availability of all employees will reduce the risk of to successfully implementing the SMS.</li> </ul>



Secure approval for new biosolids strategy and execute a

Goal(s)	<ul style="list-style-type: none"> <li>Review and evaluate submissions from the Requests for Qualifications (RFQ) process which began in 2021, to identify potential proponents for a new Biosolids Processing Facility (BPF) by Q1.</li> <li>Based on the RFQ process, develop, and implement a Request for Proposals (RFP) process that culminates with the selection of a preferred proponent by Q3 2022/23 (tentative).</li> </ul>
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**STRAIGHT from  
the SOURCE**



contract for the new  
BPF

	<ul style="list-style-type: none"> <li>Negotiate and execute a new long-term Biosolids Processing Facility Expansion/Upgrade and Operating contract (tentative).</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>As the existing facility approaches its processing capacity limits and its end-of-life, Halifax Water must plan to upgrade/expand. As part of this, the utility must accommodate the forecasted increase in biosolids production, due mainly to population growth within HALIFAX, and HHSP secondary treatment requirements currently required by Canadian Council Minister of the Environment regulations by 2040.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>This project will help mitigate the following risks: <ul style="list-style-type: none"> <li>Environmental – ensures continuity of our Biosolids Management Program and creates an opportunity to produce renewable energy to support climate change initiatives.</li> <li>Financial – could significantly reduce the capital and operating costs to process biosolids, which can, directly and indirectly, benefit ratepayers.</li> <li>Infrastructure and capital assets – ensure the upgrade/expansion of an existing asset that is approaching end-of-life.</li> <li>Regulatory – ensures continued compliance with respect to biosolids processing capacity and beneficial re-use of biosolids.</li> <li>Stakeholders – ensures continued and long-term delivery of expected Level of Service (LOS) to HALIFAX and our ratepayers.</li> </ul> </li> </ul>



Develop a Climate  
Action Plan

Goal(s)	<ul style="list-style-type: none"> <li>Develop a Climate Action Plan (CAP) for Halifax Water for approval of the Halifax Water Board in 2023/24.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>A CAP will guide Halifax Water's planning and investment decisions and ensure long-term resiliency of its infrastructure. It will also allow the utility to establish targets and track the progress of mitigative measures and adaptation strategies, including reductions in greenhouse gas emissions, stormwater management, flood resiliency, water treatment, and vulnerability risk assessments.</li> </ul>

	<ul style="list-style-type: none"> <li>This plan will align with HalifACT 2050 goals that provide value to Halifax Water's ratepayers and will also support the utility's Environmental Management System (EMS).</li> </ul>
Impact	<ul style="list-style-type: none"> <li>As climate science continues to evolve, specific targets may be difficult to define and achieve; however, there is greater risk by not acting and planning for future infrastructure requirements accordingly.</li> <li>A lack of action could lead to an increased risk in all Halifax Water risk categories, including the potential inability to provide service, higher risk of rate increases to cover costs of recovery from events, and impacts to the environment from climatic changes or infrastructure failure. By anticipating and planning, Halifax Water can adapt while continuing to provide a high level of service (LOS) to customers.</li> </ul>



Align green initiatives  
for fleet and buildings  
with Climate Action  
Plan

Goal(s)	<ul style="list-style-type: none"> <li>Where appropriate, incorporate energy efficient vehicles as part of Halifax Water's Fleet Capital Upgrade Program in 2022/23. Halifax Water anticipates replacing up to five gasoline-powered ¼ and ½ ton service trucks with self-charging hybrid ¼ ton service trucks. These units have been tendered and delivery is expected at the end of Q3 or early Q4 2022/23.</li> <li>Upgrade lighting controls at 450 Cowie Hill building to energy efficiency in Q1/Q2.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>This represents the first significant step to "greening" the Halifax Water fleet of vehicles. By successfully adopting these vehicles into our current inspection and supervision fleet, we reduce greenhouse gas emissions. In addition, we can develop internal support and employee buy-in for utilization of these vehicles in other business applications.</li> <li>Upgrades to the existing lighting controls will improve overall building efficiencies and reduce electricity consumption.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>The introduction of more energy efficient technology allows the utility to progress towards a more environmentally sustainable business. There is a risk that these vehicles and lights could be delayed due to supply chain disruptions.</li> </ul>





Maintain regulatory compliance and enhance reporting

Goal(s)	<ul style="list-style-type: none"> <li>Implement the rollout of the enhanced reporting requirements and procedures in Q1.</li> <li>Complete rollout, monitor effectiveness and adjust as necessary in Q2 and Q3.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Our regulators (e.g., NSECC, Environment Canada, Department of Fisheries and Oceans) require Halifax Water to provide consistent and timely reporting of non-compliance events related to Combines Sewer Overflows (CSO), Sanitary Sewer Overflows (SSO) and other water system issues. These events are generally related to planned maintenance, emergency repairs or wet weather events. Halifax Water staff addressing these situations understand the importance of reporting these events to the Regulatory Compliance team.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>Enhanced monitoring and reporting will help reduce the risk of non-compliance with regulations and environmental legislative requirements. There will be less manual process, less reliance on specific individuals, and clear methods and guidance for employees. Although the risk is low, there is the potential that this goal may not be achieved if staff are not fully engaged or participating in this process.</li> </ul>



Launch new service compliance program

Goal(s)	<ul style="list-style-type: none"> <li>Achieve final approval of the Compliance Program Project Charter in Q1.</li> <li>Conduct a comprehensive stakeholder engagement process in Q2 and Q3.</li> <li>Review feedback and develop an options analysis by Q4. (Note: projected to be operational in Q4 of 2023/24).</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>The goal of this compliance program is to eliminate the majority of the private side sources of Inflow and Infiltration (I&amp;I) entering the wastewater system. This is a long-term and sustainable approach to reduce I&amp;I entering the wastewater system, which otherwise results in increased collection and treatment costs for Halifax Water.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>By increasing focus on compliance, it reduces the risk of wet weather overflow events and additional operational costs Halifax Water incurs for the conveyance and treatment of extraneous water in the wastewater systems. This project will involve other departments within the</li> </ul>

		utility, which will require resource commitments from them for this to be a success.
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### Implement corporate Environmental Management System (EMS)

Goal(s)	<ul style="list-style-type: none"> <li>The initial rollout and general environmental awareness training commenced in Q3 of 2021/22 and should be completed by Q1.</li> <li>Complete internal audits for all groups at 450 Cowie Hill Road, Water Quality, Fleet and Logistics, as well as at the Lakeside/Timberlea Wastewater Treatment Facility in Q2/Q3.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>EMS is a system of procedures, records, and processes to manage environmental issues and assist with regulatory compliance. It also makes day-to-day operations more sustainable and engages employees in these operational activities. It is audited against ISO 14001 standards, and if compliant, achieves ISO certification. This standard focuses on organizational leadership, risk identification and the associated influences, internal and external, to an organization.</li> <li>Expanding the program will provide more consistency and comprehensive strength to Halifax Water's management of risks in protection of the environment and compliance within its operating systems.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>The EMS system and ISO certification is designed to reduce the risk of events that may impact the environment and potentially non-compliant events. This project will involve various departments within the utility, which will require resource commitments from them for this to be a success.</li> </ul>



### Execute the Get the Lead Out Program

Goal(s)	<ul style="list-style-type: none"> <li>Replace 150 public and 200 private lead service line replacements in 2022/23 as outlined in Halifax Water's proposal to the Nova Scotia Utility and Review Board (NSUARB) in 2020.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>The Get the Lead Out program was accepted by the NSUARB in August of 2020, with a goal of removing all lead service lines from the main to the meter at Halifax Water's expense by 2038 through coordination with HALIFAX on paving programs and development of targeted programs.</li> </ul>



	<ul style="list-style-type: none"><li>• Get the Lead Out was launched in 2021, and programs have been developed to replace lead services in coordination with paving projects and through a property owner-requested replacement program.</li><li>• 2022/23 sees the continuation of this program and implementation of lessons learned from 2021/22 to both reduce costs and streamline processes to meet replacement goals.</li></ul>
Impact	<ul style="list-style-type: none"><li>• Lead service lines can result in increased lead at customers taps. Corrosion control can reduce but not eliminate lead exposure, and orthophosphate used for corrosion control is a costly product. Therefore, removal of lead service lines in a cost-effective and timely manner both addresses the public health impact and reduces utility costs in the long run through reduced requirements for corrosion control chemicals. The continuation of the COVID-19 pandemic could impact internal and external resource availability (both human and material) and costs.</li></ul>



## Financial & Regulatory Accountability

Ensuring that Halifax Water has capacity to fund existing and future infrastructure, we prudently manage assets and operate our business by balancing value and customer service. Improve financial position and update the long-range financial plan.



Optimize capital project planning and delivery

Goal(s)	<ul style="list-style-type: none"> <li>Develop a plan to align engineering and asset management functions to optimally deliver the Integrated Resource Plan (IRP) level capital expenditure of \$130 million annually in Q1.</li> <li>Implement a capital project planning and management system by Q4.</li> <li>Implement a formal governance process for capital project monitoring and oversight by Q4.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Halifax Water's 2019 IRP identified \$4 billion in capital spending over a 30-year period. This was developed to meet the infrastructure needs of the utility and is driven by asset renewal, growth, and regulatory compliance. The IRP represents a quadrupling of Halifax Water's capital spending from just ten years ago. To deliver these projects when required and at optimal cost, Halifax Water requires a greater level of planning integration with other stakeholders as well as additional human resources and new systems and processes.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>Successful delivery of IRP projects ensures Halifax Water continues to provide service and avoids the cost of infrastructure failure or a breach of environmental regulations. It also ensures Halifax Water can accommodate growth within the municipality.</li> </ul>



Progress asset management and infrastructure planning initiatives

Goal(s)	<ul style="list-style-type: none"> <li>Update and approve Halifax Water's Asset Management policy by Q1, and initiate Asset Management strategy scope by August 31, 2022.</li> <li>Confirm Sanitary Sewer Overflow (SSO) Management scope of work by June 30, 2022 and award the Request for Proposals by September 30, 2022.</li> <li>Refine the methodology to calculate the benefit to existing customers by February 28, 2023.</li> <li>Realign LOS initiative with Halifax Water's overall corporate strategy October 31, 2022. (<u>NOTE</u>: this is tied to</li> </ul>
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	the maintaining a high level of day-to-day service goal on pg. 39)
Rationale	<ul style="list-style-type: none"><li>Effective asset management practices are crucial to both optimal planning and execution of capital projects with a sustainable financial plan to fund them. It also helps to optimize the overall lifecycle cost of assets by conducting maintenance and renewal interventions at the right time to ensure the utility meets the accepted LOS.</li></ul>
Impact	<ul style="list-style-type: none"><li>It mitigates the risk of premature asset failure. By avoiding catastrophic failure, it also helps to ensure continuous service and avoid spending more than necessary to maintain assets.</li></ul>



Complete an actuarial valuation of the Halifax Water Employees' Pension Plan and implement recommendations

Goal(s)	<ul style="list-style-type: none"> <li>Halifax Water will be conducting an actuarial valuation of the Halifax Water Employees' Pension Plan (the Plan) in Q1.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>The Plan is a defined benefit pension plan regulated by the Pension Act. An actuarial valuation is required every three years.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>The actuarial valuation will provide an assessment of the pension obligations of the Plan, the assets currently available and the ongoing costs required to meet the pension obligations. Depending on results, employee and employer contribution rates may be affected.</li> </ul>



Complete a cost-of-service and a general rate application

Goal(s)	<ul style="list-style-type: none"> <li>An updated cost-of-service manual and a general rate application will be filed with the NSUARB in the last quarter of 2021/22 with the expectation that a Hearing will be conducted by the end of September 2022.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Halifax Water continues to efficiently operate critical infrastructure in a region that continues to grow, has aging infrastructure, as well as increasingly stringent environmental compliance and protection regulations.</li> <li>While utility essentially operates as a not-for-profit, it is not permitted to operate with a deficit and must recover costs from customers.</li> </ul>

	<ul style="list-style-type: none"> <li>While the utility's costs continue to increase, its ability to recoup these costs from customers has not kept pace. As a result, Halifax Water is now at a critical point, where its financial position compels it to seek approval for rate increases. These rates can no longer be deferred.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>To maintain services and the financial health of Halifax Water, rates charged to customers must be adjusted to generate sufficient revenue to maintain the financial health of the utility. The process to change customer rates is governed and decided by the NSUARB.</li> </ul>



Complete System  
Assessment Reports  
and Water Safety  
Plans for all drinking  
water systems

Goal(s)	<ul style="list-style-type: none"> <li>Halifax Water will complete System Assessment Reports and prepare first drafts of water safety plan risks for all drinking water systems by March 31, 2023.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>System Assessment Reports are a regulatory compliance requirement. Halifax Water is replacing the five-year Water Quality Master Plan process with Water Safety Plans. These plans will: <ul style="list-style-type: none"> <li>Allow for assessing risks and vulnerabilities to both current and future compliance while tying into ERM.</li> <li>Provide a continuous improvement approach to assessing water quality risks from source to tap that engages stakeholders across departments and at all levels.</li> <li>Allow for proactive rather than reactive planning and response to water quality through risk-based decision making.</li> <li>Tie water quality into asset management and capital planning processes.</li> </ul> </li> </ul>
Impact	<ul style="list-style-type: none"> <li>Provides a greater understanding of capacity restraints, source lake recovery, as well as aging asset/infrastructure management. This allows Halifax Water to adopt best practices and have greater control over capital management. For this to be a success, it requires buy-in from internal stakeholders that provide effective change management. It is important that the utility has the resource capacity to execute the program. Ongoing COVID-19 restrictions and potential delays could impact the timeline.</li> </ul>



Secure Regulatory  
approval for:

Stormwater Service  
Expansion

Goal(s)	<ul style="list-style-type: none"> <li>Halifax Water will seek approval from the NSUARB to begin providing stormwater service to expanded areas on June 1, 2022. Pending approval, in 2022/23, the utility will conduct Phase 2 of its stakeholder engagement. This also includes gathering additional information regarding the assets, drainage, and areas of concern for customers within the new service areas. Pending approval by the NSUARB, the utility will launch service delivery.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>HALIFAX Council approved the transfer of provincial roads to the municipality and directed that Halifax Water should assume ownership and responsibility for the stormwater infrastructure and provide stormwater service. It is important that Halifax Water fulfil the direction from HALIFAX Council and provide stormwater service to the new service areas in a manner that demonstrates they are receiving value. This is an opportunity to also raise broader awareness about the increasing importance of stormwater management.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>The activities being carried out in 2022/23 are critical to help mitigate the reputational risks posed by the transfer and help mitigate future operational and financial risks by providing improved information to plan service delivery and establish future rates to recover the cost of providing the service.</li> </ul>



Secure Regulatory  
approval for:

Cogswell District  
Energy System (DES)

Goal(s)	<ul style="list-style-type: none"> <li>Halifax Water will request NSUARB approval for DES by Q1.</li> <li>Complete initial cost-of-service and rate design models for the DES by Q4.</li> <li>Begin development of DES corporate support systems by Q4.</li> <li>Start planning for design approval and constructions of DES energy centre by Q4.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Through HALIFAX's HalifACT 2050, our Board, and the Investing in Canada Infrastructure Program (ICIP) funding agreement executed with Infrastructure Canada Fund Programs (INFC), Halifax Water has committed to develop the Cogswell DES. Halifax Water's goals and deliverables must align with HALIFAX's Cogswell Regional Development Plan (RDP) to ensure that the DES is built in parallel with the Cogswell RDP, and ready for operation as new</li> </ul>



	<ul style="list-style-type: none"> <li>developments (<i>i.e.</i> buildings) are completed in the Cogswell Regional Development Area (RDA).</li> <li>The NSUARB has ruled that the DES will be regulated as a public utility. Halifax Council has approved a mandatory connection by-law for the Cogswell RDA.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>The Cogswell DES will help Halifax Water achieve it's environmental goals by contributing to the reduction of GHG emissions, to our CAP, and by demonstrating our commitment to sustainability.</li> </ul>



Secure Regulatory  
approval for:

Burnside Operations  
Depot

Goal(s)	<ul style="list-style-type: none"> <li>Halifax Water will issue a Request for Proposals for the Burnside Depot in Q2.</li> <li>Pending regulatory funding approvals, construction will start in Q4.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>This project replaces four depots and supports Halifax Water's One Team, One Water strategy. This aligns the workforce in a more customer centric way and helps improve service effectiveness in the central and east regions.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>The timely delivery of the project is necessary for an effective transition of Halifax Water employees to a less siloed working approach. By effective delivery of the project, it will speed this transition and help mitigate the risk of cost escalation on a project of this scale. The current COVID-19 pandemic and its associated impact on supply chains, the labour market, and volatile construction costs, may pose risks to project estimates.</li> </ul>



Secure Regulatory  
approval for:  
Mill Cove Wastewater  
Treatment Facility  
(WWTF) Upgrade

Goal(s)	<ul style="list-style-type: none"> <li>Halifax Water will retain an engineering consultant to begin the process for the planned upgrade of the Mill Cove Wastewater Treatment Facility (WWTF) in Q3, with an anticipated start beginning in three to five years.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>The Mill Cove WWTF treats wastewater from Bedford, Sackville, and nearby communities. The plant needs upgrades at an estimated cost of \$90 million. This is necessary to maintain a good state of repair, ensure regulatory compliance and accommodate planned growth in the service area.</li> </ul>

Impact

- This plan will reduce the potential for infrastructure failure, mitigate the risk of environmental non-compliance and generate capacity to accommodate growth.



## Operational Excellence

We are committed to service, reliability, and quality for our customers. Focused on safely and efficiently building, operating, and maintaining our critical infrastructure, we ensure a more sustainable community.



Implement plan for expanded stormwater service in June 2022

Goal(s)	<ul style="list-style-type: none"> <li>• Gather historical maintenance plans and field information on trouble spots from Nova Scotia Public Works (NSPW) in Q1.</li> <li>• Conduct operations and maintenance inspections on stormwater infrastructure within the new service boundary in Q1.</li> <li>• Generate operations and maintenance plans based on information gained from field condition assessments and information gathering from NSPW in Q1 and Q2.</li> <li>• Update Halifax Water's priority flood lists with assets from the new service boundary to ensure the utility is prepared to respond during storms in Q3.</li> <li>• Pending NSUARB approval, execution of work plans will commence at the proposed takeover date from Q2 to Q4.</li> <li>• Build capital renewal plans for fiscal 2023/24 in Q3-Q4.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>• A plan will help ensure appropriate levels of service are met for new customers in the new service boundary. By understanding the asset condition and maintenance requirements in advance, work planning can be completed to facilitate a preventative maintenance program that can be executed efficiently.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>• By having an updated assessment of the transferred assets/infrastructure, Halifax Water can understand and manage the service needs of stormwater customers. To ensure the success of this transition, the utility will require timely and accurate information from NSPW and effective collaboration with HALIFAX to manage customer expectations. Without these relationships, Halifax Water will be challenged to meet customer demands.</li> </ul>





### Develop an operating plan for the Burnside Operations Depot

Goal(s)	<ul style="list-style-type: none"> <li>Progress the planning process in the West operations business units to bring increased cohesion to the delivery of service in the region in Q1. Based on this planning process, this can become the framework for the new Burnside Operations Center.</li> <li>Implement a change management team to help guide the transition to a new organizational business model for the One Team, One Water approach by Q4.</li> <li>Develop a new organizational structure through collaborative workshops with water and wastewater/stormwater operations in Q3-Q4.</li> <li>Structure a coordination and planning group that will lead the development of work plans for execution across the operational workgroups in Q2-Q3.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Efficient service delivery under the One Team - One Water umbrella improves customer service, provides value, and allows for a more efficient use of available resources.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>It is essential that Halifax Water's infrastructure and capital assets are maintained to provide a LOS that customers expect. A failure to do so could alienate customers, increase the liability for property damage and result in regulatory non-compliance. To ensure this is avoided, Halifax Water must promote cultural changes within its teams, to avoid a territorial approach to resources and unproductive competitiveness.</li> </ul>



### Year 2: Water Supply Enhancement Program

Goal(s)	<ul style="list-style-type: none"> <li>Establish a program management office for the Water Supply Enhancement Program (WSEP) in Q1.</li> <li>Sign off on clarifier pre-design in Q1.</li> <li>Initiate Lake Major pumping station pre-design in Q4.</li> <li>Initiate Pockwock clearwell pre-design in Q3.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>The establishment of these milestones play a significant part in the overall WSEP. This is a key strategy for Halifax Water to mitigate the risk of lake recovery impacting water supply plant's ability to deliver high-quality water.</li> </ul>

	Impact	<ul style="list-style-type: none"> <li>The advancement of this program reduces risk of service interruption due to infrastructure failure and the risk of changes in the source water having an impact on the utility's ability to provide high-quality water and achieve regulatory compliance.</li> </ul>
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#### Incorporate Digital Water Strategy into Five Year Strategic Plan

Goal(s)	<ul style="list-style-type: none"> <li>Complete an updated three- to five-year IT Strategy, which focuses on digital transformation and intelligent water by Q3.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Utilities are rich in data that provide opportunities to improve customer service and its operations. By equipping staff with the tools to manage and analyze data, it provides Halifax Water with the ability to be more innovative. By using existing IT infrastructure and the data collected, it can provide information that is insightful in a cost-effective and sustainable way.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>This strategy document will ensure cyber security measures are more reflective of the utility's digital transformation and make sure that the utility's cyber security posture is maintained as the IT landscape evolves.</li> </ul>



#### Optimize WSP & WWTF processes through Dalhousie research partnership

Goal(s)	<ul style="list-style-type: none"> <li>Pending the award of the Proposed Alliance Grant by Natural Sciences and Engineering Research Council (NSERC), Halifax Water will enter a contract and launch the next five-year research term by July 2022.</li> <li>Halifax Water will work with Dalhousie to develop a plan to facilitate research required to execute the proposal, including procurement, installation, and commissioning of a pilot plant for wastewater by December 31, 2022.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>In the fall of 2021, Dalhousie University submitted a five-year research proposal titled Partnership for Innovation in Climate Change Adaptation in Water &amp; Wastewater Treatment to the NSERC Alliance grant program. This five-year program would mark the fourth five-year research partnership with Halifax Water; however, this program encompasses both water and wastewater where previous industrial research chairs were for drinking water alone.</li> </ul>

	<ul style="list-style-type: none"> <li>Outcomes from the One Water research program on the drinking water side will feed directly into capital planning for the Water Supply Enhancement Program (WSEP), ensuring selection and design of robust advanced treatment technology to meet source water quality challenges and regulatory requirements for decades to come.</li> <li>Outcomes from the wastewater research tasks aim to assist Halifax Water in meeting future compliance requirements of the Wastewater Systems Effluent Regulations (WSER) in a cost-effective manner. Through the exploration of UV LED technology, piloting and optimizing existing chemically enhanced primary treatment research may present innovative solutions to both reduce energy use and costs associated with present and future compliance.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>This research provides a better understanding of Halifax Water's capacity restraints, as well as source lake recovery, climate change and regulatory compliance. This partnership requires a funding decision by NSERC, and Halifax Water must ensure that its staff accept and agree to participate in and facilitate this research.</li> </ul>



### Implement corporate Enterprise Risk Management (ERM)

Goal(s)	<ul style="list-style-type: none"> <li>Develop operational risk management tools to be used by Halifax Water to manage project and operational risk by Q4.</li> <li>Develop a comprehensive Business Continuity Plan (BCP) by Q4.</li> <li>Finalize ERM framework document that will be used to provide guidance to internal and external stakeholders and ensure ERM is considered in all aspects of the organization in Q3/Q4.</li> <li>Continue to work to ensure that ERM is integrated into all other business units throughout 2022/23.</li> <li>Develop an internal audit process as an assurance tool in Q3.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>ERM provides the risk management principles and processes required to assist Halifax Water in taking a proactive approach to managing principal risks. This approach will improve performance, encourage innovation, and support the overall achievement of the organization's strategic objectives. The ERM strategy will</li> </ul>

	provide better communication throughout the organization. Over the long term, ERM can enhance enterprise resilience and the ability to respond to change that could impact performance and necessitate a shift in strategy.
Impact	<ul style="list-style-type: none"> <li>ERM provides risk management principles and processes that can be applied across the organization to identify, measure, assess, respond to, monitor, and report on organizational risks that affect Halifax Water's ability to meet its strategic initiatives. By developing operational risk management, it will help Halifax Water mitigate the capital management, asset management, and aging infrastructure risks. A comprehensive BCP will safeguard operations and ensure that Halifax Water continues to offer services in the event of an emergency. In addition, an internal audit process will support the entire ERM program by addressing assurance, thus, assisting in the mitigation of all organizational risks.</li> <li>Lack of resources and change management may impact Halifax Water's ability to achieve these goals in 2022/23.</li> </ul>



Implement ERP project to improve operational efficiency

Goal(s)	<ul style="list-style-type: none"> <li>Complete the transition of Halifax Water's Enterprise Resource Planning (ERP) system to Cayenta in Q3.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>An ERP is required to effectively manage the utility, and Halifax Water was required to transition from its current ERP system, SAP. Through a rigorous procurement process, Cayenta was selected as a cost-effective alternative. As the utility's new ERP system, Cayenta will streamline many financial and customer relationship management processes and will provide for more effective reporting.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>The ERP will support the financial management and the continued financial health of the utility. The ERP is a significant, organization-wide implementation and will require support from all parts of the organization. Implementations of this scale are complex and may be affected by system technical challenges, allocation of staff resources, and the ability of the organization to effectively manage the change.</li> </ul>



Maintaining a high level of day-to-day service

Goal(s)	<ul style="list-style-type: none"> <li>Complete LOS work through the Asset Management Plan (AMP) and with input from stakeholders. The AMP is to be presented to the Halifax Water Board by the end of Q4.</li> <li>Review the customer complaint and dispute resolution processes with internal stakeholders and the new Dispute Resolution Officer in Q1.</li> <li>Review measures to monitor and report on the volume of work handled by all workgroups by the end of Q3, as part of documenting the current volume of activity and support future workforce planning to maintain day-to-day service.</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>Halifax Water is focused on resolving as many customer concerns as possible. When a resolution is not possible, or the customer is dissatisfied, the utility requires a process to escalate the complaint in an effective and meaningful way. Customers must have a clear understanding of how service is provided, what it costs, and the LOS they can expect. To achieve this, Halifax Water must seek clarity on the LOS customers demand, compared to the current service levels and whether the utility is achieving these.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>These activities will help Halifax Water better manage customer expectations and deliver service. Staffing capacity and the need to focus on more urgent initiatives may prevent achieving this work.</li> </ul>



**STRAIGHT from  
the SOURCE**





## BUDGET SUMMARY

### Capital Budget

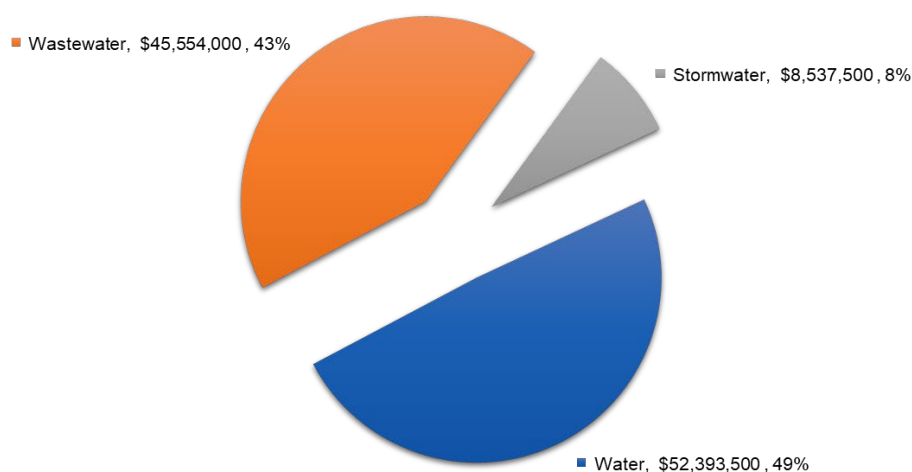
Halifax Water's 2022/23 Capital Budget at a total value of \$106,485,000 and detailed information on the capital budget is provided in Appendix B.

Halifax Water's 2019 IRP identifies a 30-year capital investment plan valued at \$2.7 billion (net present value), and a requirement to achieve an average level of spend of \$130 million per year. In relation to the IRP, the capital budget program focuses on providing required infrastructure for asset renewal, regulatory compliance, and growth.

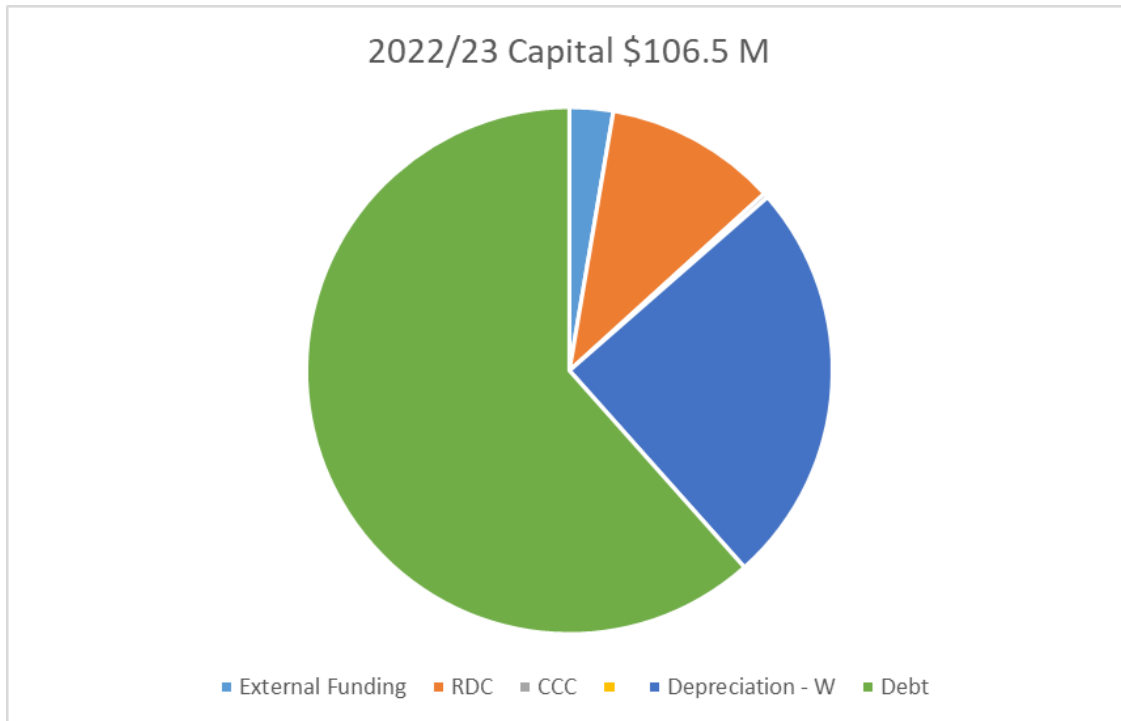
This year's capital budget also recognizes the significant challenge Halifax Water faces in increasing a capital budget that was approximately \$30 million just ten years ago to an average IRP spend of \$130 million per year, including some years in excess of \$200 million. Staff have reviewed Halifax Water's capacity to deliver our capital budget and determined significant changes are required in the areas of human resources, tools, and business processes. Accordingly, this year's proposed capital budget has been reduced compared to last year's budget of \$126 million, and from the planned amount for this year in the most recent five-year capital budget of \$153 million. The proposed budget of \$106,485,000 is intended to achieve critical projects with well advanced planning while respecting the current capacity to deliver, augmented by some human resource additions.

The funding plan for the capital budget is comprised of the following funding sources; depreciation, debt, regional development charge reserve, capital cost contribution, Federal/Provincial infrastructure funding, HALIFAX cost sharing and energy rebates.

**2022/2023**  
**Capital Budget by Asset Class - All Divisions**



The funding plan for the proposed Capital Budget is shown below:



Water		Wastewater		Stormwater	
Depreciation	9,279,000	Depreciation	15,906,000	Depreciation	1,281,000
Debt	33,620,000	Debt	24,807,000	Debt	7,147,000
RDC	9,041,000	RDC	2,237,000	External Funding	110,000
External Funding	453,000	CCC	315,000		\$8,538,000
	\$ 52,393,000	External Funding HRM	2,289,000		
			\$45,554,000		
<b>Total Capital Funding</b>	<b>\$ 106,485,000</b>				

## Operating Budget

The operating budget for 2022/23 reflects a projected deficit of \$10.9 million and requirements to maintain current LOS and is based on rates approved by the NSUARB. The water rates were effective April 1, 2016, stormwater rates were effective July 1, 2017, base charges for wastewater effective April 1, 2016, while approved wastewater consumption rates by the NSUARB were effective April 1, 2021.

The main cost drivers of Halifax Water's operating budget are salaries and wages, energy, chemicals, depreciation, and debt servicing. Operating expenses are proposed to increase by \$3.4 million or 2.7% compared to the budget for last year. Full details of the operating budget are provided in Appendix C.

Operating Budget Summary (in thousands)				
	Actual 2020/21	Approved Budget 2021/22	Proposed Budget 2022/23	Change
Operating revenues	\$ 136,569	\$ 150,466	\$ 152,765	\$ 2,298
Operating expenditures	113,689	125,379	128,788	3,409
Earnings from operations	22,880	25,087	23,977	(1,110)
Financial and other revenues	963	722	733	11
Financial and other expenditures	33,726	37,461	35,598	(1,863)
Deficit	\$ (9,883)	\$ (11,651)	\$ (10,888)	\$ 764

All three services – water, wastewater and stormwater are currently operating at a deficit and Halifax Water will be making an application in 2022/23 to the NSUARB to adjust rates for services to reflect the current costs of providing service. As noted above, the majority of Halifax Water's rates are based on operating costs from several years ago and do not reflect current costs or recognize general inflation.

### Operating Budget Key Assumptions

Revenue budgets have been developed based on the current rates for service. Net consumption is projected to increase by 1% in 2022/23 as decreasing consumption from existing customers is projected to be less than consumption increases caused by growth. Halifax Water is budgeting for 680 new customers connections, an increase from 638 in prior years.

The Consumer Price Index (CPI) in Halifax is currently running at 3.68%. The increase in Halifax Water's total operating expenses is less than this. Specific assumptions regarding some of Halifax Water's most significant expenses are shown below.

Chemicals	5%
Electricity	3%
Furnace oil	15%
Natural gas	15%
Salaries	2.25-3%**

\*\* Halifax Water has three employee groups governed by 2 collective agreements and 1 compensation policy. This range provides allowance for step increases as employees move through various salary bands.



The budgets for depreciation expense, and non-operating expenses such as debt servicing and grant in lieu of taxes paid to the municipality are developed based on capital spending and additions to utility plant in service.

## PERFORMANCE MEASUREMENT

At the end of the 2022/23 fiscal year, Halifax Water's overall performance will be assessed against the Corporate Balanced Scorecard (CBS). Halifax Water has been utilizing a CBS to measure utility performance since 2001. Each year the Halifax Water Board sets organizational indicators and reviews performance results. The CBS targets for 2022/23 will be presented for approval at the March 2022 meeting of the Halifax Water Board.

There are eight Critical Success Factors (CSFs) derived from Halifax Water's vision statement and under each of the CSFs, there are organizational indicators to track performance and allow for the establishment of targets. This year the eight critical success factors will be organized based on the four pillars:

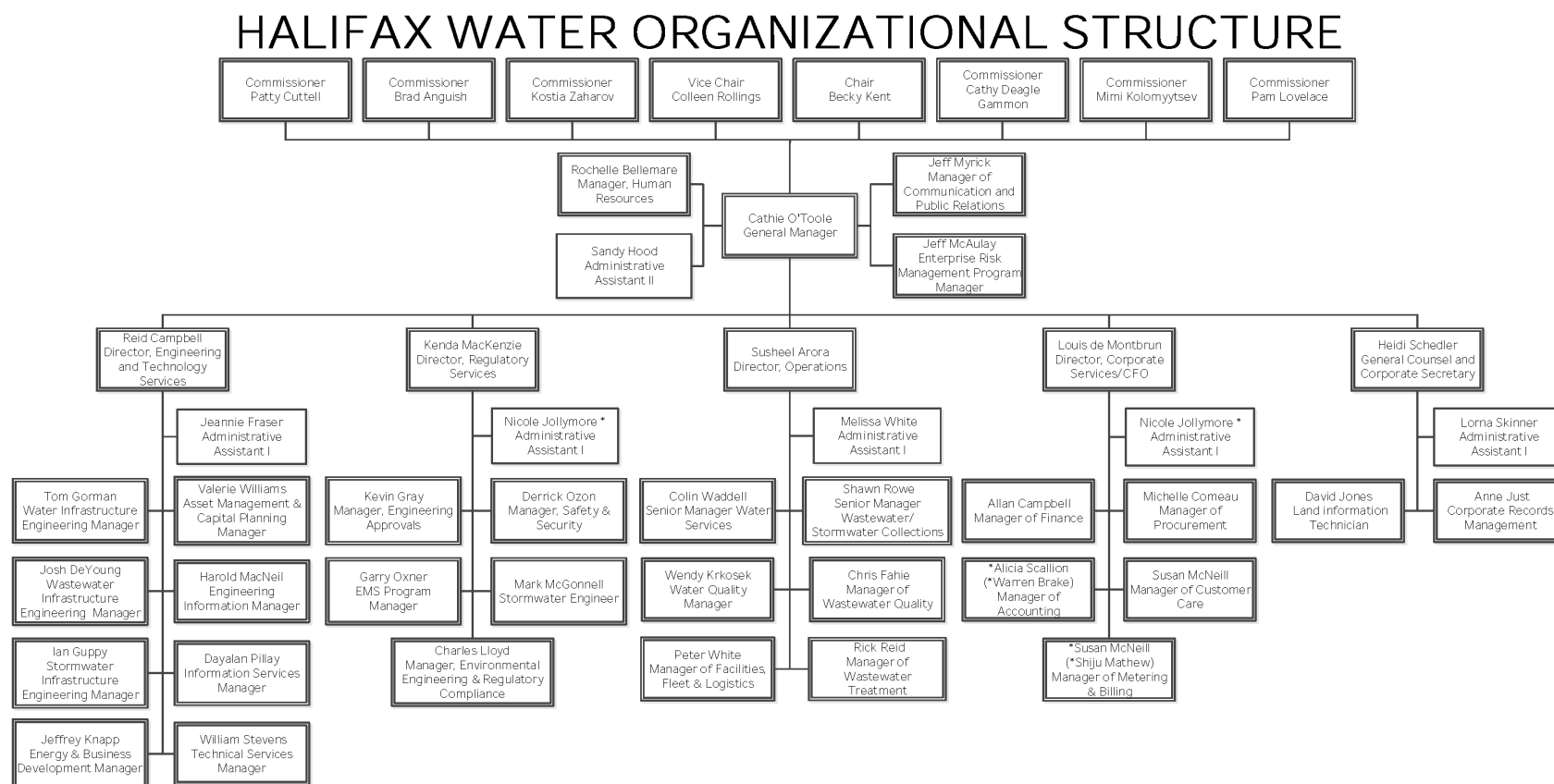
<b>People</b> Employee satisfaction survey result Average number of days absenteeism % of grievances resulting in arbitration % of jobs filled with internal candidates Customer satisfaction about water quality - % from customer survey Customer satisfaction with service - % from customer survey	<b>Health, Safety and Environment</b> Average score on internal safety audits Lost time accidents - # of accidents resulting in lost time per 100 employees Safe driving - # of traffic accidents per 1,000,000 km driven Training - # of employees trained or re-certified before due date % of completed safety talks # of IC&I properties inspected by Pollution Prevention each year Energy management kwh/m <sup>3</sup> reduction associated with capital projects Adherence with Water Quality Master Plan - % of sites achieving targets Bacteriological tests - % free from total coliform Bio-solids residual handling - % of sludge meeting bio-solids concentration targets
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Financial and Regulatory Accountability	Operational Excellence
<p>Operating expense/revenue ratio percentage</p> <p>Annual cost per customer connection – water</p> <p>Annual cost per customer connection – wastewater</p> <p>Capital budget expenditures - % of budget spent by end of fiscal-year</p> <p>Department of Labour, Skills (DLS&amp;I) and Immigration compliance - # of incidents with written compliance orders</p> <p>% of public health and environmental regulatory infractions resulting in an environmental warning report, summary offense ticket, ministerial order, or prosecution</p> <p>% of WWTFs complying with NSECC approval permits</p>	<p>Water leakage control – target leakage allowance of 160 litres per service connection per day</p> <p>I&amp;I reduction - # of inspections on private property for discharge of stormwater into the wastewater system</p> <p>Peak flow reduction from wet weather management capital projects</p> <p>Hours of unplanned outages in GIS and Cityworks</p> <p>Water service outages - # of connection hours/1000 customers</p> <p>Wastewater service outages – # of connection hours/1000 customers</p> <p>Average speed of answer – % of calls answered within 20 seconds</p>



## Appendix A: Organizational Structure and Service Overview

### ORGANIZATIONAL STRUCTURE



Effective April 01, 2021  
Updated January 2022

## SERVICE OVERVIEW

### Operations

The Operations Department provides water, wastewater and stormwater service and activities are organized functionally in a way that ensures that respective services are managed as systems.

#### Water Services

- *Source Water Protection:* responsible for managing and protecting watershed land, developing and maintaining source water plans, enforcement of Protected Water Areas and other relevant source water regulations, source water community relations including working with and developing watershed advisory boards, real property maintenance of source water lands, and forestry management of watershed lands.
- *Water Quality Management:* responsible for water quality planning, water quality monitoring, process support to treatment plants, customer inquiries and investigations, water quality support to capital projects, policy development, research and management of the Halifax Water – Natural Sciences and Engineering Research Council (NSERC) Industrial Research Chair at Dalhousie University.
- *Water Supply Plant Operations:* responsible for operation and maintenance of three large water supply plants (Pockwock, Lake Major and Bennery Lake), six small systems, six dams, two emergency water supplies and 35 chlorine monitoring devices and re-chlorination stations.
- *Distribution System Operations:* responsible for operation and maintenance of the water distribution and transmission systems. The system is managed according to three geographic regions with responsibility for over 1563 km of transmission and distribution mains, 8450 fire hydrants, 85,500 service connections, 141 pressure control/flow metering facilities, 21 pumping stations, 16,000 valves and 16 water storage facilities. This also includes responding to third party requests for buried infrastructure locates.

#### Wastewater Services

The Wastewater and Stormwater Services division activities include operating and maintaining municipal systems from “drains back to the source again.” In this regard, the Wastewater and Stormwater Services division has a mandate to protect the environment while providing essential collection and treatment services to its customers. These essential services are delivered in sections that are responsible for both stormwater and wastewater activities in three regions and 14 treatment facilities. The supervisors and the field crews carry out both wastewater and stormwater related duties.

Wastewater Services strives to provide uninterrupted delivery of the following services:

- *Wastewater Treatment Facility Operations:* responsible for operation and maintenance of 14 WWTFs and associated infrastructure, regulatory reporting, and implementing and coordinating capital upgrades with other Halifax Water departments. As per the WSER, two



plants are classified as very large, three are large, two are medium and nine are small capacity. The department also operates four additional small treatment facilities under contract from HALIFAX and the province.

- *Biosolids Processing:* responsible for liquid transport, dewatering and processing of sludge, operation, and maintenance of various dewatering equipment at WWTFs, administering trucking contracts for dewatered biosolids and BPF operations contract, and processing of biosolids from on-site septic systems. The BPF, located at the Aerotech Industrial Park, produces a soil amendment for beneficial use in agriculture.
- *Collection System Operations:* responsible for operation, repair and maintenance of the wastewater collection and trunk sewer system. The system is managed according to three geographic regions with responsibility for over 1,425 km of collection pipes, 164 pump stations, 21 combined sewer overflow facilities, and 82,464 service connections.
- *Septage Treatment Services:* This is an unregulated activity for Halifax Water, but it provides an essential service to residents who do not have a centralized wastewater service. The septage from septic hauling companies who service these users was accepted at strategic locations within the core sewer service area and at the Aerotech WWTF. With the completion of the upgrade of Aerotech WWTF in 2019, most of the septage has been diverted to the Aerotech WWTF from the core service area.
- *Facilities, Fleet & Logistics Services:* responsible to supply, maintain and repair approximately 270 pieces of mobile equipment and vehicles ranging from trailers and small utility service vehicles to large excavation, construction, and transportation equipment. Replacement of vehicles and equipment on a life cycle costing basis and vehicles records management and regulatory compliance. This section also operates and maintains corporate facilities at the Cowie Hill campus and provides logistical and services support to operations and treatment facilities to facilitate efficient operations.

## Stormwater Services

The Stormwater Services division is responsible for operation and maintenance of stormwater infrastructure within the public right-of-way and within easements. This service has undergone significant changes over the past few years and continues to progress to achieve a higher LOS.

- *Collection System Operations:* provides operation, repair and maintenance of the stormwater collection and trunk sewer system. The system is managed by shared crews within the three geographic regions with responsibility for approximately 900 km of stormwater collection pipes, 46 stormwater retention facilities, over 600 km of ditches, 2,495 cross culverts and 15,061 driveway culverts. This section provides proactive maintenance of the pipes, ditches, and other systems with a goal to ensure uninterrupted flow within Halifax Water infrastructure. Staff also replace a driveway and cross culverts on a priority basis to manage the infrastructure with sound asset management practices.

- *Service Review:* Operations provide support to the Stormwater Engineer within the Regulatory Services department, and allocates resources to drainage investigations, stormwater billing exemption requests, and operations support. Drainage investigations may be triggered by a customer inquiry on private property or an operational issue on Halifax Water owned infrastructure. The Stormwater Engineer reviews the drainage issues and renders a finding which may involve an operational fix or a capital improvement. Complaints stemming from stormwater billing are vetted through the Stormwater Engineer.

## Engineering and Technology Services

The Engineering & Technology Services (ETS) Department is responsible for the provision of engineering and technical services relating to the planning, design, construction, and maintenance of water, wastewater and stormwater infrastructure and related asset information. It is also responsible all of Halifax Water's digital infrastructure services including information management, geographic information systems and operational technology.

The ETS Department has six core areas of responsibility with eight specific operational sections delivering programs.

- *Asset Management:* responsible for development of the AM program; including the overall strategy, inventories, condition and performance assessments, and the development and delivery of annual AMP. The section is also responsible for modelling and flow monitoring, long-term infrastructure master planning (including implementation of the IRP, and the development of the five-year and one-year capital budget).
- *Infrastructure Engineering:* contains four sections that are responsible for the design, construction and project management for water, wastewater, and stormwater capital projects, respectively. These four sections also provide support for capital project prioritization, master planning and asset management relating to the core infrastructure.
- *Energy Efficiency:* responsible for the provision of engineering services related to energy management and energy efficiency of water, wastewater, and stormwater infrastructure. This section is responsible for the development and implementation of two exciting new corporate initiatives. The first, the Cogswell District Energy System, is planned as a new regulated business unit to provide energy to proposed new buildings within HALIFAX's Cogswell RDA based on energy extracted from the warm wastewater effluent that discharges from Halifax Water's Halifax WWTF. The second, the new BPF, is being strategically developed to efficiently manage the conversion of the utility's wastewater sludge into commercially viable soil amendment product and recoverable energy.
- *Engineering Information:* responsible for the corporate GIS, including the maintenance and distribution of all record information. The section is also responsible for ongoing GIS development including both desktop and mobile GIS applications. This section also supports capital projects and other initiatives through Computer Aided Drafting (CAD) and map production.

- *Information Services (IS)*: responsible for administration of services relating to network resources (storage, servers, printers, etc.), users, access control and network security, server hardware and operating systems, all computer equipment (including desktops, laptops, monitors, printers, and servers), corporate desktop software, and updating and delivery of the information technology( IT) Strategic Plan including all IT project delivery services. The IS section is the first line of support for all IT related problems or requirements.
- *Technical Services*: responsible for operation and maintenance of the SCADA system and the process communications network; implementation of the SCADA master plan, process control, cyber security, instrumentation maintenance, electrical maintenance, maintenance of water pumping stations, and operation and development of the process data warehouse.

### Regulatory Services

The Regulatory Services Department continues to support the utility through the delivery of programs such as Environmental Engineering, Engineering Approvals, Regulatory Compliance, Safety and Security, Stormwater Engineering and EMS.

- *Environmental Engineering*: responsible for two key programs, Pollution Prevention (P2) and the private side I&I reduction. The section also provides support for updating NSECC permits to operate and to withdraw water and oversee projects related to contaminated sites and impacts to Halifax Water's infrastructure.
  - *Pollution Prevention*: responsible for promoting compliance of waste discharges with the Rules and Regulations, through education and inspections.
  - *Inflow and Infiltration* assists the WWMP in locating and addressing private side sources of I&I.
  - *Regulatory Compliance*: responsible for sampling of the water treatment and distribution systems for bacteria and residual chlorine, ensuring compliance with Canadian Drinking Water Guidelines and operational permits issued by NSECC. Similar sampling is completed for wastewater effluent parameters for compliance with permits issued by NSECC, consistent with federal regulations. The group is also tasked with compiling and submitting reports associated with the sampling results to NSECC. Regulatory Compliance is completing work with the Water Quality Management section to implement new permit tracking and data management and reporting software, Klir® to replace WaterTrax® as part of the IT Strategic Program.
  - *NSECC Permits*: coordinates permit renewals and/or amendments.
- *Engineering Approvals*: The Engineering Approvals group is focused on adherence to the Halifax Water Design Specifications, the Supplementary Standard Specification, and the Halifax Water Regulations with respect to connections to, and expansions of, the Halifax Water system. In addition, the group oversees the administration of the Backflow Prevention Program which provides a layer of protection to the water distribution system from potential contamination events (cross connections) from medium to high-risk

customers. The group also administers new service connections including the inspection of the new services and renewals and the administration of RDCs and CCCs.

- *Safety & Security*: Provides the overall support and delivery of the Halifax Water's safety program, as well as oversight of the security systems and programs to protect Halifax Water's critical infrastructure.
- *Stormwater Engineering*: Conducts drainage investigations, stormwater billing exemption requests, and operations support. Drainage investigations may be triggered by a customer inquiry on private property or an operational issue on Halifax Water owned infrastructure. The Stormwater Engineering team reviews the drainage issues and renders a position which may involve an operational fix or a capital improvement. Complaints stemming from stormwater billing are vetted through the Stormwater Engineer and a decision is provided to the customer.
- *Environmental Management System (EMS)*: a system of procedures, records, and processes to manage environmental issues and assist with regulatory compliance. It also makes day-to-day operations more sustainable and engages employees in these operational activities. The EMS program can be audited against ISO 14001 standards, and if found to comply, receives a certification through ISO. The ISO standard places a focus on organizational leadership and identification of risks and the associated influences, both internal and external to an organization.

## Corporate Services

Corporate Services consists of five sections, with service to internal and external customers.

- *Finance*: responsible for development of operating budgets, funding plans for the capital budget, rate applications and financial modeling for business plans. This group assists in preparing the capital budgets and confirms the availability of funding sources. The group is responsible for forecasting revenues and expenditures, including associated trend analysis, administering the pension plan, internal control testing, and quality assurance activities around financial transactions including payroll.
- *Accounting*: responsible for timely and accurate financial reporting, financial accounting, fixed asset accounting, financial analyses, and preparing the financial statements. This group is also responsible for revenue; budgeting and forecasting; predicting cash flows; developing and implementing accounting procedures; internal controls; managing the billing and collection of non-customer charges; and coordinating and supporting the annual external financial statement audit. Accounting also assists in preparing the capital budgets.
- *Procurement*: responsible for planning and delivering procurement services to the organization ensuring compliance with corporate policies, legislation, and trade agreements. This section develops and implements reporting and monitoring systems, programs and procedures for inventory and procurement. Procurement also supports and guides internal departments in the acquisition of goods, services, and construction to meet Halifax Water's objectives and capital programs.



- *Customer Care*: responsible for managing customer contacts, establishing corporate customer service standards, goals, and objectives, and coordinating the improvement of business processes in Customer Care and other departments.
- *Metering and Billing*: responsible for installing, maintaining, reading, sampling, and testing meters, establishing standards, and billing customers for Water, Wastewater and Stormwater Services in a timely and accurate manner.

## Administration

- *General Manager's Office*: responsible for overall administration of the utility. Some initiatives led by the General Manager's Office include governance, business planning, public and stakeholder relationships, and employee relations. Communications, Legal Services and Human Resources fall directly under the General Manager's Office.
- *Communications*: responsible for external and internal communications, maintaining the internet and intranet sites, media relations, social media, and providing support to operations and capital delivery to ensure the public is kept informed of significant projects, service disruptions, and initiatives.
- *Legal Services*: includes the legal function, corporate records management, FOIPOP administration as well as land administration. The General Counsel acts as the Corporate Secretary to the Halifax Water Board and helps ensure that board governance processes function smoothly.
- *Human Resources*: responsible for the effective delivery of all human resource initiatives including effective workforce planning, organizational change and development, recruitment functions, disability management, health and wellness initiatives, labour/employee relations, compensation and benefit functions, pension administration, and employment equity.

## Unregulated Business

Halifax Water conducts some lines of business that are ancillary to the core water, wastewater, and stormwater services. These activities constitute approximately 1% of the utility's business and include leasing of land for telecommunications, cell phone and radio towers, and some energy related initiatives such as leasing land for wind turbines and generating electricity through in-line turbines in the water system. The most material lines of un-regulated business are treatment of septage from waste haulers dealing with private septic systems, and treatment of airline effluent. Halifax Water also can provide some services such as contract operations, consulting or leak detecting on a fee for service bases. Currently, Halifax Water is providing some consulting services to the Atlantic First Nations Water Authority. Unregulated business is conducted for the benefit of the regulated rate base.

## Appendix B: 2022/23 Capital Budget

### HALIFAX WATER

#### Capital Budget 2022/23

##### Summary

Asset Category	Project Costs
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<i>Water - Land -- T O T A L</i>	\$240,000
<i>Water - Transmission -- T O T A L</i>	\$15,999,000
<i>Water - Distribution -- T O T A L</i>	\$8,490,000
<i>Water - Structures -- T O T A L</i>	\$11,773,000
<i>Water - Treatment Facilities -- T O T A L</i>	\$3,165,000
<i>Water - Energy -- T O T A L</i>	\$200,000
<i>Water - Security -- T O T A L</i>	\$125,000
<i>Water - Equipment -- T O T A L</i>	\$135,000
<i>Water - Corporate Projects - T O T A L</i>	\$12,266,500
<b>TOTAL - Water</b>	<b>\$52,393,500</b>

<i>Wastewater - Collection System -- T O T A L</i>	\$11,823,000
<i>Wastewater - Forcemains -- T O T A L</i>	\$820,000
<i>Wastewater Structures -- T O T A L</i>	\$8,620,000
<i>Wastewater - Treatment Facility -- T O T A L</i>	\$10,872,000
<i>Wastewater - Energy -- T O T A L</i>	\$600,000
<i>Wastewater - Security -- T O T A L</i>	\$275,000
<i>Wastewater - Equipment -- T O T A L</i>	\$157,000
<i>Wastewater - Corporate Projects -- T O T A L</i>	\$12,387,000
<b>TOTAL - Wastewater</b>	<b>\$45,554,000</b>

**HALIFAX WATER**  
**Capital Budget 2022/23**

**Summary**

Asset Category	Project Costs
<i>Stormwater - Pipes -- T O T A L</i>	\$3,406,000
<i>Stormwater - Culverts -- T O T A L</i>	\$2,366,000
<i>Stormwater - Corporate Projects -- T O T A L</i>	\$2,765,500
<b>TOTAL - Stormwater</b>	<b>\$8,537,500</b>
<b>GRAND TOTAL</b>	<b>\$106,485,000</b>

## HALIFAX WATER

### Capital Budget 2022/23

#### Summary

Asset Category	Project Costs
<i>Stormwater - Pipes -- T O T A L</i>	\$3,406,000
<i>Stormwater - Culverts -- T O T A L</i>	\$2,366,000
<i>Stormwater - Corporate Projects -- T O T A L</i>	\$2,765,500
<b>TOTAL - Stormwater</b>	<b>\$8,537,500</b>
<b>GRAND TOTAL</b>	<b>\$106,485,000</b>

**HALIFAX WATER**

**Capital Budget 2022/23**

**Water**

Project Number	Project Name	Project Cost
<b><u>Water - Land</u></b>		
3.033	Watershed Land Acquisition	\$100,000
3.656	Lake Major Road - Safety and Grading Improvements	\$140,000
<b><i>Water - Land -- T O T A L</i></b>		<b>\$240,000</b>
<b><u>Water - Transmission</u></b>		
3.042	Critical Valve Replacement Program	\$200,000
3.587	Prince Albert Road Transmission Main Replacement	\$100,000
3.554	North End Feeder Replacement - Design	\$200,000
3.571	Highway 118 Crossing - Shubie Park to Dartmouth Crossing	\$120,000
3.631	Transmission Main Upgrades - Churchill Drive Corridor	\$9,420,000
3.293	Peninsula Low North Transmission Main Replacement - Maritime Life and CN Crossing	\$75,000
3.553	Peninsula Intermediate Looping - Quinpool Rd to Young Street (Dublin St 2022)	\$1,622,000
3.679	Extension of Fall River to Bennery Lake - Concept Design Work	\$200,000
3.399	Cogswell Interchange - Water Transmission Main Realignments	\$2,530,000
3.657	Bedford to Burnside Transmission Main Phase 1 - Road Crossings/Casings Culvert Extension	\$880,000
3.550	Bedford to Burnside Transmission Main Phase 2 - Rock Trench Preparations	\$420,000
3.045	Bedford West CCC - Various Phases	\$30,000
3.261	Lakeside Timberlea CCC	\$7,000
3.343	Northgate Oversizing	\$145,000
3.232	MacIntosh Estates Phase 1 Oversizing	\$50,000
<b><i>Water - Transmission -- T O T A L</i></b>		<b>\$15,999,000</b>
<b><u>Water - Distribution</u></b>		
3.022	Water Distribution - Main Renewal Program	\$4,900,000
3.661	Watermain Rehabilitation Structural Lining Program	\$75,000
3.067	~ Valves Renewals	\$200,000
3.068	~ Hydrants Renewals	\$75,000
3.069	~ Service Lines Renewals	\$100,000
3.390	Lead Service Line Replacement Program	\$2,000,000
3.294	Automated Flushing Program	\$20,000
3.296	Water Sampling Station Relocation Program	\$30,000
3.652	Jubilee Road CN Bridge Replacement - Watermain	\$400,000
3.670	Standardization of Hydrant Front Pumper Nozzles	\$175,000

**HALIFAX WATER**

**Capital Budget 2022/23**

**Water**

Project Number	Project Name	Project Cost
3.584	Siversands WSP - Linear Main Extension Cow Bay Road	\$150,000
3.649	Silver Sands Water Meter Installation	\$250,000
3.687	Robie Control Chamber - Peninsula High PRV Installation	\$85,000
3.688	Little Salmon River Bridge Watermain Replacement	\$30,000
<b>Water - Distribution -- T O T A L</b>		<b>\$8,490,000</b>

# HALIFAX WATER

## Capital Budget 2022/23

### Water

Project Number	Project Name	Project Cost
<b><u>Water - Structures</u></b>		
3.601	PRV Valve Replacement Program	\$100,000
3.602	PRV Chamber - Electrical Panel Replacement Program	\$40,000
3.603	DMA - Meter Replacement Program	\$50,000
3.263	District Metered Areas (DMA) Program	\$100,000
3.455	Reservoir Mixing and Residuals Management Upgrade Program	\$300,000
3.623	Booster Station Building Envelope	\$30,000
3.606	Highway #7 Booster Station - Fire Pump Replacement	\$100,000
3.662	Fairview Clayton High Pressure Management Upgrades	\$150,000
3.663	Peninsula High Zone Pressure Management Upgrades	\$27,000
3.664	Robie 2 PRV Chamber Valve Replacement	\$25,000
3.667	Dartmouth - New Meter Replacement	\$110,000
3.358	Blue Mountain Meter Replacement	\$20,000
3.672	Pinehill Drive PRV Chamber Replacement	\$445,000
3.665	Removal of Underground Fuel Tanks - Leiblin, Parkdale and Rockmanor Booster Stations	\$50,000
3.681	Lake Lemont Back Up Supply Facility - Hazardous Material Assessment and Removal	\$90,000
3.477	Aerotech Booster Station Capital Upgrades	\$200,000
3.607	Condition Assessment - Miscellaneous Structures	\$75,000
3.583	PRV Chamber - Gallery Crescent - Sackville	\$295,000
3.528	Beaver Bank Booster Station - Pump Upgrade	\$250,000
3.590	Larry Uteck PRV Chamber - CSE Retrofit	\$60,000
3.591	Starboard Drive PRV Chamber - CSE Retrofit	\$60,000
3.592	Mount Edward PRV - CSE Retrofit	\$66,000
3.288	Akerley Reservoir Rehabilitation	\$7,430,000
3.453	Geizer 123 Reservoir Rehabilitation	\$200,000
3.641	Dam Safety Review - Chain Lake Dam - Capital Work	\$150,000
3.642	Dam Safety Review - Pockwock Lake Dam - Capital Work	\$950,000
3.640	Dam Safety Review - Capital Implementation Program	\$150,000
3.110	Mount Edward Gunite Reservoir Rehabilitation	\$150,000
3.605	Silverside Pumping Station Upgrades Construction	\$100,000
<b><u>Water - Structures -- T O T A L</u></b>		<b>\$11,773,000</b>

### **Water - Treatment Facilities**

**HALIFAX WATER**

**Capital Budget 2022/23**

**Water**

Project Number	Project Name	Project Cost
<b>J D Kline Water Supply Plant:</b>		
3.604	JD Kline WSP - Pretreatment and Clarification - WSEP JDK-800.10	\$604,000
3.633	Program Management Fess and Expenses - WSEP JDK-MAJ	\$479,000
3.673	JD Kline WSP - Purchase Fluorescence Excitation Emission Matrix (FEEM) Analyzer	\$60,000
3.680	JD Kline WSP - Lime System Renewal	\$60,000
3.671	JD Kline WSP - Install In-Line Flow Cytometer	\$150,000
<b>Lake Major Water Supply Plant:</b>		
3.618	Lake Major WSP - Clarification/Pretreatment - WSEP MAJ 800.15	\$500,000
3.158	Lake Major WSP - HVAC at the Low Lift Pumping Station	\$36,000
<b>Bennery Lake Water Supply Plant:</b>		
3.692	Bennery Lake WSP - Lagoon Maintenance Study and Improvements	\$50,000
<b>Non-Urban Core WSP</b>		
3.678	Groundwater Assessment - New Water Source for Middle Musquodoboit System	\$100,000
3.685	Collins Park WSP - New Chemical Storage Building	\$26,000
3.669	Purchase Algae Particle Counter	\$200,000
3.674	Pockwock Lake and Lake Major Stream gaging	\$250,000
3.682	Purchase Mobile Sonde Equipment	\$250,000
3.690	WSP Plants - Instrumentation and Controls Equipment Program	\$100,000
3.691	Pump and Equipment Overhauls Program for WSPs	\$200,000
3.694	Bayers Diversion Site Improvements	\$100,000
<b>Water - Treatment Facilities -- T O T A L</b>		<b>\$3,165,000</b>
<b><u>Water - Energy</u></b>		
3.635	Energy Management Capital Program (Water)	\$100,000
3.107	Chamber HVAC Retro-Commissioning Program	\$100,000
<b>Water - Energy -- T O T A L</b>		<b>\$200,000</b>
<b><u>Water - Security</u></b>		
4.009	Security Upgrade Program	\$50,000
3.683	Safety Equipment (Water)	\$75,000
<b>Water - Security -- T O T A L</b>		<b>\$125,000</b>
<b><u>Water - Equipment</u></b>		
3.101	Miscellaneous Equipment Replacement	\$50,000
3.689	Valve Maintenance Trailer - Purchase	\$85,000



**HALIFAX WATER**

Capital Budget 2022/23

Water

Project Number	Project Name	Project Cost
	<i>Water - Equipment -- T O T A L</i>	\$135,000
	<i>Water - Corporate Projects - T O T A L</i>	\$12,266,500
	<b>GRAND TOTAL - WATER</b>	<b>\$52,393,500</b>

# HALIFAX WATER

## Capital Budget 2022/23

### Wastewater

Project Number	Project Name	Project Cost
<b><u>Wastewater - Collection System</u></b>		
2.168	Wastewater System - Trenchless Rehabilitation Program	\$2,410,000
2.839	Eastern Passage Gravity Pressure Sewer	\$300,000
2.107	Pier A Pumping Station - Gravity Maintenance Bypass	\$125,000
2.103	Jubilee Road CN Bridge Replacement - Wastewater	\$900,000
2.357	Manhole Renewals WW	\$60,000
2.358	Lateral Replacements WW (non-tree roots)	\$1,785,000
2.563	Lateral Replacements WW (tree roots)	\$570,000
2.223	Wet Weather Management Program	\$350,000
2.074	Bedford West Collection System CCC	\$25,000
	Integrated Projects - HRM	
2.052	Integrated Wastewater Projects - Program	\$1,420,000
2.692	Cogswell Redevelopment - Sewer Relocation	\$1,070,000
2.948	Meadowlands PS Elimination	\$90,000
2.356	Auburn Avenue PS Elimination	\$60,000
2.946	SSP - Bayers Road Pocket - Engineering Analysis	\$500,000
2.675	Bayers Road Phase 1 - Sewer Separation	\$55,000
2.835	LoWSCA: Canal Street Separation	\$184,000
2.982	Young Street Pocket - Sewer Separation - Route to Harbour	\$900,000
2.830	Eastern Passage RDII Reduction Program FMZ24	\$55,000
2.831	Eastern Passage RDII Reduction Program FMZ37	\$64,000
2.832	Mill Cove RDII Reduction Program FMZ07 & FMZ40	\$475,000
2.833	Mill Cove RDII Reduction Program FMZ10	\$50,000
2.834	Ellenvale area RDII Reduction Program	\$80,000
2.585	Gottingen Cogswell: Linear Upgrade - Gottingen & Cogswell Area 2_GOT_G2	\$295,000
<b>Wastewater - Collection System -- T O T A L</b>		<b>\$11,823,000</b>
<b><u>Wastewater - Forcemains</u></b>		
2.887	Majestic Avenue Forcemain Replacement & Twinning	\$200,000
2.945	390 Waverley Road Forcemain Upgrades	\$420,000
2.993	Dingle FM Replacement & Twinning	\$75,000
2.102	Bissett Pumping Station - Force Main Section Replacement	\$125,000
<b>Wastewater - Forcemains -- T O T A L</b>		<b>\$820,000</b>

# HALIFAX WATER

## Capital Budget 2022/23

### Wastewater

Project Number	Project Name	Project Cost
<b><u>Wastewater - Structures</u></b>		
2.42	Emergency Pumping Station Pump replacements	\$250,000
2.442	Wastewater Pumping Station Component Replacement Program - West Region	\$200,000
2.443	Wastewater Pumping Station Component Replacement Program - East Region	\$200,000
2.444	Wastewater Pumping Station Component Replacement Program - Central Region	\$250,000
2.920	Herring Cove Pumping Station - Pump Replacements	\$900,000
2.1005	Roach's Pond Pumping Station - Storage Tank Condition Assessment	\$65,000
2.1009	Sackville Street CSO - Screen Rebuild	\$110,000
2.101	Upper Water Street CSO - Screen Rebuild	\$110,000
2.101	CSO Screens - PLC and HMI Upgrades	\$260,000
2.1013	Harbour Solutions Pumping Stations - PLC and HMI Upgrades	\$355,000
2.1014	Main Street Pumping Station (Golf View Drive) Upgrade	\$200,000
2.459	William's Lake PS Rehabilitation	\$440,000
2.66	Bissett PS Component Upgrade	\$4,000,000
2.665	CSO Upgrade Program	\$300,000
2.1004	Pier A Pumping Station VFD Replacement	\$120,000
2.74	Duffus Pumping Station Replacement and CSO Modification	\$210,000
2.1006	Duffus Street Pumping Station - Pump Replacement	\$135,000
2.819	Pumping Station Oil Tank Replacements	\$60,000
2.654	PS Control Panel / Electrical Replacement	\$100,000
2.827	Wastewater Pumping Station Generator Plug/Switch Installations	\$105,000
2.005	Autoport Pleasant Street PS Replacement	\$250,000
<b>Wastewater Structures -- T O T A L</b>		<b>\$8,620,000</b>
<b><u>Wastewater - Treatment Facility</u></b>		
2.056	Plant Optimization Program	\$125,000
2.522	Emergency Wastewater Treatment Facility equipment replacements	\$500,000

# HALIFAX WATER

## Capital Budget 2022/23

### Wastewater

Project Number	Project Name	Project Cost
<b>Halifax Wastewater Treatment Facility:</b>		
2.765	Raw Water Pump Refurbishment	\$55,000
2.773	Industrial Water System - Replacement	\$205,000
2.776	Sludge Dewatering - Fournier Press Upgrades	\$1,900,000
2.952	Replace Hydraulic System Controls	\$120,000
2.953	Wet Well - Stop Log Lifting System	\$50,000
2.954	Raw Water Pumps - VFD Replacement	\$120,000
2.955	VFD Replacement Program	\$100,000
2.956	Chemical Storage Area - Epoxy Floor	\$50,000
2.957	Fibre Optic System Upgrade	\$15,000
<b>Dartmouth Wastewater Treatment Facility:</b>		
2.871	SS Pipe Work Replacement Program	\$200,000
2.790	Fournier Press - Sludge Dewatering Upgrade	\$100,000
2.959	UV Disinfection System - Replace Hydraulic System Controls	\$30,000
2.960	AHU Intake Heating Coil Replacement	\$55,000
2.961	AHU Fan Timing Belts	\$30,000
2.962	Garage Door Replacement	\$50,000
2.963	Fixed Gas Detector System Replacement	\$150,000
2.964	Hypo Storage Tank	\$20,000
2.965	Course Screens Replacement	\$500,000
2.958	Carbon Scrubber - FRP Exhaust Damper Replacement	\$60,000
<b>Herring Cove Wastewater Treatment Facility:</b>		
2.801	Fine Screens - New Perforated Plate Screens	\$1,350,000
2.966	UV Disinfection System - Replace Hydraulic System Controls	\$30,000
2.967	Garage Door Refurbishment	\$30,000
2.968	Chemical Storage Areas - Epoxy Floors	\$30,000
2.968	Chemical Storage Area Upgrades	\$75,000
2.970	New Sludge Extraction Solids Analyzers	\$150,000
2.971	Replace Fournier Press Flywheel Covers	\$25,000
2.972	Grease Sprayers Integration into SCADA	\$50,000
2.973	Carbon Scrubber FRP Exhaust Damper Replacement	\$50,000
<b>Mill Cove Wastewater Treatment Facility:</b>		

# HALIFAX WATER

## Capital Budget 2022/23

### Wastewater

Project Number	Project Name	Project Cost
2.505	Asset Renewal Program	\$100,000
2.903	Dewatering - Centrifuge Rebuild Program	\$30,000
2.989	Headworks Splitter Box Valve Actuators	\$35,000
<b>Eastern Passage Wastewater Treatment Facility:</b>		
2.808	New Yard Tractor	\$12,000
2.974	UV System UPS	\$80,000
2.975	Polymer Bay Heater Upgrades	\$15,000
2.976	Spare Centrifuge Conveyor Gear Box	\$10,000
2.977	Headworks Compressor & Air Dryer Replacement	\$20,000
<b>Aerotech Wastewater Treatment Facility:</b>		
2.912	Lagoon - Fencing Repairs	\$20,000
2.983	Carbon Scrubbers - Media Replacement	\$80,000
2.984	Dewatering - HVAC System Improvements	\$60,000
2.985	Centrate Diversion - Phase 2	\$270,000
<b>Timberlea Wastewater Treatment Facility:</b>		
2.509	Asset Renewal Program	\$125,000
<b>Community Wastewater Treatment Facilities:</b>		
2.05	Asset Renewal Program	\$175,000
2.986	Middle Musquodoboit WWTF - Electrical Upgrades	\$400,000
2.987	Middle Musquodoboit WWTF - Refurbish Polishing Pond Berms	\$75,000
<b>Biosolids Processing Facility:</b>		
2.919	Gas Sensor Upgrade Program	\$15,000
2.924	CS1 - Screw & Liner Replacement	\$75,000
2.930	Facility Upgrade - Preliminary and Detailed Design	\$3,000,000
2.988	Biofilter - Slatted Floor Replacement	\$50,000
<b>Wastewater - Treatment Facility -- T O T A L</b>		<b>\$10,872,000</b>
<b><u>Wastewater - Energy</u></b>		
2.362	Energy Management Capital Program (Wastewater)	\$500,000
2.491	Pump Station HVAC Retro-Commissioning Program	\$100,000
<b>Wastewater - Energy -- T O T A L</b>		<b>\$600,000</b>
<b><u>Wastewater - Security</u></b>		
4.008	Security Upgrade Program	\$200,000

**HALIFAX WATER**

Capital Budget 2022/23

Wastewater

Project Number	Project Name	Project Cost
2.951	Safety Equipment (Wastewater)	\$75,000
<b>Wastewater - Security -- T O T A L</b>		<b>\$275,000</b>
<b><u>Wastewater - Equipment</u></b>		
2.451	Miscellaneous Equipment Replacement	\$120,000
2.1011	Video Nozzle - Sewer Jet	\$37,000
<b>Wastewater - Equipment -- T O T A L</b>		<b>\$157,000</b>
<b>Wastewater - Corporate Projects -- T O T A L</b>		<b>\$12,387,000</b>
<b>GRAND TOTAL - WASTEWATER</b>		<b>\$45,554,000</b>

# HALIFAX WATER

## Capital Budget 2022/23

### Stormwater

Project Number	Project Name	Project Cost
<b><u>Stormwater - Pipes</u></b>		
1.038	Integrated Stormwater Projects - Program	\$1,200,000
1.102	Manhole Renewals SW	\$16,000
1.103	Catchbasin Renewals SW	\$65,000
1.135	Lateral Replacements SW	\$25,000
1.204	National Disaster Mitigation Program	\$50,000
1.145	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Irishtown Rd to Harbour	\$150,000
1.247	Penhorn Lake Stormwater System Renewal	\$1,000,000
1.188	Cogswell Redevelopment - SW Sewer Relocation	\$900,000
<b><u>Stormwater - Pipes -- T O T A L</u></b>		<b>\$3,406,000</b>
<b><u>Stormwater - Culverts/Ditches</u></b>		
1.104	Driveway Culvert Replacements	\$1,200,000
1.279	Corss Road Culvert Replacement Program - Field discovery and operations construction	\$100,000
<b><u>Street Specific Culvert Replacements:</u></b>		
1.260	43 Flat Lake Drive	\$25,000
1.261	39 Flat Lake Drive	\$30,000
1.262	9 Flat Lake Drive	\$30,000
1.263	1 Windsor Drive	\$25,000
1.264	51 Buckingham Drive	\$35,000
1.265	1 Cambridge Court	\$30,000
1.266	73 Kingsway Drive	\$30,000
1.267	22 Kingsway Drive	\$25,000
1.268	1 Arbutus Avenue	\$27,000
1.269	6 Iris Avenue	\$25,000
1.270	2 Primrose Avenue	\$25,000
1.214	Bundy Lane, near civic 79	\$66,000
1.215	Parkway Dr at Atholea Dr	\$65,000
1.216	Fredrick Dr at Dyke Rd	\$93,000
1.217	Millers Rd, near civic 1	\$81,000
1.271	Seabreeze Dr at Caldwell Rd	\$94,000
1.272	Shore Rd, near civic 2269	\$62,000
1.274	Riley Rd, near civic 135	\$87,000

**HALIFAX WATER**

**Capital Budget 2022/23**

**Stormwater**

Project Number	Project Name	Project Cost
1.275	Wilfred Joseph Dr at Simmonds Rd	\$76,000
1.276	Old German Rd, near civic 10	\$70,000
1.278	Sime Crt, near civic 5	\$65,000
<b>Stormwater - Culverts/Ditches -- T O T A L</b>		<b>\$2,366,000</b>
<b>Stormwater - Corporate Projects -- T O T A L</b>		<b>\$2,765,500</b>
<b>GRAND TOTAL - STORMWATER</b>		<b>\$8,537,500</b>



# HALIFAX WATER

## Capital Budget 2022/23

### Corporate Projects

Project Number	Project Name	Project Cost
<b><u>Corporate - Information Technology</u></b>		
4.157	Asset Condition	\$190,000
4.151	Capital Planning	\$1,000,000
1.011	Computer Replacement Program	\$400,000
4.147	Document Management Sharepoint Rollout	\$300,000
4.149	Electronic Content Management Linkage	\$200,000
4.126	Full Enterprise Data Warehouse	\$300,000
4.153	General Analytic Tool	\$100,000
4.012	Network Upgrades	\$280,000
4.101	Mobile Devices and Applications	\$800,000
4.095	New CRM with Integration	\$500,000
4.048	SAP Rate Structure Support	\$220,000
4.15	Enterprise Resource Planning Solution	\$2,100,000
4.107	Customer Portal	\$200,000
4.152	Security Awareness	\$420,000
4.152	Vulnerability and Patch Management	\$190,000
4.152	Data Protection and Classification	\$900,000
4.152	Asset and Configuration Management	\$245,000
4.152	Identity and Access Management	\$150,000
4.152	Policy and Standards	\$135,000
4.152	Change Management	\$120,000
4.152	Authentication and Authorization	\$40,000
4.152	Risk Management	\$460,000
4.152	Third Party Risk Management	\$310,000
4.152	Continuity and Resilience	\$180,000
4.194	Explore Intelligent Water	\$260,000
4.195	New Service Account Compliance Program	\$430,000
<b>Corporate - Information Technology -- T O T A L</b>		<b>\$10,430,000</b>
<b><u>Corporate - GIS</u></b>		
4.04	GIS Data Program	\$250,000
4.115	GIS Data Build - Services (IC)	\$150,000
4.01	Sewer Service Entry	\$150,000
4.116	GIS Data Project (CAD schematic retirement)	\$100,000
4.038	GIS Hardware/Software Program	\$50,000

**HALIFAX WATER**

**Capital Budget 2022/23**

**Corporate Projects**

Project Number	Project Name	Project Cost
4.039	GIS Application Support Program	\$150,000
4.105	GIS/Cityworks Upgrade Program	\$50,000
4.059	GIS Data Modelling	\$50,000
4.155	Stormwater Billing Imagery Acquisition and Analysis	\$150,000
4.198	Intelligent Water (GIS Initiatives)	\$50,000
<b>Corporate - GIS -- T O T A L</b>		<b>\$1,150,000</b>
<b><u>Corporate - Asset Management</u></b>		
2.872	Wastewater Sewer Condition Assessment	\$285,000
1.254	Storm Sewer Condition Assessment	\$125,000

**HALIFAX WATER**

**Capital Budget 2022/23**

**Corporate Projects**

<b>Project Number</b>	<b>Project Name</b>	<b>Project Cost</b>
2.043	Corporate Flow Monitoring Program	\$1,200,000
4.158	Condition Assessment Program	\$400,000
4.163	Annual Asset Management Plan Update	\$10,000
4.165	Asset Management Awareness Program	\$20,000
4.168	Model Enhancements	\$50,000
4.113	Climate Change Management Program	\$200,000
4.183	Annual Unit Rates Review	\$10,000
4.184	Institutional Capacity Assessment Update	\$50,000
4.185	Regional Development Charge Program Implementation	\$300,000
4.178	Model Update and Calibration	\$75,000
2.878	Wastewater Treatment Facilities Compliance Plan	\$150,000
4.197	CSO Management Study	\$50,000
1.496	Water Safety Plan	\$500,000
<b>Corporate - Asset Management -- T O T A L</b>		<b>\$3,425,000</b>
<b><u>Corporate - Facility</u></b>		
4.187	Burnside Operations Centre	\$9,000,000
4.077	Building Capital Improvements	\$230,000
3.221	Energy Management Capital Program	\$100,000
<b>Corporate - Facility -- T O T A L</b>		<b>\$9,330,000</b>
<b><u>Corporate - SCADA &amp; Other Equipment</u></b>		
4.093	GPS Units - Replacement	\$45,000
4.189	Central Spread Spectrum Radio Network Replacement Program	\$40,000
4.191	ICS Cyber-Security Enhancements 2022-2023	\$105,000
4.192	PI System Enhancements 2022-2023	\$150,000
4.193	AMI Communications Upgrade 2022/2023	\$30,000
4.190	SCADA Equipment Renewals 2022-2023	\$48,000
4.188	Wastewater Community Plant Scada Enhancements	\$26,000
4.154	Customer Meters - New and Replacement	\$530,000
<b>Corporate - SCADA &amp; Other Equipment -- T O T A L</b>		<b>\$974,000</b>
<b><u>Corporate - Fleet</u></b>		
4.006	Fleet Upgrade Program Stormwater	\$351,000
4.006	Fleet Upgrade Program Wastewater	\$1,404,000
4.007	Fleet Upgrade Program Water	\$355,000
<b>Corporate - Fleet -- T O T A L</b>		<b>\$2,110,000</b>

**HALIFAX WATER**

Capital Budget 2022/23

Corporate Projects

Project Number	Project Name	Project Cost
<b>GRAND TOTAL - Corporate Projects</b>		<b>\$27,419,000</b>
<b>ALLOCATION BREAKDOWN:</b>		
Water - Corporate Projects - T O T A L		\$12,266,500
Wastewater - Corporate Projects -- T O T A L		\$12,387,000
Stormwater - Corporate Projects - T O T A L		\$2,765,500
<b>GRAND TOTAL - Corporate Projects</b>		<b>\$27,419,000</b>

**HALIFAX WATER**

**Capital Budget 2022/23**

**Summary of Routine Capital Expenditures included within Capital Budget**

Project Number	Project Name	Project Cost	Asset Class
3.067	Valves Renewals	\$200,000	Water
3.068	Hydrants Renewals	\$75,000	Water
3.069	Service Lines Renewals	\$100,000	Water
3.390	Lead Service Line Replacement Program	\$2,000,000	Water
3.101	Miscellaneous Equipment Replacement (W)	\$50,000	Water
4.007	Fleet Upgrade Program Water	\$355,000	Water
2.357	Manhole Renewals WW	\$60,000	Wastewater
2.358	Lateral Replacements WW (non-tree roots)	\$1,785,000	Wastewater
2.563	Lateral Replacements WW (tree roots)	\$570,000	Wastewater
2.451	Miscellaneous Equipment Replacement (WW)	\$120,000	Wastewater
4.006	Fleet Upgrade Program Wastewater	\$1,404,000	Wastewater
1.102	Manhole Renewals SW	\$16,000	Stormwater
1.103	Catchbasin Renewals SW	\$65,000	Stormwater
1.135	Lateral Replacements SW	\$25,000	Stormwater
4.006	Fleet Upgrade Program Stormwater	\$351,000	Stormwater
4.011	Desktop Computer Replacement Program	\$400,000	Corporate
4.093	GPS Units - Replacement	\$45,000	Corporate
4.154	Customer Meters - New and Replacement	\$530,000	Corporate
4.012	Network Upgrades	\$280,000	Water & Wastewater
<b>GRAND TOTAL - Routine Capital Projects</b>		<b>\$8,431,000</b>	

## Appendix C: 2022/23 Operating Budget

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**HALIFAX WATER**  
**STATEMENT OF EARNINGS - ALL SERVICES - NSUARB**  
**PROPOSED OPERATING BUDGET**  
**APRIL 1, 2022 to MARCH 31, 2023**  
( in thousands )

	ACTUAL APR 1/20 MAR 31/21	APPROVED BUDGET (1) APR 1/21 MAR 31/22	PROPOSED BUDGET APR 1/22 MAR 31/23
<b>Operating revenues</b>	\$ 136,569	\$ 150,466	\$ 152,765
<b>Operating expenditures</b>	<u>113,689</u>	<u>125,379</u>	<u>128,788</u>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<u>22,880</u>	<u>25,087</u>	<u>23,977</u>
<b>Financial and other revenues</b>			
Interest	215	173	105
Other	748	549	628
	<u>963</u>	<u>722</u>	<u>733</u>
<b>Financial and other expenditures</b>			
Interest on long term debt	7,118	7,603	6,669
Repayment on long term debt	20,379	22,717	21,846
Amortization of debt discount	209	258	233
Dividend/grant in lieu of taxes	5,951	6,836	6,804
Other	69	46	46
	<u>33,726</u>	<u>37,461</u>	<u>35,598</u>
<b>Loss for the year</b>	<u>\$ (9,883)</u>	<u>\$ (11,651)</u>	<u>\$ (10,888)</u>

1. 2021/22 Operating Budget approved by the Halifax Water Board of Commissioners, January 28, 2021.

**HALIFAX WATER**  
**STATEMENT OF EARNINGS - WATER - NSUARB**  
**PROPOSED OPERATING BUDGET**  
**APRIL 1, 2022 to MARCH 31, 2023**  
**( in thousands )**

	ACTUAL APR 1/20 MAR 31/21	APPROVED BUDGET (1) APR 1/21 MAR 31/22	PROPOSED BUDGET APR 1/22 MAR 31/23
<b>Operating revenues</b>			
Water	\$ 47,631	\$ 48,424	\$ 48,771
Public fire protection	7,336	7,628	7,628
Private fire protection	1,001	1,312	1,335
Bulk water stations	318	337	334
Late payment and other connection fees	155	236	264
Miscellaneous	204	276	296
	<u>56,645</u>	<u>58,212</u>	<u>58,629</u>
<b>Operating expenditures</b>			
Water supply and treatment	9,987	10,778	11,246
Water transmission and distribution	12,031	11,876	12,441
Engineering and technology services	3,654	5,654	4,667
Regulatory services	1,091	1,201	1,465
Corporate services	2,614	4,565	3,985
Administration	3,619	2,511	2,986
Depreciation and amortization	10,879	12,052	12,171
	<u>43,875</u>	<u>48,637</u>	<u>48,961</u>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<u>12,770</u>	<u>9,576</u>	<u>9,667</u>
<b>Financial and other revenues</b>			
	<u>699</u>	<u>495</u>	<u>545</u>
<b>Financial and other expenditures</b>			
	<u>12,974</u>	<u>15,292</u>	<u>14,387</u>
<b>Earnings (loss) for the year</b>	<u>\$ 495</u>	<u>\$ (5,221)</u>	<u>\$ (4,175)</u>

1. 2021/22 Operating Budget approved by the Halifax Water Board of Commissioners, January 28, 2021.

**HALIFAX WATER**  
**STATEMENT OF EARNINGS - WASTEWATER - NSUARB**  
**PROPOSED OPERATING BUDGET**  
**APRIL 1, 2022 to MARCH 31, 2023**  
**( in thousands )**

	ACTUAL APR 1/20 MAR 31/21	APPROVED BUDGET (1) APR 1/21 MAR 31/22	PROPOSED BUDGET APR 1/22 MAR 31/23
<b>Operating revenues</b>			
Wastewater	\$ 69,605	\$ 80,619	\$ 81,608
Leachate and other contract revenue	416	484	491
Septage tipping fees	486	505	475
Overstrength surcharge	1	15	0
Airplane effluent	33	76	76
Late payment and other connection fees	118	221	247
Miscellaneous	163	247	253
	<u>70,822</u>	<u>82,166</u>	<u>83,149</u>
<b>Operating expenditures</b>			
Wastewater collection	14,467	12,604	13,096
Wastewater treatment	20,623	22,071	23,395
Engineering and technology services	4,187	5,881	7,109
Regulatory services	1,385	1,587	1,674
Corporate services	2,189	3,840	3,480
Administration	2,965	2,079	2,582
Depreciation and amortization	15,019	16,775	16,093
	<u>60,835</u>	<u>64,838</u>	<u>67,429</u>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<u>9,987</u>	<u>17,329</u>	<u>15,721</u>
<b>Financial and other revenues</b>	<u>231</u>	<u>197</u>	<u>176</u>
<b>Financial and other expenditures</b>	<u>18,176</u>	<u>19,043</u>	<u>18,167</u>
<b>Loss for the year</b>	<u>\$ (7,958)</u>	<u>\$ (1,518)</u>	<u>\$ (2,270)</u>

1. 2021/22 Operating Budget approved by the Halifax Water Board of Commissioners, January 28, 2021.



**HALIFAX WATER**  
**STATEMENT OF EARNINGS - STORMWATER - NSUARB**  
**PROPOSED OPERATING BUDGET**  
**APRIL 1, 2022 to MARCH 31, 2023**  
**( in thousands )**

	ACTUAL APR 1/20 MAR 31/21	APPROVED BUDGET (1) APR 1/21 MAR 31/22	PROPOSED BUDGET APR 1/22 MAR 31/23
<b>Operating revenues</b>			
Stormwater site generated service	\$ 5,127	\$ 6,051	\$ 6,790
Stormwater right of way service	3,835	3,835	3,996
Late payment and other connection fees	38	104	104
Miscellaneous	102	97	97
	<u>9,102</u>	<u>10,087</u>	<u>10,987</u>
<b>Operating expenditures</b>			
Stormwater collection	4,762	5,885	5,281
Engineering and technology services	440	1,396	2,165
Regulatory services	1,505	1,684	1,727
Corporate services	278	555	349
Administration	482	338	287
Depreciation and amortization	1,512	2,046	2,588
	<u>8,979</u>	<u>11,905</u>	<u>12,398</u>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<u>123</u>	<u>(1,817)</u>	<u>(1,411)</u>
<b>Financial and other revenues</b>	<u>33</u>	<u>31</u>	<u>12</u>
<b>Financial and other expenditures</b>	<u>2,576</u>	<u>3,126</u>	<u>3,043</u>
<b>Loss for the year</b>	<u>\$ (2,420)</u>	<u>\$ (4,912)</u>	<u>\$ (4,442)</u>

1. 2021/22 Operating Budget approved by the Halifax Water Board of Commissioners, January 28, 2021.

**HALIFAX WATER**  
**STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB**  
**PROPOSED OPERATING BUDGET**  
**APRIL 1, 2022 to MARCH 31, 2023**  
**( in thousands )**

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	ACTUAL APR 1/20 MAR 31/21	APPROVED BUDGET (1) APR 1/21 MAR 31/22	PROPOSED BUDGET APR 1/22 MAR 31/23
<b>REGULATED ACTIVITIES</b>			
<b>Operating revenues</b>			
Water	\$ 47,631	\$ 48,424	\$ 48,771
Wastewater	69,605	80,619	81,608
Stormwater	8,962	9,886	10,785
Public fire protection	7,336	7,628	7,628
Private fire protection	1,001	1,312	1,335
Other	1,061	1,495	1,557
	<u>135,596</u>	<u>149,363</u>	<u>151,684</u>
<b>Operating expenditures</b>			
Water supply and treatment	9,970	10,740	11,208
Water transmission and distribution	12,031	11,876	12,441
Wastewater collection	14,421	12,503	13,000
Stormwater collection	4,762	5,885	5,281
Wastewater treatment	20,060	21,274	22,634
Engineering and technology services	8,281	12,910	13,934
Regulatory services	3,981	4,471	4,866
Corporate services	5,026	8,887	7,799
Administration	7,028	4,859	5,706
Depreciation and amortization	27,392	30,872	30,852
	<u>112,952</u>	<u>124,278</u>	<u>127,721</u>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<u>22,644</u>	<u>25,086</u>	<u>23,963</u>
<b>Financial and other revenues</b>			
Interest	215	173	105
Other	88	31	32
	<u>303</u>	<u>204</u>	<u>137</u>
<b>Financial and other expenditures</b>			
Interest on long term debt	7,118	7,592	6,669
Repayment on long term debt	20,379	22,693	21,846
Amortization of debt discount	209	258	233
Dividend/grant in lieu of taxes	5,951	6,836	6,804
Other		1	1
	<u>33,657</u>	<u>37,381</u>	<u>35,553</u>
<b>Loss for the year</b>	<u>\$ (10,710)</u>	<u>\$ (12,091)</u>	<u>\$ (11,452)</u>
<b>UNREGULATED ACTIVITIES</b>			
<b>Operating revenues</b>			
Septage tipping fees	\$ 486	\$ 505	\$ 475
Leachate and other contract revenue	416	484	491
Airplane effluent	33	76	76
Miscellaneous	38	38	38
	<u>973</u>	<u>1,103</u>	<u>1,080</u>
<b>Operating expenditures</b>			
Water supply and treatment	17	32	32
Wastewater collection	46	88	82
Wastewater treatment	563	798	762
Sponsorships and donations	93	73	73
Depreciation and amortization	18	0	0
Administration	0	110	119
	<u>737</u>	<u>1,101</u>	<u>1,067</u>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<u>236</u>	<u>2</u>	<u>13</u>
<b>Financial and other revenues</b>			
Other	660	518	596
<b>Financial and other expenditures</b>			
Other	69	80	45
	<u>69</u>	<u>80</u>	<u>45</u>
<b>Earnings for the year</b>	<u>\$ 827</u>	<u>\$ 440</u>	<u>\$ 564</u>
<b>Total earnings (loss) for the year (Regulated and Unregulated)</b>	<u>\$ (9,883)</u>	<u>\$ (11,651)</u>	<u>\$ (10,888)</u>





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## Appendix D: 2022/23 Business Plan on a Page



# 2022/23 Business Plan



<b>Our Mission</b> To provide world-class services for our customers and our environment.		<b>Our Vision</b> We will provide our customers with high quality water, wastewater, and stormwater services. Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment. We will fully engage employees through teamwork, innovation, and professional development.	
<b>Our Values</b>			
<b>Relationships</b> We nurture relationships with our customers, our team members and the environment. We are engaged in the neighbourhoods we serve and we support continual learning across our team.	<b>Innovation</b> We are among the top utilities across the continent and we are known on the global stage. We always ask, "how can we improve efficiency, sustainability, creativity and the customer experience?"	<b>Accountability</b> We refuse to cut corners. We check in with our excellence standards regularly and look to one another for support. Safety steers our decision-making. We are driven to make our policies, decisions and projects as clear as our drinking water.	<b>Protection</b> Halifax Water protects the health and well-being of our population. We exist to guard natural resources, finding ways to sustain our communities and environment.
 <b>People</b> We attract and retain high-quality team members in an inclusive and respectful work environment. We are committed to our customers and the communities where we live and work, determined to provide a high level of service and sustainable future through ongoing engagement. <ul style="list-style-type: none"><li>Enhance workforce planning (talent management, meeting staff resource requirements, training, etc).</li><li>Build a positive &amp; diverse workplace.</li><li>Increase stakeholder &amp; customer engagement.</li><li>Support transition of Halifax Water Board with new members.</li><li>Ensure that major initiatives have communication and stakeholder engagement plans.</li><li>Enhance information available to customers through Customer Connect &amp; bill redesign.</li></ul>	 <b>Health, Safety &amp; Environment</b> We are focused on a safety-first culture, working to provide healthy, safe, sustainable, and reliable services for our community. <ul style="list-style-type: none"><li>Continue to enhance safety &amp; security culture, starting with Safety Leadership training.</li><li>Gain approval for new biosolids strategy &amp; execute a contract for the new Biosolids Processing Facility (BPF).</li><li>Develop a Climate Action Plan.</li><li>Align green initiatives for fleet and buildings with Climate Action Plan.</li><li>Maintain regulatory compliance &amp; enhance reporting.</li><li>Execute the Get the Lead Out program.</li><li>Launch new service compliance program.</li><li>Implement corporate Environmental Management System (EMS).</li></ul>	 <b>Financial &amp; Regulatory Accountability</b> It is fundamental to ensure that Halifax Water has capacity to fund existing and future infrastructure. We prudently manage assets and operate our business by balancing value and customer service. <ul style="list-style-type: none"><li>Improve financial position &amp; update the long-range financial plan.</li><li>Optimize capital project planning &amp; delivery.</li><li>Progress asset management &amp; infrastructure planning initiatives.</li><li>Complete an actuarial valuation of the Halifax Water Employees' Pension Plan &amp; implement recommendations.</li><li>Complete a cost-of-service hearing &amp; file a general rate application.</li><li>Complete System Assessment reports &amp; Water Safety Plans.</li><li>Secure Regulatory approval for:<ul style="list-style-type: none"><li>Cogswell District Energy System (DES)</li><li>Burnside Operations Depot</li><li>Cogswell Redevelopment Infrastructure Relocation</li><li>Biosolids Processing Facility (BPF)</li><li>Mill Cove WWTF Upgrade</li></ul></li></ul>	 <b>Operational Excellence</b> We are committed to service, reliability, and quality for our customers. Focused on safely and efficiently building, operating, and maintaining our critical infrastructure, we ensure a more sustainable community. <ul style="list-style-type: none"><li>Implement expanded stormwater service in June 2022.</li><li>Develop an operating plan for the Burnside Operations Depot.</li><li>Year 2: Water Supply Enhancement Program.</li><li>Optimize Water Supply Plant (WSP) &amp; Wastewater Treatment Facility (WWTF) processes through Dalhousie research partnership.</li><li>Incorporate Digital Water Strategy in the Five Year Strategic Plan.</li><li>Implement corporate Enterprise Risk Management (ERM) &amp; improve cyber security maturity.</li><li>Implement Enterprise Resource Planning (ERP) project to improve operational efficiency.</li><li>Maintain a high level of day-to-day service that our customers have come to expect.</li></ul>

**STRAIGHT from  
the SOURCE**







2020/21 - 2024/25

# Five-Year Business Plan

Approved by the Halifax Water Board  
January 30, 2020

**STRAIGHT from  
the SOURCE**



**HALIFAX WATER**  
**Five-Year Business Plan**  
**2020/21 to 2024/25**

## **Glossary**

AM	Asset Management
AMIT	Asset Management Implementation Team
AMP	Asset Management Plan
AO	Aesthetic Objective
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
BLT	Beechville-Lakeside Timberlea
BMPs	Best Management Practices
BOD	Biochemical Oxygen Demand
BPF	Biosolids Processing Facility
CapEx	Capital Expenditures
CBOD	Carbonaceous Biochemical Oxygen Demand
CCME	Canadian Council of Ministers of the Environment
CCTV	Closed Circuit Television
CEC	Contaminants of Emerging Concern
CIPP	Cured in Place Pipe
CFIA	Canadian Food Inspection Agency
COMFIT	Community Feed-In Tariff
COS	Cost of Service
CMMS	Computerized Maintenance Management System
CRM	Customer Relationship Management
CSO	Combined Sewer Overflow
CSMMW	Canada-Wide Strategy for the Management of Municipal Wastewater Effluent
CUPE	Canadian Union of Public Employees
CWWF	Clean Water and Wastewater Fund
dia.	Diameter
EMAP	Energy Management Action Plan
EMP	Emergency Management Plan
EMS	Environmental Management System
EMSC	Energy Management Steering Committee
EMO	Energy Management Opportunities
EPWWTF	Eastern Passage Wastewater Treatment Facility
ERA	Environmental Risk Assessment
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
GHG	Greenhouse Gas
GIS	Geographic Information System
HHSP	Halifax Harbour Solutions Project
HRM	Halifax Regional Municipality
HRWC	Halifax Regional Water Commission
I&I	Inflow & Infiltration
ICI	Industrial, Commercial & Institutional

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ICIP	Investing in Canada Infrastructure Program
ICS	Incident Command System
IDF	Intensity-Duration-Frequency
IMP	Infrastructure Master Plan
IRP	Integrated Resource Plan
IRS	Internal Responsibility System
IS	Information Systems
JOHSC	Joint Occupation Health & Safety Committee
LSL	Lead Service Line
m <sup>3</sup>	Cubic Metre
MAC	Maximum Acceptable Concentration
MGD	Million Gallons per Day
NDWAC	National Drinking Water Advisory Council
NOM	Natural Organic Matter
NSE	Nova Scotia Environment
NSERC	Natural Sciences and Engineering Research Council
NSPI	Nova Scotia Power Inc.
NSUARB	Nova Scotia Utility and Review Board
OHS	Occupational Health & Safety
OpEx	Operating Expenditures
PIEVC	Public Infrastructure Engineering Vulnerability Committee
PRV	Pressure Reducing Valve
PS	Photovoltaic
PV	Pumping Station
PWI	Preventing Workplace Injury
RDC	Regional Development Charge
RDII	Rainfall Derived Inflow & Infiltration
ROW	Right of Way
RWWFP	Regional Wastewater Functional Plan
SCADA	Supervisory Control and Data Acquisition
SSES	Sanitary Sewer Evaluation Survey
SSO	Sanitary Sewer Overflow
TA	Transitional Authorization
TOC	Total Organic Carbon
TRC	Total Residual Chlorine
TSS	Total Suspended Solids
UV	Ultraviolet
WEF	Water Environment Federation
WRWIP	West Region Wastewater Infrastructure Plan
WSER	Wastewater Systems Effluent Regulations
WWMP	Wet Weather Management Plan
WWTF	Wastewater Treatment Facility
WQMP	Water Quality Master Plan

**HALIFAX WATER**  
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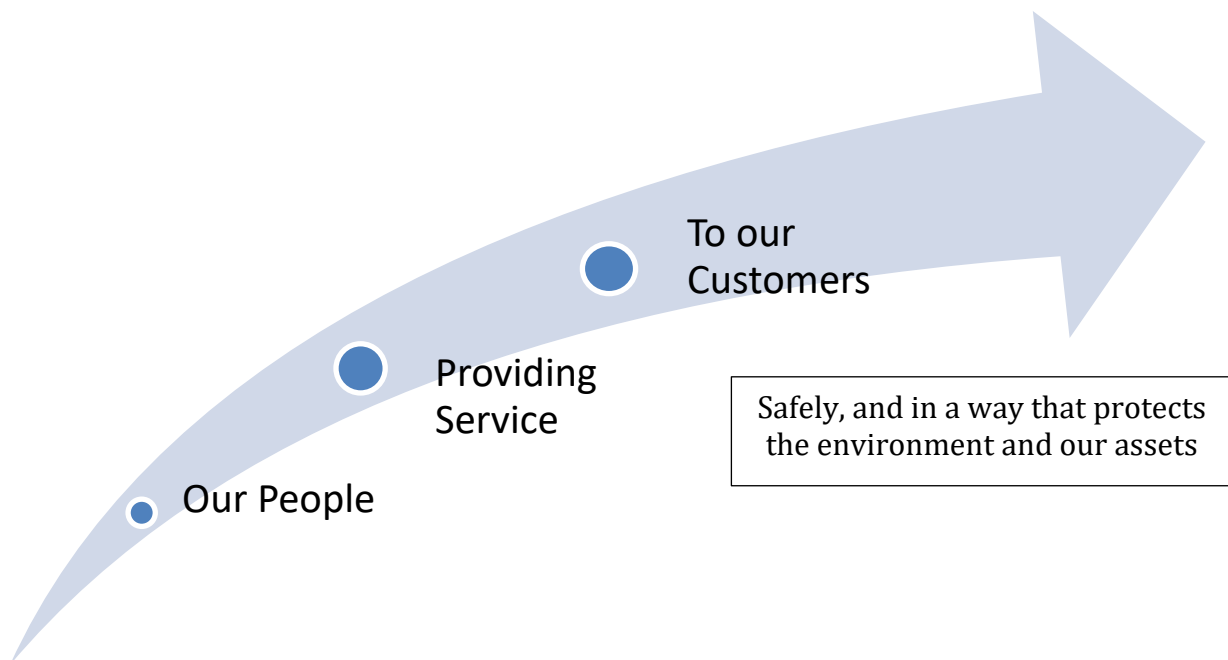
## **1. EXECUTIVE SUMMARY**

January 1, 2020 marks 75 years of service for Halifax Water. Halifax Water has grown from the Halifax Public Service Commission established in 1945 to provide water service to the city of Halifax; to an integrated water, wastewater and stormwater utility serving 105,000 customers and an estimated population of 370,000.

Halifax Water has ambitious plans for continued innovation and improvement that are outlined in this Five-Year Business Plan for the period 2020/21 – 2024/25.

This Five-Year Business Plan and 75th Anniversary presents a great opportunity to reflect on accomplishments but also provides an opportunity to recalibrate business plans for current strategic drivers. As such, staff have compiled a Five-Year Business Plan to capture the most current information. The attached Business Plan will serve as a guidance document for the implementation of programs and strategies over the next five years and position the utility for service delivery in the long-term. This Five-Year Business Plan recognizes the need for further capital investment as contemplated in the updated Integrated Resource Plan (IRP). Halifax Water is taking positive actions towards climate adaptation in ensuring the updated IRP considers climate vulnerabilities to reduce risk to infrastructure and service delivery.

**Figure 1: Graphic Representation of Halifax Water Mission**



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Halifax Water's mission is **to provide world class services for our customers and our environment**; and our vision of how we will accomplish this is threefold.

1. We will provide our customers with high quality water, wastewater and stormwater service.
2. Through the adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance and stewardship of the environment.
3. We will fully engage employees through teamwork, innovation and professional development.

In addition to the mission, vision and values Halifax Water's business plans are guided by decisions of the Halifax Water Board, and regulations, policies and direction from two regulators – the Nova Scotia Utility and Review Board and the Nova Scotia Department of Environment.

Halifax Water develops both long-term and short-term business plans for the approval of the Commission Board. The Five-Year Business Plan is consistent with the updated IRP approved by the Halifax Water Board in November 2019.

The Nova Scotia Utility and Review Board (NSUARB) Accounting and Reporting Handbook requires the submission of multi-year (three year) operating and capital budgets by September 30th of each year. The three years submitted are a subset of the Five-Year budget. To meet the annual three-year reporting requirement, the Five-Year budget must be refreshed mid-cycle. A refresh would also be considered as part of rate applications to ensure the information submitted is current. The last Five-Year Business Plan covered the period 2018/19 to 2022/23; and was based on the 2012 IRP.

The Five-Year Business Plan provides an overview of the framework and strategic drivers that impact the delivery of water, wastewater and stormwater services over the long-term. The framework consists of the 2019 IRP, the Debt Strategy, and Cost of Service Manual. These mature strategies guide development of business plans, capital and operating budgets; revenue requirements and rates.

As indicated in the 2019 IRP, there is a pressing need to replace aging water, wastewater and stormwater infrastructure that will affect operating and capital budgets. The Business Plan presents the capital program and projected operating budgets for the next five years, and includes many major capital projects such as upgrades to the Pockwock and Lake Major water supply plants, upgrades to the Mill Cove Wastewater Treatment facility, and the next phase of the Sullivan's Pond stormwater project. Over the next five years, Halifax Water will be developing and implementing strategies to increase the level of capital expenditures to the level recommended by the IRP to address the strategic drivers of asset renewal, growth, and regulatory compliance. Of the three strategic drivers included in the IRP, asset renewal

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will present the greatest challenge recognizing the backlog of investments in relation to the replacement of aging infrastructure.

The updated Five-Year Business Plan is important to support the application to increase water and wastewater rates in 2020. No rate changes for stormwater service are planned at this time; however, the need to adjust stormwater rates will be considered after satellite imagery used to measure billable impervious area is updated in spring 2020.

Halifax Water has ambitious plans for continued innovation and improvement that are outlined in the Five-Year Business Plan. Along with many other technology and customer focused projects, a customer portal combined with recently installed Advanced Meter Infrastructure will help transform Halifax Water into the utility of the future. The document also recognizes the increased importance of enterprise risk management, formal asset management, energy management and wet weather management programs to optimize service delivery and demonstrate value for our customers.

Several challenges and opportunities will garner the attention of the utility over the next five years, namely:

- 1. Implementation of the updated IRP and optimizing the processes used to plan, procure, and deliver capital projects:** The current water, wastewater and stormwater rates are insufficient to meet the capital needs for sustainable infrastructure as identified in the IRP. The IRP acknowledges that wastewater and stormwater assets have been grossly underfunded historically. Institutional capacity will have to be optimized over the term of this Business Plan in order to deliver the expected capital projects; and the processes used to plan, procure and deliver capital projects will be reviewed to achieve a target of spending 80 – 90% of the annual capital budget within the year it is approved. This is an aggressive target, given the multi-year nature and complexity of some of Halifax Water's capital projects.
- 2. Enhanced Customer Service:** Investment in employee training and technology are key to enhancing customer service. With the completion of installation of advanced meter infrastructure as part of the Customer Connect Project in 2020; Halifax Water is now focused on building and implementing a customer portal. The expectation of customers is increasing rapidly and the adoption of new technologies and business process is paramount to provide the best in customer service. Halifax Water has and will continue to invest in enhancing integration and functionality of existing systems Geographic Information System (GIS), Computerized Maintenance Management Systems (CMMS), the telephony system, and Customer Relationship Management (CRM) to enhance the customer experience through its Customer Care Centre. Greater emphasis will be placed on measuring customer satisfaction, and utility performance relative to customer centric service levels.

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3. **Lead Line Replacement Program:** The utility will further enhance its program to replace all lead service lines (LSLs) on the Halifax peninsula and downtown Dartmouth areas by increasing the level of financial assistance, and pushing for more integration of LSL replacements in conjunction with the HRM street renewals. This is based on industry best practice and recent research conducted in partnership with Dalhousie University. As Halifax Water is in the health protection` business, complete LSL renewal will be pursued for public health outcomes.
4. **Wet Weather Management:** The level of service offered by the utility can be increased if innovative business processes and technology are embedded in day to day operations for the ultimate protection of the environment. Managing the effects of wet weather, and reducing inflow and infiltration (I&I) are key to creating capacity within existing infrastructure and avoiding some future capital costs. Over the next five years, it is anticipated Halifax Water will develop new programs and tools to work with customers to address I&I issues on private property. It is estimated that more than 50% of I&I originates from private property.
5. **Employee Satisfaction:** In the next five years many of Halifax Water's workforce will be eligible to retire. To compete, attract and retain top talent, in addition to providing competitive wages and benefits, Halifax Water must strive to create a respectful work environment where employees are fully engaged through teamwork, innovation and professional development. Continued investment in improving internal communications, talent management, training, civility and respect in the workplace, and diversity will help create the kind of work environment where our employees are engaged and provide service safely, and in a way that protects the environment, our assets, and always keeps the customer in mind.
6. **Regulatory Compliance:** 2020/21 will see the implementation of a new system to track regulatory compliance and support regulatory compliance activities. In addition to improved systems and processes to support environmental regulatory compliance, a new payroll system being implemented in 2020/21 will have new functionality that will promote Occupational Health and Safety (OHS) through tracking of training and certifications required by employees.
7. **Environmental Stewardship:** Halifax Water's updated IRP contains projects that will help the utility with climate change adaptation and mitigation. Recent research indicates that climate change is accelerating, as evidenced by projections of sea level rise, more intense storm events, and changing precipitation patterns. Our environmental stewardship will also be enhanced through extension of the Environmental Management System (EMS) (ISO 14001) on a corporate wide basis. The EMS will help minimize the impact our operations have on the environment, and promote compliance with applicable laws, regulations, and other environmentally oriented requirements.

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- 8. Water and Wastewater Research:** Building on the success of the current drinking water research program with Dalhousie University, Halifax Water is expanding the program to include wastewater to ensure that treatment plants are optimized and upgraded to meet the current federal wastewater regulations at the lowest cost. Wastewater research focused on optimizing treatment processes and contaminants of emerging concerns (CEC) may help Halifax Water reduce what is estimated to be a \$425 M cost to upgrade the three HHSP from advanced primary to secondary treatment.
- 9. Technological Investment:** Halifax Water's Five-Year IT Strategic Plan calls for continued investment in core operating systems. Throughout the span of the Five-Year Business Plan Halifax Water will implement a new payroll solution (including an employee portal), a customer portal, a new Enterprise Resource Planning system (ERP), and will continue to make investments in foundational security projects that support cyber-security, continuity of service and protection of data.

In order to achieve the strategic objectives presented in this Five-Year business plan, Halifax Water will have to increase rates. Overall annual revenues will need to increase over the five-year period with the primary focus on the capital needs driven by asset renewal. Halifax Water is not alone in its quest for more sustainable funding. Unfortunately, water, wastewater and stormwater assets have been underfunded throughout North America, and other municipalities/utilities have made, or are making plans to increase rates. The projected rate increases associated with this business plan will be viewed in the context of customer affordability, with a goal of maintaining an average annual residential bill for water, wastewater and stormwater service that is less than 2% of median household income. The utility is proposing to continue with the H2O (Help to Others) Program to support low income customers, with funding from unregulated activities; and hopes to increase the funding, awareness, and utilization of this program.

Inherent in the business activities for Halifax Water is an obligation to provide value for customers as stewards of essential services. To that end, the Business Plan highlights very formal programs to deliver efficient and effective service through Enterprise Risk Management, Asset Management, Energy Management, Wet Weather Management, and the Cost Containment Program. The Wet Weather Management program, in particular, presents an opportunity to improve service delivery at a lower cost and has already shown positive results. A structured approach is in place, similar to the process used by the utility for water loss control. Halifax Water is recognized as a world leader in water loss control and the corporate goal is to put wet weather management in the same category.

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## **2. INTRODUCTION**

Halifax Water is a “one water” utility, delivering water, wastewater and stormwater service. Halifax Water is just reaching maturity as a one water utility. 2019 was the first year since the transfer of wastewater and stormwater assets from the Halifax Regional Municipality (HRM) in 2007 that all 14 wastewater treatment facilities were in compliance with regulations.

In 2012, the utility completed its first IRP; and an updated IRP in 2019 identifying investments required over a thirty year period under the strategic drivers of asset renewal, regulatory compliance and growth. After the first IRP in 2012 plans were put in place to make progress on all three strategic drivers. Halifax Water has made significant progress on wastewater treatment facility compliance. Since the upgrade of the Aerotech plant was completed in 2019, all wastewater treatment facilities are compliant with the new federal wastewater system effluent regulations or operate under approved transitional authorizations. The utility has also kept pace with growth within the municipality and helped facilitate development while ensuring cost neutrality to the existing rate base by implementing Regional Development Charges (RDCs) consistent with the Public Utilities Act. With respect to asset renewal, there has been steady progress to increase capital investments as contemplated in the IRP, although at a more moderate pace. These capital investments continue to benefit from better information and data collected over the last ten years.

As part of Halifax Water’s sustainability framework, key projects will be ready to advance under existing and future federal infrastructure programs, such as the Investing in Canada Infrastructure Program (ICIP, the Building Canada Fund and the Clean Water and Wastewater Fund (CWWF). Support from other levels of government through infrastructure funding is necessary if Halifax Water is to reach the recommended level of capital spend while preserving rate affordability.

In order to close the gap on asset renewal funding however, future rate increases are inevitable. These rate increases must follow the principle of gradualism to balance rate shock and affordability to customers. Accordingly, Halifax Water will attempt to implement its infrastructure investments with a smoothing strategy in mind. In conformance with the Public Utilities Act, all of these investments and associated funding must be based on cost causation principles and occur within the context of intergenerational equity. It is anticipated that additional funding from federal programs will be available to mitigate the impact on Halifax Water’s rate base and thus temper otherwise higher rate increases.



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### **3. CURRENT RATE STRUCTURES**

Halifax Water has a Cost of Service based rate structure for water, wastewater and stormwater service, as approved by the Nova Scotia Utility and Review Board (NSUARB). Rates are adjusted periodically when the cost of providing the service is out of line with the revenue generated by the existing rates. When an adjustment is required, Halifax Water makes an application to the NSUARB, and a formal public hearing process is held to ensure proposed rates are thoroughly reviewed in an open, objective and transparent manner.

Halifax Water has programs in place to contain costs, monitor rate affordability, and project and smooth future revenue requirements to ensure that customers are not shocked by sudden or dramatic rate increases.

#### **3.1 Water Service**

The existing charges for water service have been in place since April 1, 2016 and consist of two components – a base charge, and a charge that varies according to consumption of water. Water base rates vary by meter size and range from \$13.00 per month for a 15 mm (5/8") diameter meter to \$1,575.00 per month for a 250 mm (10") diameter meter. The consumption charge for water service is \$0.976 per m<sup>3</sup>. The water-rate structure also provides for a public fire-protection charge to the municipality based on a formula approved by the NSUARB.

#### **3.2 Wastewater Service**

The existing charges for wastewater service have been in place since April 1, 2016 and consist of two components – a base charge, and a discharge rate that varies in relation to water consumption. Wastewater base rates vary by meter size and range from \$14.00 per month for a 15 mm (5/8") diameter meter to \$1,923.00 per month for a 250 mm (10") diameter meter. The wastewater discharge rate is based on metered water consumption, and is \$1.753 per m<sup>3</sup>.

Halifax Water has a wastewater rebate program that is available to customers who use more than 1,000 m<sup>3</sup> of water in a 12 month period and can demonstrate the volume of wastewater they discharge is less than the volume of water they use. This is covered by Section 22 of Halifax Water's Rules and Regulations. As an example, manufacturing facilities that use a large volume of water that is consumed in their product, or complexes with cooling towers may qualify for this rebate.

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### **3.3 Stormwater Service**

Stormwater rates are established based on impervious area. The current rates for stormwater service have been in place since July 1, 2017. There are two stormwater rates – one billed to all customers to recoup the cost of collecting and managing stormwater from private property (Site Related Flow Charge) and one billed to the HRM for collecting and managing stormwater from the street right of way (HRM ROW Charge). HRM, in turn, charges properties within the stormwater serviceable boundary to cover their portion of the HRM ROW Charge, and Halifax Water collects and administers this charge on HRM's behalf.

The Site Related Flow Charge for non-residential customers is \$0.135 per m<sup>2</sup> of impervious area. The Site Related Flow Charge for residential customers is based on the same rate per m<sup>2</sup> but residential customers are billed according to a flat rate per tier. There are five tiers and properties are grouped according to the amount of impervious area. The lowest tier is comprised of properties with less than 50 m<sup>2</sup> of impervious area – and they are exempt from the charge, provide they do not have a driveway culvert. The largest properties – those with 810 m<sup>2</sup> or more of impervious area, are charged \$81 a year. Most residential properties fall in Tier 2 or 3 and are charged \$14 or \$28 per year, respectively.

Effective October 1, 2017, Halifax Water is collecting the HRM ROW Charge on behalf of HRM, and the charge is currently set at \$40 per year, per property.

Properties that do not receive stormwater service are exempt from both the Site Related Flow Charge and the HRM ROW Charge.

Effective July 1, 2017, a stormwater credit program was implemented for non-residential (Institutional, Commercial, Industrial) customers. Non-residential properties with stormwater Best Management Practices (BMPs), like retention ponds that help manage peak flows, may be eligible for a credit. Non-residential properties include multi-unit dwellings of four or more units.

Halifax Water plans to update satellite imagery, the cost of service model, and rates for stormwater service in 2020/21, with a few to adjusting rates in 2021/22.

### **3.4 Regional Development Charge**

The Halifax Water Regional Development Charge (RDC) is a fee payable at the building permit stage of a new development to fund regional water and wastewater infrastructure expansion requirements related to growth. The RDC was approved in 2014 and provides fairness across the rate base ensuring current customers do not subsidize new growth and development.

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When the RDC rates were approved, Halifax Water committed to update the RDC on a 5 year cycle, or mid-cycle if any of the assumptions used in determining the RDC impact the value of the charge by +/- 15%. No mid-cycle adjustment was required. Since approving the RDC, Halifax Water has completed a more detailed Infrastructure Master Plan, for water and wastewater infrastructure, to be used as inputs to the updating of the RDC.

In 2017 and 2019, Halifax Water conducted formal and informal stakeholder consultation on the updated RDC. The proposed updates were presented to the Halifax Water Board in October 2019, and the subsequent application was submitted to the NSUARB in November 2019. There is a Hearing scheduled for March 2020.

The updates included current population forecasts, people per unit, the unit type ratios, design per capita consumption values, standardized costing and benefit to existing frameworks.

Money collected from the RDC funds upgrades and improvements to the regional wastewater and water systems that are required to accommodate growth anticipated within the Municipality's Regional Plan. There is no RDC for stormwater. The infrastructure requirements were identified through the Infrastructure Master Plan which is part of the IRP, discussed in Section 7.1.

#### **4. COST OF SERVICE/RATE DESIGN**

Halifax Water has Cost of Service based rates developed using industry best practice. There is a Cost of Service (COS) Manual which clearly guides how rates are calculated for water, wastewater and stormwater service. The COS Manual was based on American Water Works Association (AWWA) and Water Environment Federation (WEF) methodologies for cost of service/rate design.

The COS Manual was developed through a process of engagement with interested parties, including prior rate case interveners and the NSUARB. The COS Manual is a living document which is periodically updated to reflect current data and new information, to support any proposed changes in rates. All changes to the COS Manual must be approved by the NSUARB.

The current rates are in line with the COS Manual, and are a true reflection of the cost of providing service in all respects except for one aspect. Halifax Water has not yet included depreciation as an expense on contributed water and wastewater assets, and most stormwater assets. Halifax Water plans to incorporate this in the future.

The COS Manual for Stormwater will be updated in Year 1 of the Five-Year Business Plan, after impervious area is updated with new satellite imagery. The COS Manual for Water and Wastewater will be updated in Year 2 of the Five-Year Business Plan, based on the first full year of AMI data after all meter conversions are completed.

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## **5. WASTEWATER SYSTEM EFFLUENT REGULATIONS**

The Wastewater System Effluent Regulations (WSER) were enacted in June 2012. These regulations, made under the Fisheries Act, implement those aspects of the Canadian Council of the Ministers of the Environment (CCME) Strategy for the Management of Municipal Wastewater Effluent which fall under federal jurisdiction, namely the discharge of deleterious substances to fish habitat. The WSER defines the following as deleterious substances, and sets national standards for their discharge:

- Carbonaceous Biochemical Oxygen Demand (CBOD); 25 mg/L
- Total Suspended Solids (TSS); 25 mg/L
- Total Residual Chlorine (TRC – for facilities using chlorine disinfection); 0.02 mg/L
- Un-ionized Ammonia; 1.25 mg/L as Nitrogen, at 15°C ± 1°C.

Wastewater treatment facilities (WWTFs) are authorized to discharge these substances at levels below the defined limits, provided that the effluent is not acutely lethal to trout as determined by standard toxicity testing. Facilities not in compliance with the limits were required to apply for a Transitional Authorization (TA) to deposit effluent exceeding those limits. The Authorization is valid for a period of 10, 20 or 30 years, depending on the risk level associated with the effluent, as determined by a defined risk-ranking system in the WSER.

Halifax Water obtained TAs effective January 1, 2015, for the Halifax and Dartmouth WWTFs, which remain in effect until December 31 of 2040. Both Halifax and Dartmouth WWTFs are medium risk, and would normally have 20 years to achieve compliance. However, both of these systems have combined sewer overflows (CSOs) which are higher risk than the WWTFs. The WSER provides that for systems having at least one CSO which is higher risk than the WWTF, the compliance period for high or medium risk WWTFs may be extended from 10 or 20 years respectively, to 30 years (from 2010). CSO discharges must also be reduced beginning in 2041, after the TA has expired. Although there are no further details in the WSER regarding the reduction, such as extent and timing, Environment Canada staff have indicated by email that *“a significant reduction ... must be achieved immediately after the TA’s expiry date”*.

A Compliance Plan was developed as part of the IRP. The Compliance Plan provides Halifax Water with a tool to plan for upgrades to the WWTFs and reduce CSO discharges.

Instances of detected toxicity have been due to chlorine levels (where chlorine is used as a disinfectant), or are of unknown cause, and are under continuing investigation. It is recognized that pH drift during the tests can be a factor, and a pH-stabilized version of the toxicity test is in use for the Mill Cove and Eastern Passage WWTFs. The Lakeside-Timberlea WWTF is the only remaining WWTF using chlorine for disinfection (all others use Ultraviolet

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systems), and includes a de-chlorination process prior to discharge to meet the WSER chlorine limit.

The WSER also requires quarterly monitoring reports for each WWTF (depending on Annual Average Daily Volume), documenting the monthly or quarterly total effluent volume, the concentrations of CBOD and TSS and results of toxicity analysis (when required). These reports have all been submitted as required by the WSER, since 2013.

## **6. DRINKING WATER REGULATIONS**

Over the last two years, Health Canada has set a direction of proactively reviewing its guidelines on a regular basis. This is a change from the previous ten to twenty years where the Health Canada Drinking Water agenda could be predicted by the agenda of the US Environmental Protection Agency. As a result, Health Canada has produced draft guidelines for public consultation that were not anticipated by utilities and advocacy groups. This will be cause for some uncertainty in this area until the basis for Health Canada's agenda becomes more widely known.

**Manganese:** Manganese is a metal which is ubiquitous in most Nova Scotia groundwater and surface water sources. The most common effects of manganese have been black staining on plumbing fixtures and laundry and has, to date, been regulated as an aesthetic objective (AO) in the Guidelines for Canadian Drinking Water Quality. In Nova Scotia, AO parameters serve only as a guidepost to utilities that problems will ensue if the AO value is exceeded. They are not a regulatory compliance issue.

In 2019, Health Canada published a new manganese guideline. The new guideline decreases the AO value from 0.05 to 0.02 ug/L, but more importantly, creates a health related value or maximum acceptable concentration (MAC) of 0.1 ug/L. Health Canada has created the MAC because they believe that manganese can have effects similar to lead in drinking water.

While manganese exists in most of our water sources to some degree, the level is such that it is easily removed. Two of our systems, Bennery Lake and Silver Sands have more challenging manganese issues. Both supplies have appropriate treatment systems to keep manganese below the MAC level continuously. Based on discussion with Nova Scotia Environment regarding their compliance approach, we do not believe manganese will create treatment challenges for Halifax Water. There is no practical effect in lowering the AO value as we currently provide treatment that is aesthetically acceptable to customers the vast majority of the time.

Manganese may prove to be a concern in future as it relates to distribution system water quality. When distribution system events result in discolored water, manganese is often a component of the material causing the color. Halifax Water quality staff is continuing to work on managing distribution system water quality, considering the manganese guideline. The

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new guideline may result in some changes in future to how we communicate distribution system water quality to customers.

**Lead:** In January of 2019, Health Canada issued a new guideline for lead. Health Canada's previous guideline was outdated, not based on the most recent science, and did not serve to protect public health. The new guideline is half of the level of the previous, and uses a more challenging sampling protocol. Based on this, it will be much more challenging to maintain regulatory compliance.

Halifax Water is currently doing everything possible to reduce lead in drinking water. We have customer sampling upon request, and a program to promote LSL replacement with rebates and financing assistance for private lateral replacement. We also have a corrosion control treatment program that is optimized to mitigate lead exposure.

In November 2019, the Halifax Water Board approved proposed enhancements to the LSL rebate program. The program enhancements will be submitted for NSUARB approval in conjunction with the 2020 Rate Application.

While the new guideline may result in the occasional non-compliance with NSE requirements, the solution is to work with customers to replace the LSL. Halifax Water will continue its efforts to inventory LSLs, communicate with customers about lead and work with them to replace LSL's.

**Other Guidelines:** Health Canada has the following guidelines consultations underway:

- Aluminum
- E.coli
- Natural Organic Matter (NOM)
- Total coliforms
- Chloramines
- Barium

Of the above guidelines, none are expected to be treatment or compliance challenges for Halifax Water. Aluminum and NOM are being proposed as operational guidelines. This means that they will not be automatically included in operating approvals, however, best practice language may inform future iterations of the operating approvals. While both of these may be challenging today, planned upgrades to treatment facilities should address any challenges raised by these proposed guidelines.

**Nova Scotia Environment Operating Approvals:** Approvals for operating all water systems expired on March 31, 2018. Nova Scotia Environment began issuing new approvals in June of 2019.

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Not all approvals have been received, and Halifax Water staff is working through them as they are received to make sure business process are in place to ensure compliance. Previous approvals placed less emphasis on ancillary processes, such as disposal of treatment waste and approval administration. The new approvals appear to be placing greater emphasis on these ancillary areas, bringing them up to the standard of the core drinking water processes. This may result in the requirement to make capital investment in some plant ancillary processes.

## **7. FINANCIAL PROGRAMS & PRO FORMA BUDGETS**

### **7.1 Capital Program**

#### **7.1.1 2019 Integrated Resource Plan**

An updated IRP was completed in 2019. The IRP Update built on the previous studies to address three primary drivers: growth (Infrastructure Master Plan), asset renewal (AMPs), and regulatory compliance (Compliance Plan). This project reviewed existing supply and demand side management activities Halifax Water has done or could do to optimize service delivery, created a six-step program integration approach, and produced a comprehensive 30-year capital investment program.

**Figure 2: IRP Strategic Linkages**



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Several important initiatives aimed at filling data gaps have been completed or initiated since the first IRP in 2012. These included:

- Implementing the Wet Weather Management Program (with inflow and infiltration reduction pilot projects);
- Continuing the implementation of the Asset Management Program (foundational elements from the AM Roadmap);
- Resolving asset attribute information gaps in GIS, and carrying out specific inventory and condition assessment projects;
- Developing Asset Management Plans (AMPs) by asset class;
- Implementing the Corporate Flow Monitoring Program;
- Implementing the Sewer Inspection Program (using closed circuit television (CCTV) inspection methods);
- Completing the Hydraulic Modelling Assessment and Strategy;
- Completing the West Region Wastewater Infrastructure Plan (WRWIP);
- Completing the Infrastructure Master Plan.

The Infrastructure Master Plan project is the latest undertaking towards data and knowledge gap completion. The Infrastructure Master Plan looked at growth requirements for the balance of the wastewater infrastructure planning (east and central regions), included the program developed in the WRWIP, and included a water infrastructure plan for all regions. The project also included a climate change assessment and a policy component to develop a climate change adaptation plan and a systems optimization plan. The project enables Halifax Water to streamline prior long-term planning initiatives to facilitate regular, holistic Infrastructure Master Plan updates on a five-year cycle for water and wastewater infrastructure.

The IRP update was completed in November 2019 and incorporates findings from work completed or planned to support the drivers of regulatory compliance, asset renewal, and growth. The IRP update features a review of demand and supply side management activities Halifax Water has been or could be involved in. Further, it uses a systematic approach to reviewing integration opportunities for outputs of the predecessor plans (Compliance Plan, AMPs, Infrastructure Master Plan).

The resulting IRP Update recalibrates the long-term investment to an estimated \$4.1 billion over 30 years with and anticipated review as part of Halifax Water's long-term planning cycle every 5 years. Several key initiatives have been identified to support the next IRP update.



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### **7.1.2 Asset Management Program**

The Asset Management division of the Engineering & IS Department provides services related to Infrastructure Planning (master planning, hydraulic system modelling, and flow monitoring), and Asset Management (program initiatives, asset management plan (AMP) development, and capital budget development).

In support of developing formal AMPs, staff have focused efforts on data collection. With some specific projects for condition assessment, staff have been able to provide detailed condition data for the Wastewater Treatment Facilities, Wastewater Pumping Stations, and Stormwater Cross Culvert asset classes. Where condition data has not been available, staff have been gathering data on asset attributes (size, age, and material) to use as a surrogate for condition in developing the AMPs.

A key outcome of the AMPs has been the recommendation for the establishment of Asset Management Implementation Teams (AMITs). AMITs are expected to work towards coordinate and integrated decisions about assets, the services they support, and the expenditures needed to meet agreed levels of service. Three AMITs were established to address Water Transmission Mains, Wastewater Forcemains, and Stormwater Cross Culverts – one for each of the infrastructure system types. Water Chambers and Booster Stations, Water Distribution Mains and Water Reservoirs have been incorporated into a “Water Network AMIT”. Adding other asset classes into the Wastewater and Stormwater AMITs is under consideration to determine the most effective aggregation and efficient use of staff resources in Engineering and Operations.

The current sewer inspection program commences year five of the five-year contract in 2020/21. As such, staff will be working on preparing the request for proposal for services associated with the next five-year contract. Staff will review opportunities to pre-qualify service providers that may allow Halifax Water to re-engage mass scale inspection techniques in addition to the conventional closed circuit television (CCTV) inspections. A central focus of the program is collection of the data to enable seamless upload to Halifax Water’s GIS and simplicity in sharing the outcomes with all staff.

The Asset Management Team has a well-defined, and well-executed process for capital budget development resulting in the one-year and five-year capital programs. The process leverages inputs from the capital project planning database and the supporting capital project summary reports for each project or line item identified in the capital budget

Following the completion of previous long-term planning initiatives such as the Regional Wastewater Functional Plan (RWWFP), the first IRP, and the West Region Wastewater Infrastructure Plan (WRWIP), Infrastructure Planning staff have completed the Infrastructure Master Plan and the IRP Update.

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The Infrastructure Master Plan brought the findings and recommendations of the WRWIP forward, assessed long-term wastewater infrastructure needs for the east and central regions, and water infrastructure needs for all service regions. The project included a “Vulnerability to Climate Change” asset assessment framework task and a rebuild of the wastewater hydraulic model.

The Infrastructure Planning team manages the corporate flow monitoring program that is entering year five of the five-year contract in 2020/21. The flow monitoring program has been invaluable to Halifax Water in terms of providing accurate, reliable, and defensible data upon which model calibration, system analysis, and system decisions can be made. Similar to the CCTV program, the focus of this program is on purchasing data and its usability and accessibility for other users at Halifax Water.

Infrastructure Planning staff have worked closely on the hydraulic model build for the wastewater system with the consulting team for the Infrastructure Master Plan. Adherence to Halifax Water’s Hydraulic Modelling Strategy included building with new modelling software for the wastewater system. For the water system, staff are completing a water model build assessment to confirm the components and requirements for the upcoming model build. The new water model will be able to leverage data collected through the Advance Metering Infrastructure (AMI) project to provide more accurate demand loading.

The Asset Management (AM) team has recently been working on an AM communications assessment aimed at identifying ways the AM team can better highlight the work being done by the team, help other departments connect with the AM programs and personnel, and present key reference documents and processes related to AM and infrastructure planning work. Halifax Water’s intranet will be foundational for disseminating information and processes to the organization.

Anticipated projects for the Five-Year Business Plan cycle for the AM and Infrastructure Planning staff are outlined in Figure 3.

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**Figure 3: Five-Year Business Plan Cycle – AM and Infrastructure Plan**

	2020/21				2021/22				2022/23				2023/24				2024/25			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>CORE PROGRAMS</b>																				
Asset Management Plan																				
Sewer Inspection Program																				
Corporate Flow Monitoring Program																				
Capital Budget Development																				
Infrastructure Master Plan																				
Integrated Resource Plan																				
Asset Management Implementation Teams																				
AM Communications / Intranet Updates																				
<b>SUPPORTING PROGRAMS AND STUDIES</b>																				
Hydraulic Water Model Build																				
Safe Yield Study																				
Transmission Main Risk Assessment																				
SSO Management Program																				
Climate Change Risk Assessment Program																				
Model Update and Calibration																				

### 7.1.3 Five-Year Capital Budget – General Overview

As part of the utility's overall mission, the annual capital budget provides funds for the acquisition, replacement, or rehabilitation of capital assets. Capital assets include all equipment; facilities; and linear infrastructures that have an asset value that exceeds \$5,000 and a useful life that exceeds one year. The capital budget development funding and subsequent project delivery help ensure that services are provided in a cost-effective and efficient manner with a focus on long-term integrity of systems.

As discussed in Section 7.1, the development of the annual and long-term capital budget has its foundation with the Engineering & IS department's core Asset Management program. This program organizes, evaluates, and prioritizes all infrastructures by individual asset class. The core asset-class priorities are reviewed and coordinated with staff from Engineering & IS and Operations departments to identify the highest-priority projects. These projects are further reviewed with technical staff from the municipality's Transportation and Public Works group to review integration opportunities with the proposed Streets Program. A detailed overview of the major projects within the proposed five-year capital budget is provided in Section 7.1.4.

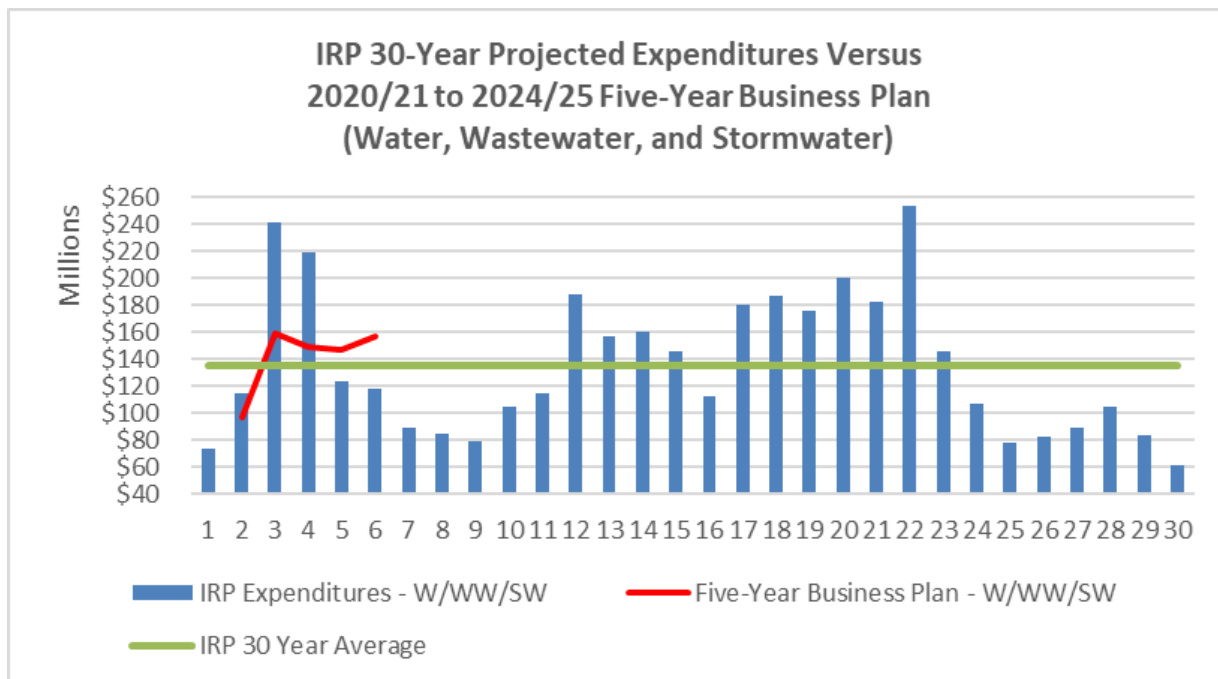
The proposed five-year capital budget is then reviewed against available sources of funding to consider the impact on depreciation and debt servicing, future operating expenses, and rates.

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In addition to the core infrastructure projects within the capital budget, employees from all departments define annual capital-equipment requirements to meet their operational mandates. These include equipment classes such as fleet, large tools, computer equipment, and consumption meters.

The full five-year capital budget is shown in Appendix D. The totals can be seen in Figure 4 below. The year-one (2020/21) budget has a total project value of \$48,929,500 for water, \$38,448,000 for wastewater, and \$9,136,500 for stormwater, with a five-year total project value of \$293,775,500 for water, \$352,250,500 for wastewater, and \$62,425,000 for stormwater. The total planned capital spend over five-year period is projected to be \$708,451,000

**Figure 4: Five-Year Capital Program Compared to 2019 IRP**



The capital budget is funded from a variety of sources. The core funding is from capital-asset depreciation accounts and long-term debt. This core funding is enhanced with regional development charges, external grants, and operating surplus, when available. The base funding amount for capital projects from depreciation increases as the NSUARB approves additions to utility plant-in-service and revenue requirements.

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**Figure 5: Five-Year Capital Program Funding**

	Capital Funding Projection					Total
	2020-21	2021-22	2022-23	2023-24	2024-25	
<b>Water</b>						
External Funding	4,770,000	12,326,050	12,347,950	6,862,000	3,105,200	39,411,200
Depreciation	11,479,000	12,434,000	13,516,000	13,819,000	13,919,000	65,167,000
Debt Funding	23,183,300	46,567,700	39,347,050	28,472,250	33,189,800	170,760,100
Regional Development Charge	150,000	2,828,250	3,264,000	167,250	2,680,500	9,090,000
CCC	9,347,200					9,347,200
<b>Total Water</b>	<b>48,929,500</b>	<b>74,156,000</b>	<b>68,475,000</b>	<b>49,320,500</b>	<b>52,894,500</b>	<b>293,775,500</b>
<b>Wastewater</b>						
External Funding	934,630	820,460	8,278,060	1,003,860	935,360	11,972,370
Depreciation	15,974,000	17,101,000	18,213,000	18,157,000	19,516,000	88,961,000
Debt Funding	17,740,970	32,249,990	19,318,140	35,891,590	27,892,990	133,093,680
Regional Development Charge	3,798,400	22,575,550	14,481,800	32,391,050	44,729,150	117,975,950
CCC		247,500				247,500
<b>Total Wastewater</b>	<b>38,448,000</b>	<b>72,994,500</b>	<b>60,291,000</b>	<b>87,443,500</b>	<b>93,073,500</b>	<b>352,250,500</b>
<b>Stormwater</b>						
External Funding	18,280	255,850				274,130
Depreciation	1,582,000	1,776,000	1,997,000	2,003,000	2,177,000	9,535,000
Debt Funding	7,536,220	9,816,650	18,096,000	8,438,000	8,729,000	52,615,870
Regional Development Charge						-
CCC						-
<b>Total Stormwater</b>	<b>9,136,500</b>	<b>11,848,500</b>	<b>20,093,000</b>	<b>10,441,000</b>	<b>10,906,000</b>	<b>62,425,000</b>
<b>Total</b>	<b>96,514,000</b>	<b>158,999,000</b>	<b>148,859,000</b>	<b>147,205,000</b>	<b>156,874,000</b>	<b>708,451,000</b>

The historical and current level of capital funding is less than the amount recommended by the IRP. The required increase in capital infrastructure investments is defined in detail within the 2019 IRP. The proposed five-year capital budget shows a transition from historical spending levels towards the level recommended within the IRP, as can be seen in Figure 4 above. A transitional period allows for the development of institutional capacity to deliver the increased volume of projects, increased funding, and enhanced Asset Management protocols to identify and prioritize specific projects. The IRP recommended level of spending is not smooth or consistent, therefore increasing capital funding will be balanced with smoothing impacts on rates, and maintaining targets for debt servicing and rate affordability.

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#### **7.1.4 Major Projects**

##### **Integrated Capital Projects:**

**Project:** Halifax Water Infrastructure Renewal Integrated with Halifax Municipal Street Renewal Program

**Asset Class:** Water Distribution, Wastewater and Stormwater Collection

**Description:** This program involves the renewal of water distribution, wastewater collection and stormwater collection infrastructure in an integrated approach with the municipality's annual Street renewal program. Water, wastewater and stormwater pipes and appurtenances are replaced or rehabilitated when approaching or exceeding their useful life cost effectively while the host municipal street is being renewed. The integrated program reduces the total project cost and minimizes the overall disturbance on community neighbourhoods. Halifax Water's planned expenditures on this program are approximately \$7 M – \$8 M per year.

**Project:** HRM Cogswell Redevelopment

**Asset Class:** Water, Wastewater, and Stormwater

**Description:** The municipality is currently finalizing the design phase of the Cogswell Redevelopment Project. The municipality plans to proceed to the tender phase of the project in late 2019 or early 2020 with approximate three year construction phase. There will be many impacts to the utility's water, wastewater and stormwater infrastructure. All net new infrastructure required to provide service to new buildings would be part of the municipal project cost. However, the relocation of existing infrastructure, required due to road alignment changes would be the responsibility of Halifax Water, based on the municipal Streets By-law. The estimated infrastructure investment for Halifax Water is \$15 M.

##### **Water Capital Projects:**

**Project:** Main Street to Caledonia Road Transmission Main

**Asset Class:** Water – Transmission Main

**Description:** Halifax Water is working to construct a new 600 mm diameter transmission main from Main Street to Caledonia Road in Dartmouth. This is the first phase of a multiple phase project to improve capacity, resiliency and reliability for the water supply to the general area of Burnside. The overall cost estimate for this project is approximately \$6 M.

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**Project:** Chain Control to Peninsula Transmission Main Rehabilitation

**Asset Class:** Water – Transmission Main

**Description:** Replacement and rehabilitation of major components of the existing water transmission system from the Chain Lake Control area to the Halifax Peninsula. The project will provide increased capacity, improve reliability and enhance system resilience for water delivery to the peninsula. The multi-year project is estimated to cost approximately \$6,500,000.

**Project:** Bedford South (Hemlock) Reservoir

**Asset Class:** Water – Structures

**Description:** The Hemlock Reservoir location and storage volume have been established in previous master planning studies completed for the Bedford South, Bedford West and Birch Cove North development areas. As these areas have developed over the last 20 years, the need for the reservoir is being constructed to meet level of service requirements in the water distribution system. The reservoir will be located at an existing Halifax Water control chamber on Masthead Court and will be 30 meters in diameter and height with a total storage volume of 21.5 million liters. Construction is anticipated to start in spring 2020 with substantial completion in spring 2021. The estimated project cost is approximately \$10 M with majority funding for the Halifax Water Capital Cost Contribution program.

**Project:** Cowie Hill Reservoir Replacement

**Asset Class:** Water – Structures

**Description:** The Cowie Hill Reservoir is a 2.4 MG gunite water storage reservoir that was constructed in 1972. The reservoir underwent a significant rehabilitation from 1990 to 1996. The internal and external inspection found numerous locations where the gunite covering had spalled off leaving the underlying steel reinforcing wires exposed and rusting. There are numerous locations on the wall that show evidence of cracks and leakage through the wall of the reservoir. The gunite reservoir inspection program identified the Cowie Reservoir as a priority for rehabilitation, however, subsequent detailed design work determined that the reservoir should be replaced as it has reached the end of its useful life and replacement has a more cost effective than rehabilitation.

The project will involve retaining a consulting engineer to design and prepare a replacement plan. It is anticipated that the design work be undertaken in 2020 and the work will then be tendered and constructed in the summer of 2021.

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**Project:** J.D. Kline Water Supply Plant – Process Upgrades

**Asset Class:** Water – Treatment Facilities

**Description:** Source Water Quality at JD Kline WSP has been changing because of the phenomenon known as lake recovery from acidification. Over the past few years, pH of the lake has been coming up. This means that the lake is more susceptible to sustain biological activity. This in turn has shown its effects in the last few years in terms of appearance of geosmin in the source water as well as most recent event in summer of 2018 where algal diatoms clogged filters to the point that it rendered the plant with not enough production to meet the distribution demand. Additionally, the amount of organics in the lake have been increasing (TOC was 1.7 mg/L in 1977 and is at 3.8 mg/l in 2019). It is to a point where it is difficult to operate the plant in its current configuration as a direct filtration plant. In order to deal with the water quality impacts from lake recovery, a clarification step needs to be added to the treatment train. Halifax Water is in the process of procuring services of a consulting team to provide expert advice and help in terms of next steps, treatment process selection, procurement and execution of projects. Some of the projects that are going to form part of these upgrades are a review and potential upgrade of existing pre-treatment setup, new or retrofit existing flocculation basins and addition of a new clarifier treatment. Other important projects that will need to happen concurrently are optimization of the existing backwash system as well as improvements to the lagoons to handle additional solids loading. All these projects are scheduled to be completed over the next five to seven years.

The J.D. Kline Water Supply Plant was commissioned in 1977 to service the City of Halifax, Town of Bedford, and parts of Halifax County. Due to the age of the facility, process equipment is nearing the end of its useful life. As well, certain treatment technologies from 30 years ago no longer meet current standards.

**Project:** Lake Major Water Supply Plant – Process Upgrades

**Asset Class:** Water – Treatment Facilities

**Description:** Lake Major WSP was commissioned in 1999. In the last few years, there have been changes to the source water in terms of pH and organics which are in line with similar trends experienced by Pockwock Lake from lake recovery. In addition to that, there has been a substantial increase in organics load from the mass blowdown of trees in the watershed during Hurricane Juan in 2003. All that has added up to significant increases in process chemicals and challenging conditions for optimal water treatment. Additionally, the clarifier technology employed in the plant is more suited towards highly turbid waters. Contrary to that, Lake Major has very low source water turbidity which leads to improper clarification performance. Moreover, the serviceable life of the clarifier and the filtration system is 20 years. Hence, both clarification and filtration system need to be rehabilitated with newer technology much suited for the current source water. The raw water pump station was built in 1960s and was an inheritance from the old Lake Lamont system. It has also come to the end of its serviceable life. Considering all these factors, Halifax Water has currently engaged a consulting team to help with the upgrade strategy for Lake Major WSP.



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Some of the projects that are going to form part of these upgrades are new raw water pump station, clarifier replacement, filter rehabilitation, residual handling upgrades and optimization of the pre-treatment process with incorporation of pre-oxidation. All these projects are scheduled to be undertaken over the next five to eight years.

**Wastewater Capital Projects:**

**Project:** Trenchless Sewer Rehabilitation Program

**Asset Class:** Wastewater – Collection System

**Description:** The Trenchless rehabilitation program is a continuation of the successful program that Halifax Water has been implementing for the past several years. The program mythology provides full structural renewal of existing sewers reaching the end of their useful life via installation of a structural liner. The process requires no cutting of the street infrastructure and is a cost effective alternative to open cut renewal. The program is estimated at approximately \$2 M per year over the five plan.

**Project:** Inflow/Infiltration Reduction Program

**Asset Class:** Wastewater – Collection Systems

**Description:** Inflow and Infiltration reduction is an aggregated program with a goal to reduce the amount of storm water that enters the wastewater system. The systemic evaluation of sewer sheds identifies a series of methods that are most effective within a given sewer shed including private side and public side investments. The program is proposed as a critical component of the Infrastructure Master Plan approach to reduce wastewater flows to facilitate additional regional growth. The five year plan has multiple I/I reduction programs throughout the service area.

**Project:** New Timberlea Pump Station and Forcemain System

**Asset Class:** Wastewater – Structures and Forcemains

**Description:** The Beechville-Lakeside-Timberlea (BLT) WWTF was commissioned in 1982, with a capacity of one million gallons per day (MGD) and the original intent was to increase the facility's capacity as required to provide service to the ultimate flow generated from the lands within the prescribed boundary. The BLT WWTF Environmental Risk Assessment and the BLT Area Wastewater Servicing Options – Concept Development Studies were completed in 2011 and 2012 respectively. Based on the results of these studies and the Regional Wastewater Functional Plan, it was determined that the phased diversion of wastewater from the BLT sewershed toward the Halifax system was the preferred approach for addressing the wastewater capacity issue in this sewershed.

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In 2015 the first phase of this diversion was completed when the Lakeside PS Diversion project was undertaken. In 2017 the West Region Wastewater Infrastructure Plan was completed and it reconfirmed that the best approach was full diversion of the BLT sewershed to Halifax and that to complete this diversion a new Timberlea PS and related forcemain system is required for an estimated cost of \$21 M. The project will result in the decommissioning of the BLT WWTF.

**Project:** Bedford to Halifax Trunk Sewer Upgrade

**Asset Class:** Wastewater – Trunk Sewers

**Description:** There is existing constraint within the trunk sewer which conveys wastewater along the Bedford Highway from Kearney Lake Road to the Duffus Street Pump Station. A section of this trunk sewer is a 1050mm dia. pipe and is located near Fairview Cove. The upstream sewer is a 2100mm x 1650mm pipe and the downstream sewer is an 1800mm dia. pipe. During major wet weather events, the Kempt Road CSO is activated resulting in discharge to the Fairview Cove Basin. There is observed flooding upstream along the Bedford Highway during mid-size events (< 1 in 2 year events) and the highway has been closed in the past due to flooding as a result of this constraint.

The concept is to twin the 1050mm dia. pipe with a new 1200mm sewer using micro tunneling and access shafts. The total length of the new tunnel will be approximately 900 metres and is estimated to cost \$20 M. It is anticipated that the design is in progress and construction will be completed by 2021.

**Project:** Autoport Pump Station Replacement

**Asset Class:** Wastewater – Structures

**Description:** The Autoport Pump Station was constructed in the mid 70's and requires replacement due to a number of concerns which include: the equipment has reached the end of its useful life; the pump station is located within the public right-of-way such that specific measures are required in order for staff to safely access the facility; the upstream wastewater collection system was reconfigured as a result of the Eastern Passage Wastewater Treatment Facility (EPWWTF) project resulting in an increased hydraulic demand on the pump station; and capacity is exceeded in some wet weather events which results in the deployment of vacuum trucks.

In order for this project to proceed there will be the need to purchase land. Assuming that the land can be secured in 2020 then the new pump station would be constructed in 2021 for an estimated cost of \$3,000,000.

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**Project:** Pump Station Upgrade Program

**Asset Class:** Wastewater – Structures

**Description:** Halifax Water owns and operates 167 wastewater pumping stations as a critical backbone to our wastewater collection system. The maintenance and capital renewal of this asset class is critical to service provision and environmental compliance. The Pumping Station Upgrade Program is a systemic approach to condition assessment and timely renewal of pumping stations as the facility or components reach the end of useful life. The program invests in the range of \$4M to \$5M per year on priority pumping station upgrades.

**Project:** Mill Cove WWTF Upgrade

**Asset Class:** Wastewater – Facilities

**Description:** The key requirements of the Mill Cove WWTF upgrades is to meet the following objectives:

1. Projected future wastewater flows and loads;
2. Current and future regulatory requirements with respect to treatment effluent quality (Nutrient Removal);
3. Future regulatory requirements with respect to management of wet weather storm flows; and Interaction between the wastewater treatment and sludge treatment processes.

This WWTP design includes information gathered from the Integrated Master Plan taking into consideration findings outlined in the ERA to ensure the design concept is the most cost effective and reliable to achieve regulatory requirements and with flexibility for the future requirements.

Following approval of the Conceptual Design Strategy the project will progress into the following: Preliminary Engineering Design, Pre-Selection of unit process equipment, Detailed Engineering Design, Tender Phase and Construction Phases.

Based on the concept design, the estimated total project cost is approximately \$75 M, with \$50 M earmarked for within the next five years.

**Stormwater Capital Projects:**

**Project:** Sullivan's Pond Storm Sewer System Replacement (Phase 2)

**Asset Class:** Stormwater – Pipes

**Description:** The Sullivan's Pond storm sewer system is the outlet for Sullivan's Pond/Lake Banook watershed which is approximately 1500 hectares in size. The system was constructed in the early 1970s and is at the end of its service life. The system is designed for

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the major flood event (runoff resulting from a 1 in 100 yr. rainfall event). In 2017/18 the first phase and upper section of the system was constructed between Sullivan's Pond and Irish Town Road. This project involves the lower downstream section from Irish Town Road all of the way to Halifax Harbour. Construction of the second phase will be challenging considering the congested urbanized environment in which the system is located. Construction of this second phase is expected to proceed in 2022, at a cost in the order of \$11 M.

**Project:** Ellenvale Run Retaining Wall Replacement Program

**Asset Class:** Stormwater – Structures

**Description:** The Ellenvale Run is a highly urbanized watercourse that runs from Lake Lemont to Morris Lake in Dartmouth. The approximately 3.5 km long watercourse has been rerouted and encroached upon as a result of adjacent development. This has resulted in the stream being contained within culverts and channels made of retaining walls. The majority of the retaining walls are at the end of their service life and need to be replaced. The system is designed for the major flood event (runoff resulting from a 1 in 100 yr. rainfall event). This program involves the systematic replacement of the retaining walls over the period of 2018 – 2024. The estimated cost of the program is \$10 M.

**Project:** Cross Culvert Replacement Program

**Asset Class:** Stormwater – Culverts/Ditches

**Description:** Halifax Water owns and maintains approximately 1700 cross road culverts. This infrastructure is a distinct asset class in addition to driveway culverts. They convey stormwater under roads and are less than three metres in diameter. Approximately five percent of the inventory of cross road culverts are in critical condition and another seven percent in poor condition. This program involves the systematic replacement of cross road culverts at the end of their service life. The estimated annual cost of this program is \$2 M.

**Project:** Halifax Water Sewer Separation Program

**Asset Class:** Wastewater and Stormwater Collection

**Description:** This program involves the separation of existing combined sewers in key areas of the Halifax peninsula to divert storm flows from the wastewater system as a key component to providing increased wastewater capacity for proposed growth within the Halifax WWTF sewershed. The sewer separation program will generally involve the installation of a new storm sewer on local streets for the collection of surface drainage and select building connections. In the near term, the program will be focused on the Young Street, Kempt Road and Spring Garden Road areas. This program is primarily funded from the Regional Development Charge program. Halifax Water's planned expenditures on this program are approximately \$6 M per year.

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**Corporate Projects:**

**Project:** Information Technology Strategic Plan Implementation

**Asset Class:** Water, Wastewater and Stormwater

**Description:** Halifax Water completed an IT Strategic Plan in 2017. The Plan (updated annually) provides a five-year program and investment roadmap consisting of a series of defined initiatives, each supporting a key strategic theme and each contributing to the continuous improvement of one or more facets of the IT environment: organization, applications and infrastructure. Halifax Water's planned expenditures on this program are approximately \$8 M per year. See Section 10.4 for a detailed summary.

## **7.2 Five-Year Operating Budgets**

Budgets have been developed to cover the period from 2020/21 to 2025/26, as shown in Appendix E. The operating budgets reveal that rate increases will be required to maintain current levels of service, deliver projects already in progress or approved, meet changing environmental requirements, and generate more funding to meet infrastructure investment demands.

Halifax Water has a goal to keep rates for combined services below 2% of median household income. The cost of annual combined services for an average household is currently estimated as 1.08% of current estimated median household income.

Halifax Water has a customer assistance program - Help to Others (H2O). The H2O program provides dedicated funding for low income households to offset water bills, administered through the Salvation Army, similar to other heating fuel or electricity bill assistance programs. Funds for the program are derived from unregulated activities of the utility.

Some of the primary operating budget drivers and assumptions are:

### **Revenues**

After a long-term trend of declining water consumption, Halifax Water has had back to back increases in consumption of 0.1% and 1.4% in 2017/18 and 2018/19 respectively due to customer growth and conversion to new meters increasing accuracy. Consumption is projected to remain relatively flat as growth in customers will offset decreasing consumption due to conservation and increases in water efficiency.

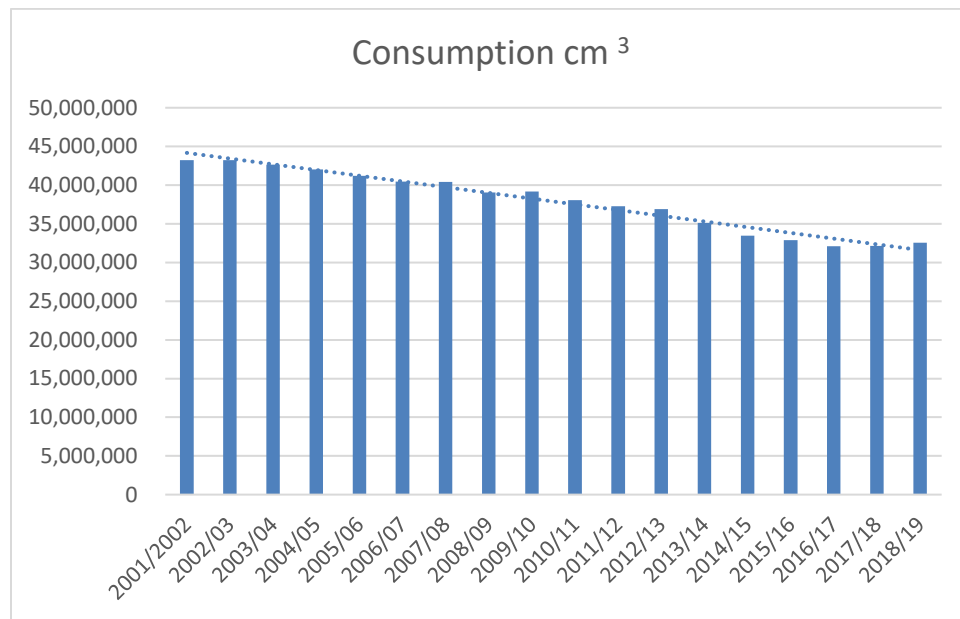
Halifax Water had experienced net metered consumption decreases of 1.64% per year on average, over seventeen years, as indicated in Figure 6. The total decrease since 2001/02 is a 25% reduction, which was managed predominantly through changing rate structures to

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align fixed and variables costs, diversifying rate structures (stormwater with a different billing determinant), increasing rates, increasing unregulated revenue and controlling costs.

For short-term planning purposes, in relation to setting rates, Halifax Water previously used a rolling historic 4 year average (net reduction) – which is currently 0.7%. Declining consumption affects both water and wastewater revenue as the discharge fee billed to most customers is based upon water consumption. Consumption is impacted by timing of development, form of development and new customer growth. It is not certain if future development will be sufficient to offset the trend of declining consumption, so by budgeting based on flat consumption Halifax Water is assuming some risk.

**Figure 6: Metered Consumption History**



Average	-1.64%
Rolling 4 Year Average decrease	-0.68%
Median	-1.75%
Total Decrease since 2001/02	-24.7%

- The amount of impervious area and number of properties receiving stormwater services is projected to increase gradually over the course of the next five years.
- 638 (0.8%) new customer connections are projected each year based on the actual customer growth in recent years.
- Revenues from unregulated business activities are increasingly important to mitigate future revenue requirements from rates. These are described in more detail in Section 7.4. Unregulated revenues are used to fund unregulated expenses and generate additional unregulated revenues for the benefit of the rate base.

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**Expenses**

Halifax Water's Five-Year Operating Budget is completed on a modified accrual basis and excludes pension expense accrual to provide better information for decision making and align with the NSUARB Accounting and Reporting Handbook for Water Utilities, which is used in determining the revenue requirements for rate making purposes. Reporting on an accrual basis under the International Financial Reporting Standards (IFRS) would require the inclusion of accrued amounts such as a liability for future employee pension benefits. If accrued pension expenses were included, the projected deficit would be greater than currently shown in Figure 7 below. There is sufficient accumulated operating surplus to offset the budgeted operating loss in 2019/20, however, rate adjustments will be required in 2020/21.

The largest components of Halifax Water's consolidated operating budgets are salaries & benefits, electricity, furnace oil and natural gas, debt financing, depreciation, dividend and chemical costs.

**Salaries and Benefits:** In 2020/21, the increase for salaries/wages ranges between 2.00% and 2.75%, which includes an allowance of 0.5% for the impact of step increases for employees within salary bands or reclassification of positions. For subsequent years, the annual increases for salaries and benefits is budgeted at 3.5%. Any planned new hires are reflected within the budgets.

**Electricity:** 6.0% in year 1, 2% each year thereafter. The impact of these increases is expected to be partially offset by the formal Energy Management Program.

**Natural Gas:** 10% in year 1, 2% each year thereafter.

**Furnace Oil:** 3% in year 1, 2% each year thereafter.

**Debt Financing:** New debt payments are budgeted to support the five-year capital plan. Over the course of the next five years, debt payments are projected to increase significantly. The amount and timing of the increases will be determined by timing of the completion of the projects and the financing rates and options available. Halifax Water's capital financing strategy is designed to maintain a debt service ratio of 35% or less; and to use a mixture of infrastructure funding, development related charges (reserves), depreciation; and debt. The cost of borrowing is based on the weighted average cost of capital of 3.22%.

**Depreciation:** As Halifax Water's assets and future capital budgets increase so do depreciation expenses. Depreciation is an integral funding source to support rehabilitation of the existing infrastructure as well as new infrastructure and upgrades to meet future requirements. The depreciation expenses shown in the Five-Year Business Plan are net of depreciation on contributed assets for contributed water and wastewater assets. In the next

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rate application, Halifax Water will be requesting permission to phase in depreciation on contributed water and wastewater assets.

**Dividend to Halifax Regional Municipality:** The current five-year water dividend agreement expires in March 2020 and a new agreement will be negotiated in advance of the 2020/21 fiscal year. HRM staff have expressed interest in expanding the scope of the dividend to include wastewater and stormwater, however this will require approval from the NSUARB and would be considered as part of a rate application. Based on the current agreement, the dividend would grow from \$5.1 M in 2019/20 to \$7.9 M by 2024/25.

**Chemical Costs:** Chemicals are tendered annually in January for optimal pricing. Chemical cost increases of 5% are anticipated for year 1, with a 5% increase for years 2, 3, 4 and 5. Long range chemical prices are difficult to predict due to the volatility of the market which is closely linked with energy prices and fluctuations in supply and demand.

Energy and electricity cost assumptions are described within Section 12.10 of the Business Plan.

On a consolidated basis, the projected five-year operating budgets are shown in Figure 7. Over the next five years, operating expenses are projected to increase from \$118 M in 2020/21 to \$136 M in 2025/26, or 15%, while operating revenues are projected to decrease by \$2 M or 1.41%. Non-operating revenues are projected to remain stable. Non-operating expenses will more than double from \$37 M to \$61 M driven by increasing debt servicing costs as Halifax Water issues debt previously approved to fund prior years' capital budgets and ramps up capital spending to meet the IRP recommendations.

**Figure 7: Pro-Forma Income Summary 2018/19 to 2020/21**

Operating Budget Summary (in thousands)				
	Actual 2018/19	Approved Budget 2019/20	Proposed Budget 2020/21	Budget/Budget Variance (Unfavourable)
Operating Revenue	\$138,413	\$138,727	\$138,618	(\$109)
Operating Expenses	\$105,731	\$115,088	\$118,110	(\$3,022)
Operating Surplus	\$32,682	\$23,639	\$20,508	(\$3,131)
Financial Revenue	\$1,898	\$1,369	\$619	(\$750)
Financial Expenses	\$33,190	\$33,374	\$37,076	(\$3,701)
Net Surplus (Deficit)	\$1,390	(\$8,366)	(\$15,949)	(\$7,583)



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Based on figures presented in Figure 7, revenue increases are required over the next five years. Halifax Water will not be able to deliver the existing level of service plus meet the requirements for growth, asset renewal and compliance identified in the IRP without revenue increases. Halifax Water has a rate smoothing strategy that promotes gradual rate increases to avoid rate shock and maintain affordability.

Appearing in Figure 8 is a continuity schedule of the accumulated surplus (deficit) for Halifax Water on a cash basis. As of March 31, 2019, Halifax Water had an accumulated operating surplus of \$40.0 M. Results have been reviewed by budget managers in conjunction with plans for the remainder of the 2019/20 fiscal year and Halifax Water is forecasting a net deficit on a cash basis of \$3.2 M. This coupled with a budgeted deficit for 2020/21, in the amount of \$15.9 M, results in an ending surplus as at March 31, 2021 of \$20.9 M. There is sufficient accumulated operating surplus to offset operating deficits in 2019/20 and 2020/21, however, the budgeted deficit for 2021/22 is \$26.2 M resulting in an accumulated deficit of \$5.3 M. Rate adjustments will be required in the fiscal years thereafter; and Halifax Water needs to begin the process to adjust rates.

**Figure 8: Continuity Schedule - Accumulated Surplus (Deficit) on a Cash Basis**

<b>Continuity Schedule - Accumulated Surplus (Deficit) on a NSUARB Handbook Basis - which Excludes Pension Accrual</b>				
	<b>Total</b>	<b>Water</b>	<b>Wastewater</b>	<b>Stormwater</b>
<b>2018/19 Fiscal Year</b>				
Balance, beginning of year	\$38,625,906	\$14,669,623	\$15,487,608	\$8,468,674
Operating surplus (deficit) for the year	\$1,390,433	\$2,760,942	(\$570,243)	(\$800,266)
Balance, end of year	\$40,016,339	\$17,430,565	\$14,917,365	\$7,668,408
<b>2019/20 Fiscal Year</b>				
Balance, beginning of year	\$40,016,339	\$17,430,565	\$14,917,365	\$7,668,408
Projected operating (deficit) for the year	(\$3,188,925)	\$2,374,560	(\$3,936,644)	(\$1,626,841)
Projected balance, end of year	<b>\$36,827,414</b>	<b>\$19,805,125</b>	<b>\$10,980,721</b>	<b>\$6,041,568</b>
<b>2020/21 Fiscal Year</b>				
Balance, beginning of year	\$36,827,414	\$19,805,125	\$10,980,721	\$6,041,568
Budgeted operating (deficit) for the year	(\$15,948,714)	(\$4,274,512)	(\$7,842,633)	(\$3,831,569)
Projected balance, end of year	<b>\$20,878,700</b>	<b>\$15,530,613</b>	<b>\$3,138,088</b>	<b>\$2,209,999</b>
<b>2021/22 Fiscal Year</b>				
Balance, beginning of year	\$20,878,700	\$15,530,613	\$3,138,088	\$2,209,999
Budgeted operating (deficit) for the year	(\$26,155,637)	(\$9,179,931)	(\$11,980,107)	(\$4,995,599)
Projected balance, end of year	<b>(\$5,276,937)</b>	<b>\$6,350,682</b>	<b>(\$8,842,019)</b>	<b>(\$2,785,600)</b>

Projections for 2020/21 and beyond are based on expected normal weather patterns. Should weather patterns deviate from the norm, operating results could be impacted accordingly as significant rain events, prolonged periods of deep cold, or droughts, impact operating revenues and expenses.

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As new and more current information becomes available, five-year projections will change. The five-year plan is sensitive to changes in consumption, weather, interest rates, availability of external infrastructure funding, level of development activity and operating results

### **7.3 Debt Strategy**

Halifax Water has an efficient capital financing structure which has been reviewed and accepted by the NSUARB and was developed based on the policies of other utilities, its longer-term capital needs, and consideration of fairness to present and future ratepayers. Utilization of debt is a key component of the capital financing structure. Debt impacts the operating budget and, therefore, the future rate requirements in several ways:

1. Increased debt payments need to be accommodated through rates.
2. Increased depreciation related to growth in the capital program needs to be accommodated through rates.
3. Operating costs of new capital assets need to be accommodated through rates.
4. Capital requirements not funded by debt will increase the requirement of capital from operating funding through rates.

Different financing alternatives were considered taking into account rate stability and affordability, Halifax Water long term financial sustainability, and intergenerational equity.

The debt strategy approved for Halifax Water concludes that appropriate financial ratios for Halifax Water to utilize are:

1. Target Maximum Debt Service Ratio of 35%
2. Target Debt/Equity Ratio of 40%/60%

In essence, the two targets serve as a framework for Halifax Water's utilization of debt. Long-term debt is projected to increase from \$208 M at March 31, 2019<sup>1</sup>, to \$436 M by March 31, 2025. It is estimated that additional debt servicing will increase from \$30.9 M in 2020/21 to \$54 M in 2024/25, and the debt service ratio will increase from 22.0% to 39.0 % during this five-year period.

The amount of timing of issuance of debt is dependent on the timing of capital projects and also on availability of infrastructure funding from other levels of government. Any changes in capital plans or availability of other funding sources will impact the requirement for new debt.

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<sup>1</sup> March 31, 2019 Audited Financial Statements

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## **7.4 Alternative Revenue**

Revenues from unregulated business activities are increasingly important to mitigate future revenue requirements from rates. Unregulated revenues help to pay for some expenses which would otherwise be funded by rate-regulated activities, and are also used to fund unregulated expenses. Halifax Water has had success generating alternative revenues aside from user fees on both the regulated and unregulated side of the business. On the regulated side, Halifax Water has entered into agreements for the sale of land deemed to be no longer used or useful for utility purposes. With NSUARB approval, revenue from land sales can be used as a source of funds for capital projects related to the delivery of water services in recognition that the land was originally purchased with water-rate base funds. As much of the surplus land has been sold, this is not a significant source of funds in the future.

Notwithstanding limitations for generating revenue from the regulated side of the business, there has and will continue to be opportunities from the unregulated side. Currently, Halifax Water generates revenue from third-party contracts for water and wastewater treatment operations, septage tipping fees, and treatment of airline effluent.

Halifax Water also generates revenue for the lease of land for telecommunications facilities throughout the municipality in recognition that reservoir and watershed sites are located on higher elevations that afford more direct line of site for telemetry. In conjunction with these leases, Halifax Water installs telecommunications equipment on these facilities for its own needs for the ultimate benefit of the water, wastewater, and stormwater rate base. As Halifax Water continues to expand the Supervisory Control and Data Acquisition (SCADA) system in accordance with its master plan, further opportunities for leases and hosting of Halifax Water equipment will be realized.

Halifax Water has expertise in water-loss control, the utility offers a wide range of related services to generate revenue. These range from leak-detection services, for Halifax Water customers and other municipalities, to consulting services under contract to municipalities and First Nation communities. There is potential to expand these services to generate additional revenue and, at the same time, provide professional development opportunities for staff.

Halifax Water also recognizes that its assets can be leveraged to bring in revenue from energy generation. This includes projects to generate electricity from wind turbines and control chambers where water pressure is reduced. These opportunities have been developed for interface with the Nova Scotia Department of Energy's Community Feed-In Tariff (COMFIT) program, which provides preferential rates to feed electricity into Nova Scotia Power Incorporated (NSPI) distribution grid. Halifax Water has completed the installation of a hydrokinetic turbine in the Orchard control chamber in Bedford, in October 2014, and the projected net revenues are in the current business plan. These projects are structured to ensure they are compliant with the Public Utilities Act with the recognition that regulated activities cannot subsidize the unregulated side of the business.

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In partnership with HRM, Halifax Water has also studied the potential for a green thermal utility whereby energy can be extracted from the heat in sewage and delivered through a local distribution system in the vicinity of treatment facilities. The planned redevelopment of the Cogswell interchange in Halifax will provide an opportunity to advance this concept since the Halifax WWTF is adjacent to the Cogswell interchange. This project is currently being pursued as a regulated activity subject to the approval of the NSUARB.

In an effort to be open and transparent to stakeholders, including the NSUARB, Halifax Water discloses revenue and expenses associated with unregulated business separately within the financial statements and budgets. Net gains from these activities ultimately go to the benefit of the rate base as they are closed out to accumulated operating surplus/(deficit) each fiscal year.

Rates for some the main sources of unregulated revenue – septage tipping fees and treatment of airline effluent were increased in 2018. Halifax Water periodically reviews and adjusts these rates.

Unregulated revenues are budgeted to be \$ 1.1 M in 2020/21 and will remain consistent for the next 5 years.

## **8. CUSTOMER SERVICE ENHANCEMENTS**

The most recent Customer Service (Quality of Service) Survey indicates satisfaction with Halifax Water's overall service delivery remains high at 96%, consistent with the last two years.

For the first time, questions were included related to stormwater service. Of the 750 surveyed, 44% were aware they receive stormwater service and 83% of those receiving stormwater service were very or generally satisfied.

Other key highlights:

- The ratings for staff promptness have improved
- Most customers believe their water is safe and the quality is high
- Confidence in the safety of water in the Halifax Harbour remains low at 44%
- Residents continue to lack awareness of the source of their municipal tap water
- Awareness of the LSL subsidy is low
- Awareness of the emergency assistance program (H2O Fund) is low
- Over 50% of customers would be interested in rounding up their bill to the nearest dollar with the rounded portion given as a charitable donation to help low income customers in need (this is an initiative being explored to grow the H2O Fund)

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Strategic objectives that will help address some of areas of potential improvement are implementation of the customer portal, enhancements in the customer care centre that will reduce call wait times, and enhanced customer communications particularly around stormwater service. Many initiatives are underway that ultimately will help us continue to enhance service to customers to keep them satisfied.

In early 2020, the phone system used to answer customer calls is being improved, to enable their calls to be answered more quickly and their issues resolved more easily.

2020/21 will see the implementation of a Customer Portal that will increase and improve the options for customers to engage with Halifax Water and get easier access to information on their account at their convenience. The Customer Connect (AMI) Project has surpassed the 90% installation mark and the information on customer water usage is being successfully received. The ability of our customers to access their water usage data will be a significant component of the Customer Portal. Customers will also be able to request many services online, the Halifax Water website will be easier for customers to use and navigate, and there will be increased functionality for customers to receive information about their account, water consumption, property characteristics used to bill for stormwater, and receive and pay bills electronically.

Within the Five-Year Business Plan, there are significant technology initiatives that will enhance integration of key corporate systems such as CMMS, GIS, and the ERP with the Customer Care Centre. The utility is well positioned to implement a corporate customer service strategy and utilize information received through AMI and the computerized maintenance management system (CMMS) to track resolution of customer requests. Halifax Water is continuing to improve and enhance service standards to respond to customer issues and the mechanisms to monitor and report to ensure all departments are meeting service standards.

The Dispute Resolution Process continues to provide an opportunity for customers to have an outside review of their complaint, but adds additional costs to revenue requirements. Statistics from the last two years are shown in table 3 below:

**Figure 9: DRO Statistics**

<b>Year</b>	<b>Cost Paid to DRO</b>	<b># Complaints</b>	<b>Dismissed/ Withdrawn</b>	<b>Successful</b>
2017/18	\$225,850	39	35 dismissed 2 withdrawn	2
2018/19	\$137,730	43	41	2

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It is hoped that increasing the focus on customer communication, and early resolution will help reduce complaints going to the Dispute Resolution Officer, as the majority of the complaints are without merit and result in unnecessary costs that are passed on to rate payers.

## **9. ENERGY EFFICIENCY AND GHG REDUCTION**

### **9.1 Energy Management Program**

Through its Energy Management Program, Halifax Water is committed to creating and ensuring an ongoing focus on sustainability and energy efficiency throughout all operating areas. This program defines the goals, objectives, accountabilities, and structure for activities related to sustainability and responsible energy use. The focus of this Program is being updated to include more emphasis on GHG emission reduction, and developing specific targets and actions for Halifax Water that will support HalifACT 2050. HalifACT 2050 is a long-term climate change plan to reduce emissions and help communities adapt.

In support of this program, Halifax Water's Energy Management Policy defines longer-term goals and commits Halifax Water to the principles of responsible energy management. This includes reducing dependence on fossil fuels through energy conservation and best practices; identifying and implementing cost-effective energy-reduction initiatives; developing alternative and renewable forms of energy from utility assets; and reducing pollution by increasing the usage of energy supplied from sources that are less greenhouse gas intensive.

Halifax Water has an Energy Management Steering Committee (EMSC) that guides creation and implementation the corporate Energy Management Action Plan (EMAP).

#### **Energy Management Action Plan**

The EMAP includes details of energy-management activities that will be developed and undertaken by Halifax Water each year. Key activities contained in the action plan include:

- Delegation of the responsibility for achieving energy goals;
- Assignment of team members as required to meet goals;
- Development of an employee-awareness strategy to facilitate energy savings at work and home;
- Establishment of an energy accounting system that allows for collection, monitoring, and reporting of all data on energy-consuming assets, energy consumption, energy costs, energy savings, and key performance indicators;
- Preparation of energy audits on all facilities on a priority basis;

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- Implementation of identified energy projects based on sound financial principles;
- Benchmarking of Halifax Water's facilities and establishment of annual energy-reduction targets;
- Identification of funding requirements and external funding sources for the EMAP;
- Refinement of contract and purchasing policies to incorporate energy-efficient practices; and
- Development of renewable energy generation projects.

### **Greenhouse Gas (GHG) Emissions**

Following on its recent endorsement of the Pan-Canadian Framework on Clean Growth and Climate Change, the government of Nova Scotia implemented a carbon "Cap & Trade" program in 2018 to comply with the federal government's carbon pricing regulations. This program applies only to very large industrial GHG emitters (> 100,000 tonnes CO<sub>2e</sub> per year), electric utilities, petroleum product suppliers and natural gas distributors. Halifax Water's GHG emissions at source are currently very low, and do not meet the industrial threshold as implemented. As such, Halifax Water will continue to monitor the provincial Cap & Trade program, and will continue to work to reduce energy usage, GHG emissions, and track energy savings achieved through various energy efficiency projects and annual initiatives.

Halifax Water's efforts to reduce energy use and GHG emissions began in 2010. Since that time, over 57,000 MWh<sub>e</sub> of cumulative energy savings, over 37,000 tonnes CO<sub>2e</sub> of cumulative GHG emission reductions, and over \$5,700,000 in cumulative operational cost savings have been realized from either the numerous and specific energy efficiency projects, or annual energy savings initiatives such as our annual UV shutdown program, or the annual winter season Odour Control System by-pass program in the HHSPs. Halifax Water will continue to focus on annual targets for energy savings and GHG reductions, and will work with external funding organizations such as Efficiency Nova Scotia to advance and implement more projects in the future.

In January 2019, HRM declared a climate emergency. Halifax Water staff have been engaged in HalifACT 2050. The Intergovernmental Panel on Climate Change (IPCC) released a special report on global warming that indicates the global community has only 10 years to table actions to course-correct if there is any hope of keeping global warming at 1.5°C. Halifax Water will update the Energy Management Policy and EMAP to reflect aggressive targets in support of broader community objectives.

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## **9.2 Renewable-Energy Generation**

Halifax Water has identified renewable energy as an important way of offsetting energy costs and increasing revenue that will help the utility to significantly reduce energy use and greenhouse gas emissions in the region.

To date, two key project areas have been identified: renewable energy and energy recovery from both water and wastewater systems.

### **9.2.1 Solar Energy**

Under Nova Scotia's Solar Energy for Community Buildings Pilot Program, Halifax Water was awarded a 75 kW solar photovoltaic (Solar PV) project in 2018. This project is scheduled to be installed at our Halifax Wastewater Treatment Facility in early 2020. This project will see 264 solar panels installed on the roof of the Halifax WWTF, and will generate approx. 108,000 kWh/yr of clean, renewable energy. Additional Solar PV projects are being considered for other Halifax Water facilities in the future.

### **9.2.2 Energy Recovery Turbines**

Halifax Water installed an in-line hydrokinetic turbine in its Orchard Pressure Reducing Valve (PRV) Chamber in 2014. Since that time, the system has performed flawlessly, generating in excess of 1,100 MWh of clean renewable energy to date, and over \$150,000 in operating revenue. The system produces enough energy annually to power in excess of 25 average Nova Scotian households. Additional in-line turbine projects are being considered for other Halifax Water facilities in the future.

### **9.2.3 Wind Energy**

In 2014, Halifax Water worked with the Chebucto Community Wind Fields to install a 10 MW wind farm, on lands near Halifax Water's J.D. Kline Water Supply Plant, as part of the provincial Community Feed-In Tariff (COMFIT) program. Since that time, the system has performed as expected, generating in excess of 150,000 MWh of clean renewable energy, and delivering almost \$600,000 in operational royalties to Halifax Water.

## **9.3 Energy/Nutrient Recovery**

Energy recovery from process or waste streams is recognized as one of the biggest renewable energy opportunities available to society. Recoverable energy is everywhere – in solid municipal/residential waste streams, industrial by-products, and water and wastewater streams. Halifax Water has significant recoverable energy resources available in



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both its water and wastewater streams. Specifically, as noted in the previous section, inline turbines can be used in place of pressure reducing valves (PRVs) to recover energy from water distribution systems. In the wastewater system, energy can be recovered from the waste sludge produced by wastewater treatment facilities, along with thermal energy from the effluent streams.

Reducing the cost of wastewater collection and treatment has been an important issue and has been on the radar of most utilities for some time. Over the years, the field of wastewater treatment has seen a gradual progression with a focus changing from sewage treatment to water reclamation to resource recovery. Following industry best practices, many utilities currently view the wastewater components of water, biosolids, nutrients, and energy as valuable resources. Nutrients, such as phosphorus, can be recovered in various forms for use in agricultural fertilizers. Energy can be extracted from organics to offset energy demands of the facility, or sold to the local community. Halifax Water has been progressing several initiatives over the years on all four forms of resources available from wastewater. These efforts will continue in the future.

### **9.3.1 Biosolids Strategy**

Halifax Water currently supplies approximately 30,000 tonnes per year of partially dewatered sewage sludge, or biosolids, to its Aerotech Biosolids Processing Facility (ABPF). Currently, the biosolids are turned into a soil amendment and fertilizer for beneficial reuse for agricultural purposes such as topsoil manufacturing, sod growing, horticultural use, and land reclamation.

Energy recovery from biosolids is one of the most developed opportunities for wastewater treatment plants. This is commonly achieved through anaerobic digestion of wastewater sludge. Halifax Water's Mill Cove WWTF and Lakeside Timberlea WWTF are equipped with anaerobic digesters, and the methane gas generated within those digesters is utilized for digester operation and space heating within the plants. All of Halifax Water's WWTFs currently produce biosolids that are subsequently treated in the ABPFs alkaline stabilization process and utilized as soil amendment for beneficial reuse. Halifax Water expects to continue this practice given the success of the current beneficial reuse program. There are several emerging technologies in the industry that show promise for alternative uses of biosolids for energy production. Halifax Water staff have reviewed these technologies as part of the recently completed biosolids management planning process, along with the risks associated with the complex issue of biosolids management.

Halifax Water will be issuing an RFP in 2020 seeking innovative solutions to utilize biosolids and maximize resource recovery.

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### 9.3.2 Wastewater Effluent Heat Recovery

The volume of wastewater effluent flowing out of wastewater treatment facilities is immense. The capacity of water to store energy in the form of heat is also immense, as noted in Figure 10 below. This combination presents a real and readily available resource for an efficient, cost-effective heat sync that can be used, at a minimum, to provide or remove energy to and from wastewater treatment facilities, or to the local community at large.

**Figure 10: Wastewater Effluent Heat-Recovery Potential**

<b>Facility</b>	<b>Annual Flow (m<sup>3</sup>/yr.)</b>	<b>Available Power Capacity<sup>(1)</sup> (MW)</b>
Halifax WWTF	36,825,000	59.7
Dartmouth WWTF	22,100,000	35.3
Herring Cove WWTF	4,630,000	7.4
<b>Totals</b>	<b>63,555,000</b>	<b>102.4</b>

*Notes: Total available power based on an average effluent temperature of 12°C.  
Based on 2013/14 usage and cost data.*

Halifax Water has completed studies at the three Harbour Solutions plants to determine and understand the technical and financial challenges associated with these types of energy-recovery systems, and then implement the projects that make sense from an energy efficiency and financial perspective.

#### **Cogswell District Energy System**

The HalifACT 2050 program initiated by the municipality identifies the Cogswell District Energy System as a significant climate change mitigation opportunity. A study was completed in 2016 to determine the feasibility and preliminary business case for an Ambient Temperature District Energy System [ATDES] within the Cogswell Redevelopment Area of downtown Halifax. The feasibility of the DES is predicated on the assumption that connection to the DES will be mandatory within the redevelopment area. To that end, HRM has completed amendments to its Charter through the Legislature to facilitate this authorization. Work on the Cogswell ATDES continues with stakeholder consultation, and the completion of preliminary and detailed design work in parallel with the Municipality's effort to advance the Cogswell Redevelopment project. Halifax Water strategic objectives related to DES in 2020/21 include enactment of a mandatory connection by-law by the municipality, confirming that the service will be regulated by the NSUARB, finalizing the business case, and securing necessary Halifax Water Board and NSUARB approvals to proceed.

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## **10. CONTINUOUS IMPROVEMENT**

### **10.1 Organizational Cultural Change**

Halifax Water has approximately 475 employees, 3/4 of which are unionized under CUPE Locals 227 and 1431. Changing culture within a large organization takes time, but is often accelerated by new technology or societal events. Halifax Water is going through an accelerated period of change during the next five years, prompted by new technology, new business processes, new policies and turnover in key positions as a result of demographics and retirement. One advantage Halifax Water has as employer implementing change, is that turnover is low relative to other public sector organizations, and employee satisfaction is generally high.

Halifax Water conducts an employee survey every year. The survey is a very important tool to help identify opportunities and challenges from the perspective of employees. The 2019 employee survey results indicated a “B+” rating, and improvement over the 2018 B rating. Halifax Water’s target is an A, and it is hoped that target will be achieved during the period covered by this Five-Year Business Plan.

As part of the overall approach to talent management, Halifax Water has a succession plan for key positions, and has an approach to total compensation that supports attraction and retention of employees. Many initiatives are underway, or planned that will help maintain a positive culture within the organization and build resilience to respond to new challenges. The primary areas of focus in the next five years will be:

- Ensuring all employees are aware of Halifax Water’s strategic objectives
- Helping employees understand how they can meet personal career or performance targets and providing access to training and development opportunities
- Communicating and recognizing achievements to help employees feel a sense of accomplishment from their work
- Demonstrating that senior leadership is approachable, and promoting more two-way communication and feedback at all levels
- Promoting a workplace that is psychologically safe and healthy, respectful and civil for all employees, and reflective of the diverse community served by Halifax Water
- Developing employees to be ready to take on new responsibilities in the organization, and building resilience to adapt to change.

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## **10.2 Cost Containment**

Halifax Water reports semi-annually to the HRWC Board, and annually to the NSUARB on the results of cost containment initiatives. The next cost containment report will be filed with the NSUARB in June 2020. Some of these initiatives are on-going, and some are one time in nature. The containment initiatives from 2013/14 to 2019/20 reflect cost savings of \$6.3 M. The inclusion of initiatives and amounts from prior years reflects an intentional focus on sustainable results over the long-term.

Halifax Water continues to promote and develop a cost containment culture. As salaries and benefits are the largest element in the operating budget, the most significant opportunity identified is to improve workforce planning and the staffing process. The redesign of the Halifax Water Pension Plan has resulted in the Plan being fully funded as of January 1, 2019. The result is an elimination of the special payment, saving Halifax Water over \$800 thousand annually. Another area of opportunity is focusing on productivity through enhanced business processes and technology, performance management, and improving time and attendance tracking.

## **10.3 Advanced Metering Infrastructure (AMI)**

With the approval of the Customer Connect (AMI) Project by the NSUARB in the fall of 2016 and the launch in December 2016, Halifax Water has installed over 90% of the new meters, 80,000 meters. We have begun to collect customer water usage information without the need to visit a customer and have been using the water usage information to bill customers.

In addition to removing the need to visit a customer to read the meter, the Customer Connect Project will improve the level of service Halifax Water can offer its customers. These include:

- The ability to offer monthly billing to residential and small commercial customers; making it easier for customers to manage cash flow and automated payments.
- The ability to provide an accurate reading of water usage for customers moving into or out of a residence.
- The capability to alert customers to higher than normal consumption including plumbing leaks; almost as they happen. This will reduce billing disputes and high bills.

The ability, through the Customer Portal, to manage their water consumption, in near real time, and see the effect of any conservation measures they take. To realize the full benefits of the AMI, we continue to strive for installation of meters to all Halifax Water customers, however, some customers have not been accepting of the radio frequency technology. We continue to work with these customers but we do expect that a small number of meters will need to be read in the traditional manner and a manual read fee may apply in the future.

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The new technology will enable significant reductions in the cost of reading meters, billing and collecting from customers and the number of disputes related to high bills.

## **10.4 IT Five-Year Strategic Plan**

Halifax Water continues to update its IT Strategic Plan. The business focus is on using progressive technologies to improve organizational efficiency, effectiveness and customer service.

The Strategic Business Drivers shaping the information technology environment have not changed:

- Provide world class services to our customers and our environment
- Retain leadership position as an integrated water, wastewater and stormwater utility
- Retain position as a top utility in all Lines of Business focused on Public and Employee Safety, Water Quality, Sustainable Infrastructure and Asset Renewal, Regulatory Compliance and Growth, and Environmental Stewardship.
- Follow an IRP Framework

**Six Strategic Themes** characterize the plan:

- **Customer Experience:** Providing customers with the ability to access most services using online services.
- **Information Integration with Location:** Having all necessary data linked together and tracked through a geographic lens.
- **Analytics Driven Decision Making:** Being able to model customer usage, financial, environmental, and infrastructure data across the Water, Wastewater and Stormwater systems and having the capability to tie data together into business intelligence.
- **Managed Knowledge and Workflow:** Capturing and storing key content in a logical and easy to access place for those who need it.
- **Enable Employees Anywhere:** Providing functionality for employees to access, capture and update the information they need to effectively do their job and support others, wherever they may be working.
- **Secure IT Foundation:** Effectively managing the IT function and providing infrastructure that is resilient, cost effective, well supported, and recoverable within clearly defined requirements.

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The IT Strategy Five-Year Roadmap 2020/21 is a high-level snapshot of the sequence of programs to deliver on the approved technology vision and recommended architecture. The plan has an estimated total cost of \$28,000,000. The projects contained within the Five-Year Business plan can be seen in the detailed Capital Budget under Corporate Projects in Appendix D.

## **10.5 Water Quality Master Plan**

Halifax Water began developing its first Water Quality Master Plan (WQMP) in 2005 to assess its water quality program and to keep in front of the rapidly changing drinking water regulations. The initial WQMP established a road map towards more effective water quality management and staff determined at the time that a water quality research program was the most effective way to achieve the plan goals.

In 2006, Halifax Water executed a research agreement with Dr. Graham Gagnon of Dalhousie to execute the WQMP research. Subsequently, Dr. Gagnon applied to the Natural Sciences and Engineering Research Council (NSERC) for an Industrial Research Chair (IRC). Under the research chair, NSERC matches all funds provided to Dr. Gagnon by research chair partners, effectively doubling Halifax Water's investment.

In April 2017, Dr. Gagnon was awarded a third, five-year research chair term and the chair has grown to include other partners including Cape Breton Regional Municipality, the City of Moncton, CBCL Limited consulting engineers, and several water analysis technology companies, further multiplying the value of Halifax Water's investment.

Since its beginning in 2007, the IRC has created many benefits. Through our collective efforts, Dr. Gagnon and Halifax Water have emerged as leaders in North America on drinking water quality. Dr. Gagnon has trained many graduate students who have found employment, in some cases, at Halifax Water, and also in prominent roles in the drinking water sector.

Direct benefits of this Chair to Halifax Water include:

- Documentation for NSE that there was no public health benefit to install filter-to-waste at the JD Kline water supply plant, thus avoiding a \$5 M capital cost and ongoing organizational risk. Halifax Water did improve public health as part of this process by adopting new filter washing practices at minimal cost.
- Halifax Water chose not to adopt chloramines as a secondary disinfectant, which was a preferred strategy for disinfection byproduct removal when research showed that chloramines would have adverse effects for lead levels in drinking water.
- Identifying the need to increase corrosion control levels, reducing lead levels in drinking water by 35%.

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- Adoption of biofiltration at the JD Kline plant, saving \$40,000 per year in chlorine costs and reducing disinfection by-product levels by 40%. Longer term plans are in place to convert Lake Major to biofiltration.
- Determination that partial replacement of LSLs was not protective of public health and possibly harmful. Halifax Water was one of the first utilities to take this stand in 2012, a position that is now commonly held in the water industry.
- Identified the phenomenon of lake recovery. This is a process where lakes are experiencing increasing pH as a result of the reduction of sulfur oxide emissions into the atmosphere. This process has negative consequences for water treatment and early discovery has led to a head start on planning treatment upgrades.

Halifax Water published its third WQMP in September 2017 and it was subsequently approved by the Halifax Water Board. The WQMP guides Halifax Water's water quality work and also guides the research chair. There are four themes in the current WQMP as follows:

1. **Understanding Lake Recovery:** As indicated above, lake recovery is a process whereby improved air quality and the reduction on acid rain is allowing lakes to recover to their previous state. Unfortunately, this process has resulted in increasing levels of total organic carbon (TOC) which is a critical treatment parameter and increasing levels of biotic activity in the lakes. The increasing levels of biotic activity are an explanation for the geosmin episodes experienced since 2012. Increasing levels of biotic activity are also a potential precursor to other taste and odour causing compounds as well as potentially harmful algal toxins such as microcystin-LR. As well, the increasing levels of TOC are challenging the ability of the water supply plants to operate efficiently and may eventually reach levels beyond what the plants were designed to deal with. Plant improvements will be required in the medium term and understanding how far the process of lake recovery will go is necessary to design the plant processes of the future.
2. **Adapting to Lake Recovery:** As indicated above, lake recovery is already impacting the treatment plants. While treated water quality still meets Halifax Water goals, the plants are more difficult and more expensive to operate. Short and medium term strategies and operating approaches are necessary to continue to produce high quality drinking water. This includes planning for a new intake for Lake Major to get access to more treatable and more consistent water quality as well as maximizing the utilization of biofiltration.
3. **Maintaining Distribution System Water Quality:** Maintaining water quality between the water treatment plant and the customer's tap is an important part of the multiple barrier approach to providing safe drinking water. Continuing our research into lead occurrence and corrosion control chemistry will remain a focal point. This theme will also explore maintaining water quality during emergencies such as water

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main breaks and continuing to optimize disinfection in the distribution system to maintain chlorine residuals while reducing disinfection by-products.

4. **Water Quality Data Mining:** Ten years of research and source water protection work has resulted in an immense resource of water quality data. New resources recruited as part of the LSL Program include a data analyst whose long-term responsibility will be to work with water quality data sets to gain new insights into water quality issues and employ data analytics techniques for processes like distribution system water quality modelling.

### ***forWater Network***

In 2015, Halifax Water was asked to participate in an application by researchers at the University of Waterloo and the University of Alberta in an application to NSERC for a \$5 M network grant. The purpose of the network is to bring forest ecology researchers from across Canada to share ideas on how to manage forests to protect drinking water quality.

The network grant was awarded in 2016 and unites 7 research platforms across Canada, including Dalhousie University. Halifax Water staff participate in the network in addition to hosting research on our watersheds. Research in Halifax is focusing on how climate change impacts the transfer of naturally occurring carbon from the forest to water, where the carbon levels impact the treatment process.

It is expected that this program will have a major influence on watershed management in coming years.

## **10.6 Lead Service Lines**

One significant new program that has grown out of water quality master planning has been the adoption of a formal LSL replacement program. Halifax Water has approximately 2,500 LSLs remaining in the public right of way and up to 3,500 remaining on private property. In 2017, Halifax Water initiated a program intended to remove all LSLs by 2050, consistent with the recommendation made to the USEPA by the National Drinking Water Advisory Council (NDWAC). In 2019, the Halifax Water Board approved an enhanced program that will see all LSLs replaced by 2039 or earlier, subject to NSUARB approval.

Halifax Water is one of a few utilities in Canada to adopt a NDWAC based approach to LSL replacement. This approach is consistent with industry association policy, is consistent with the safeguarding of public health, and positions Halifax Water well from increased public attention to the lead issues arising from the new Health Canada guideline.



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The program has the following five pillars:

1. **Replace all LSLs by 2039:** Both those owned by the utility and those owned by customers. Program enhancements approved by the Halifax Water Board in 2019, if approved by the NSUARB, will remove remaining barriers to private LSL replacement.
2. **Inventory:** Getting an accurate inventory of where LSLs are, both public and private is key to working with customers and executing an effective program. Resources and new business process will be dedicated to building an accurate inventory of LSLs. This portion of the program has been very successful to date. Several record sources have been consolidated and confidence is improving in existing records. Halifax Water is working toward an industry best practice of an online inventory tool for customer access.
3. **Customer communication:** The NDWAC recommendations require direct communication with customers who have a LSL, a minimum of once every three years until the LSL is removed. Further, to encourage customers to replace LSL's, it will be necessary to provide more information on our web site and interactive tools to see what type of service they have. It will also be necessary to provide them more frequent and better information on the replacement process, how to access funding programs, how to hire a contractor and the health risks associated with LSL's.
4. **Continuation of customer sampling programs:** Sampling properly for lead detection is expensive and intrusive for the customer. It is important that Halifax Water continue to offer free lead sampling for at risk homeowners in order to engage them in the issue and provide public health information. Through our partnership with Dalhousie University we have been able to provide very cost effective lead sampling.
5. **Corrosion control:** Providing corrosion control treatment at the treatment plant is an important part of a comprehensive lead strategy. Effective corrosion control reduces lead levels where service lines exist and will continue to protect customers from lead found in solder and brass fixtures well after LSLs are removed.

Halifax Water launched its new lead program on April 1, 2017. In August 2017, the NSUARB approved a program to enable Halifax Water to provide a 25% rebate for customers replacing a LSL and to replace LSLs that are disturbed during emergency repairs, at the utilities expense. This makes Halifax Water one of the first utilities in North America to take this step. To further reduce barriers to replacement, Halifax Water has applied to the NSUARB to allow Halifax Water to offer customers a financing program for the balance of the replacement cost. This financing program was approved in 2018.

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In the first two years of the program, 197 public LSL's and 212 private LSL's were replaced. Unfortunately, in 2019 we saw a reduction in uptake in the program. Based on discussions with other utilities across North America, this appears to be a common phenomenon, as motivated customers participate in the program in the early years leaving less motivated customers in later years.

Accordingly, Halifax Water will be exploring further regulatory and incentive options to promote LSL replacement and anticipates an application to the NSUARB in 2020.

## **10.7 Compliance Plan**

The Regulatory Compliance division of Regulatory Services has established a tracking system to monitor trends of non-compliance and associated sources for all of the wastewater treatment facilities (WWTF). A working group has been established between Asset Management, Operations and Design Services staff to track and plan for the upgrades to maintain compliance with Provincial and Federal regulations. As of 2018/19, all treatment facilities are in compliance with WSER or have approval for operational variances consistent with the CCME Municipal Wastewater Effluent Strategy.

Building on the framework of the basic Compliance Plan from 2012, the plan was updated in 2019 utilizing information Halifax Water has available to create a path forward to maintain or achieve compliance for our wastewater, water and stormwater infrastructure systems over the next 30 years. The Compliance Plan highlights the current state of compliance at our wastewater treatment facilities and water supply plants as well as future compliance requirements. It also includes overall guidance on our wastewater collection system, sanitary and combined sewer overflows and our water distribution system including water reservoirs.

The key objectives of the Compliance Plan included:

- Review of previous work completed that relates to compliance, including the 2012 IRP, 2019 Infrastructure Master Plan and 5-year Capital Program;
- Understanding current and future compliance requirements as they relate to wastewater, water and stormwater infrastructure;
- Understanding previous compliance trends and exploring potential compliance requirements taken from regional and global examples;
- Reviewing, documenting and analyzing the current performance of infrastructure against compliance requirements;
- Generation of infrastructure needs and costs to meet current and future compliance requirements;

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- Incorporating the three drivers behind infrastructure planning (growth, asset management and compliance) through incorporating the impact of future growth trends and outlining projects that contain compliance components and asset renewal / growth components;
- Developing an action plan that outlines current, medium and long-term projects; and
- Identification of action plan risks and potential mitigation methods.

Halifax Water has been consistently working toward achieving the provincial level of wastewater treatment as stipulated by Nova Scotia Environment (NSE) permits and Federal Wastewater System Effluent Regulations (WSER). Historically, NSE has set compliance standards for each wastewater treatment facility (WWTF) issuing Approval for Operation which sets the effluent limits, and the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CSMMW) provided national standards for combined sewer overflows (CSO) and sanitary sewer overflows (SSO). Then in June 2012, the WSER was enacted which set national standards for WWTF effluent discharge and CSO and SSO standards.

Since the introduction of the federal WSER standards, NSE has been reviewing and renewing Halifax Water's operating permits with steady increases in compliance and reporting requirements.

The Compliance Plan is a key input to the Infrastructure Resource Plan (IRP). The IRP provides holistic guidance to understand the current level of compliance and actions required for maintaining compliance. Several initiatives have recently been completed and others underway shall continue. Current compliance initiatives are as follows:

- Compliance Monitoring and Reporting through the Regulatory Services Department;
- Engaging Dalhousie University in compliance research;
- Adopting the Environmental Management System (EMS);
- Environmental Risk Assessments (ERA); and
- WSER Transitional Authorization.

Halifax Water has entered into a 3-year research agreement with Dalhousie University to conduct specific research and optimization of Halifax Water facilities to stay "ahead of the curve" to meet its compliance requirements. The research program is eligible for funding under NSERC's Collaborative Research and Development Grant, an application to NSERC was made in spring 2019; the approval is pending. The NSERC is in the midst of redesigning its funding programs, Halifax Water and Dalhousie University intend to make a future application for a long-term funding when the new programs are in place. The current 3-year plan has a primary objective to improve effluent quality from chemically enhanced primary systems through bench, pilot and full scale testing and optimization of coagulation/

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flocculation processes; the other elements being the application of innovative UV technologies and assessment of contaminants of emerging concern.

Post Walkerton, Nova Scotia was a leading province in modernizing its drinking water regulatory framework. Between 2005 and 2010, Halifax Water went through the provincial process to make sure all water supply plants were compliant at that time. This process resulted in minor upgrades to most facilities and major upgrades to two of the small systems. Nova Scotia Environment maintains a process of doing a systems assessment of all water plants, compare to design standards every ten years with the next round of system assessment reports due to be completed in 2023.

With the discovery of the lake recovery phenomenon, Halifax Water's focus now is to keep water supply plants compliant in the face of changing source water. It is almost certain that significant upgrades will be required to the Pockwock and Lake Major plants to equip them to deal with a source water that is significantly different than when the plants were designed.

## **10.8 Environmental Management System Expansion**

An Environmental Management System (EMS) is a system of procedures, records and processes to manage environmental issues and assist with regulatory compliance. It also makes day to day operations more sustainable and engages employees in these operational activities. The EMS program can be audited against ISO 14001 standards, and if found to comply, receives a Certification through ISO. The ISO standard changed from a 2004 version to a 2015 version, with greater focus placed on organizational leadership and identification of risks and the associated influences, both internal and external to an organization.

Staff have successfully obtained certification for the existing facilities, Pockwock, Lake Major and Bennery Water Treatment Facilities and the Herring Cove and Dartmouth Wastewater Treatment Facility under the new Standard. Halifax Water is currently preparing for internal audits for Eastern Passage, Halifax and Mill Cove WWTFs. It is anticipated they will be certified in 2020.

A request for proposal closed in November and a Consultant will be in place by January 2020 to develop the framework for a corporate wide EMS program. It is anticipated the implementation of a corporate EMS will be completed by 2022. Expansion of the EMS program presents a significant opportunity to reduce Halifax Water's environmental footprint.

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## **10.9 Wet Weather Management**

Halifax Water maintains approximately 1,000 km of wastewater mains, 300 km of combined sewer mains, 14 wastewater treatment facilities, and 166 wastewater pumping stations. Like many municipalities and utilities across North America, Halifax Water's wastewater collection system is subject to dramatic flow increases in response to precipitation events due to age, historical construction practices, maintenance, number of connections as well as other factors. These Inflow & Infiltration (I&I) flows can lead to wastewater releases, sewer backups/basement flooding, increased operation and maintenance costs, treatment process upsets, and treatment facility effluent quality & capacity issues.

Recognizing the impacts of wet weather generated flows on the system, Halifax Water developed a wet weather management program (WWMP). The WWMP is a strategic program to address the negative impacts of wet weather on the wastewater collection system and treatment facilities. The WWMP monitors flows within priority sewersheds before and after wet weather flow reduction activities, while separating the combined sewer systems when practical to do so. The program is long-term in nature and follows a phased implementation approach to meet objectives.

The negative impacts of wet weather can generally be managed by the following:

1. Peak flow reduction - Reduce the quantity of wet weather generated flows that are collected, pumped and treated by the wastewater collection and treatment systems.
2. Peak flow attenuation - Store wet weather generated flows during wet weather periods and release & treat the flows when the system has capacity.
3. System capacity increase

The WWMP intends to systematically identify opportunities to employ the most cost effective wet weather management strategy. Where possible, all three methods are considered based on a cost benefit analysis and the sewershed specific driver for flow reduction, with regulatory compliance being the highest priority. By reducing wet weather flows, the wastewater system will see a reduction in untreated discharges to the environment, effluent noncompliance at WWTFs, operational and maintenance costs, and an increase in available system capacity.

I&I is grouped into two sources, public infrastructure (mains, manholes, laterals up to the property line, etc.) and private infrastructure (laterals from property line up to and including connections within buildings). The program employs a variety of strategies to reduce wet weather impacts such as pipe condition assessments, cured in place pipe (CIPP) rehabilitation, sewer separation, flow monitoring, illegal connection investigations, public communications, and modeling. To effectively address all the issues that contribute to the impacts of wet weather, multiple business units within Halifax Water are engaged to work together to achieve the goals of the WWMP. Figure 11 indicates the working relationships and activities between the contributing business units.

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**Figure 11: Contributing Business Activities of the Wet Weather Management Program**



A phased approach is being followed to implement the program. While the phasing is prescriptive; it is important to revisit the objectives of the program periodically and adjust where necessary.

- **Phase I:** The initial phase of the WWMP involved initiation and development of the program. It was quickly realized that strategies would have to be implemented within each priority sewershed based on individual system characteristics. The program's initial organizational structure was comprised of a wet weather steering committee and a wet weather action committee. Key contributors continue to be engaged in the program with monthly meetings between the steering committee and implementation team.

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- **Phase II:** Phase II of the program required identifying priority sewersheds that demonstrated a need for wet weather management. In the absence of measured flow data, pump station run time data was used to develop a sewershed prioritization matrix. Since that time, significantly more flow monitoring data is available and has almost negated the need for pump station run time data.
- **Phase III:** Pilot sewersheds were identified from the prioritization matrix from Phase II. These pilots were selected so that specific wet weather management strategies could be assessed. Each pilot sewershed was evaluated using pre and post rehabilitation flow data and a cost benefit analysis was conducted with respect to actual wet weather flow reductions. Post rehabilitation flows continue to be monitored in the pilot sewersheds to confirm wet weather flow reductions are achieved long-term.
- **Phase IV:** With the information collected from pilot and other wet weather reduction projects, future project recommendations are being identified and implemented in other sewersheds. This approach allows Halifax Water to identify the most cost-effective strategies to manage wet weather flows using system-specific historical data. Since the initiation of the program, 205 sewersheds have been identified with varying degrees of impacts from wet weather.

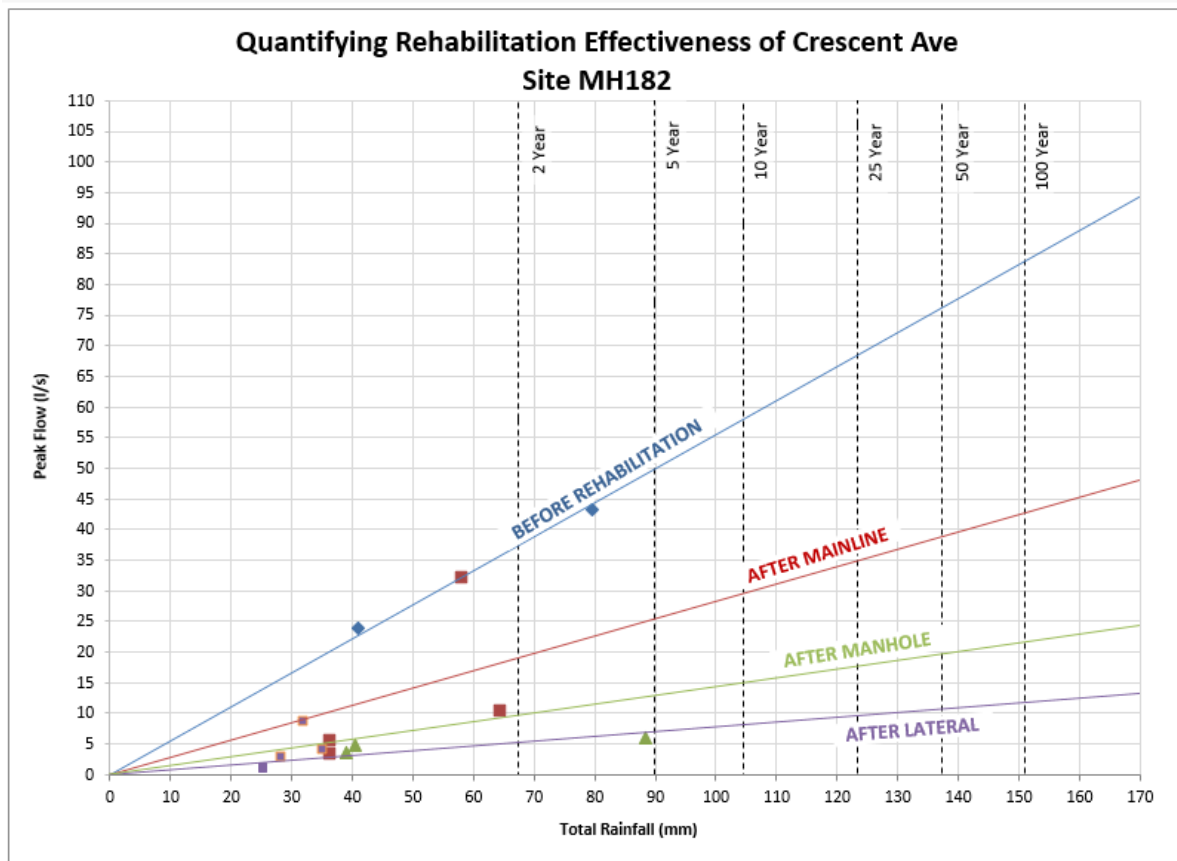
Recognizing the importance of flow monitoring and infrastructure condition assessments, Halifax Water enhanced the service delivery of the flow monitoring and CCTV programs. Both programs have performance-based contracts to ensure accurate and dependable data delivery to the industry standard.

The near term (2020/2021) goals for Halifax Water's Wet Weather Management Program include:

1. **Rehabilitation Pilot Projects:** Halifax Water's WWMP has completed 5 pilot projects: Stuart Harris Pump Station Sewershed, Cow Bay Rd., Leiblin Park, North Preston, and Crescent Ave. These pilot areas were chosen to enable Halifax Water to assess the effectiveness of the various wet weather management strategies and collect rehabilitation cost information. Wet weather management strategies for these sewersheds included mainline, manhole, and lateral CIPP, new stormwater mains, and system spot repairs. 2020/21 will see continued flow monitoring and data analysis on pre and post activity for each pilot. As an example, Figure 12 below illustrates the reduction in rainfall derived inflow and infiltration (RDII) peak flow for the Crescent Ave pilot project. This pilot underwent a three-phase rehabilitation including mainline, manhole, and lateral renewal activities.

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**Figure 12: Crescent Ave. Pilot Project RDII Peak Flow Reduction by Rehabilitation Phase**



2. **Refinement of Cost Benefit Analysis:** Phase IV of the WWMP involved applying a cost benefit analysis of the various strategies to manage wet weather flows. As expected, the pilot sewersheds are demonstrating a significant reduction in RDII as the various wet weather management strategies are implemented. The financial cost of the RDII reduction was normalized so that the information can be applied to other sewersheds and compared to more traditional approaches to wet weather management such as capacity increase and storage. Additional data from various sewersheds is continually analyzed as it becomes available. In addition to flow data, cost information is available for application to larger scale rehabilitation projects.

The cost and reductions in RDII have been compiled since the inception of the formalized WWMP. The program is structured to evaluate all wet weather management activities using the same methodology to ensure consistent application across identified areas. This enables Halifax Water to employ the most cost effective strategy to future areas. It has become evident that the RDII reduction cost has significant dependence on the sewershed characteristics; however, it provides essential guidance for the future projects. The Program continues to augment this information and its application to future projects.



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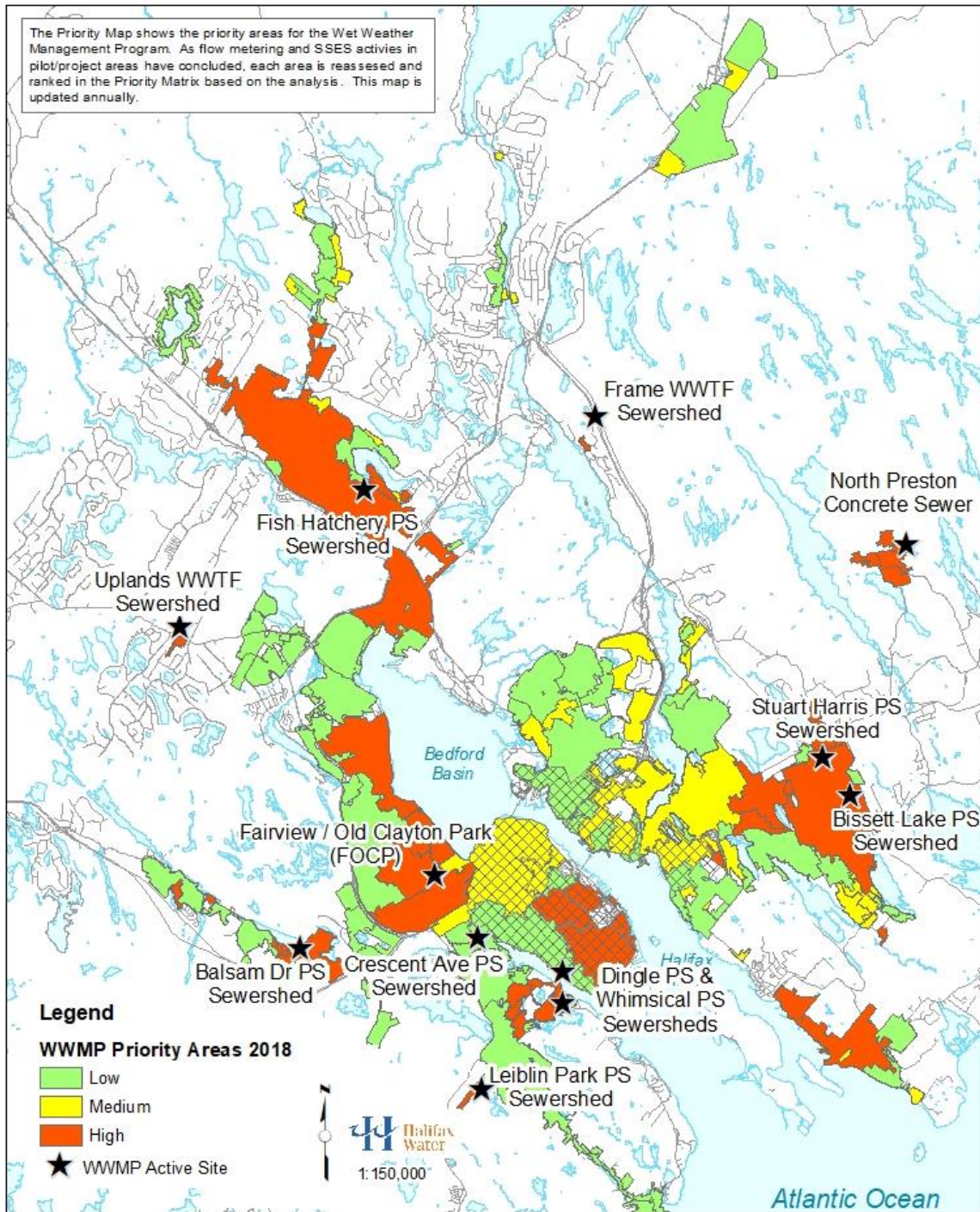
3. **Fairview / Old Clayton Park / Bridgeview:** The analysis of flow monitoring data undertaken as part of the West Region Wastewater Infrastructure Plan identified the potential for significant reductions in RDII in the Fairview, Old Clayton Park and Bridgeview areas. With the goal of reducing peak flows by approximately 200 L/s, a phased I&I reduction program was initiated in 2017. In 2018/19, approximately 11 km of CIPP lining was completed as part of Phase 1 and 2019/20 Phase 2 will see approximately 15 km completed. 2019/20 included smoke testing with the goal of identifying both public and private inflow sources. Flow monitoring and data analysis will continue to quantify RDII reductions for the project area and assess the effectiveness of the asset renewal during all phases of the project.
4. **Program Expansion: Central and East Region Infrastructure Master Plan:** Work on the Infrastructure Master Plan for the East and Central regions has been completed in 2019. Wet weather flow management is a part of the overall wastewater strategy for the Infrastructure Master Plan (IMP). The WWMP will continue to work with the IMP project team in strategy selection for management of wet weather flows. In 2020/21, the WWMP will continue with SSES (Sanitary Sewer Evaluation Survey) activities in the Fish Hatchery Park Pump Station and Eastern Passage sewersheds with the goal of identifying the sub-sewersheds where implementation of wet weather projects are considered feasible.
5. **Decision Matrix Implementation:** Building on the past experience with WWMP projects; an enhanced prioritization methodology is being developed with the addition of a decision matrix to assist in identifying areas that can benefit from wet weather management in a cost effective manner. The decision matrix provides a process flow framework to prioritize candidate sewersheds for future rehabilitation projects.

Figure 13 below shows current sewershed priority ranking based on a previous methodology. Beginning in 2020/21, the WWMP is updating the sewershed prioritization methodology by incorporating recommended criteria to refine priority areas going forward.

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**Figure 13: Priority Map Wet Weather Management Program**

**Priority Map**  
**Wet Weather Management Program**



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The planned WWMP activities for the next five years are listed in Figure 14 (WWMP Preliminary 5 Year Plan) below. Note that activities planned in years 1-2 are unlikely to change and the activities in years 3-5 are subject to change as the program evolves.

**Figure 14: WWMP Preliminary 5 Year Plan**

**2020/2021**

Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)
<i>Fish Hatchery PS Sewershed (FMZ07 &amp; FMZ10)</i> <i>Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)</i> <i>Eastern Passage Sewersheds (FMZ37)</i> <i>Loon Lake Sewersheds (FMZ24)</i>
Rehabilitation: Capital Projects
<i>Fairview/Old Clayton Park/Bridgeview - Phase III</i>

**2021/2022**

Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)
<i>Fish Hatchery PS Sewershed (FMZ07 &amp; FMZ10)</i> <i>Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)</i> <i>Eastern Passage Sewersheds (FMZ37)</i> <i>Loon Lake Sewersheds (FMZ24)</i>
Rehabilitation: Capital Projects
<i>Fish Hatchery PS Sewershed (FMZ10) - Phase I</i> <i>Eastern Passage Sewersheds (FMZ37) - Phase I</i>

**2022/2023**

Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)
<i>Fish Hatchery PS Sewershed (FMZ07 &amp; FMZ10)</i> <i>Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)</i> <i>Loon Lake Sewersheds (FMZ24)</i> <i>Bissett PS Sewersheds</i>
Rehabilitation: Capital Projects
<i>Fish Hatchery PS Sewershed (FMZ10) - Phase II</i> <i>Eastern Passage Sewersheds (FMZ37) - Phase II</i>

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**2023/2024**

Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)
<i>Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)</i>
<i>Eastern Passage Sewersheds (FMZ37)</i>
<i>Loon Lake Sewersheds (FMZ24)</i>
<i>Bissett PS Sewersheds</i>
Rehabilitation: Capital Projects
<i>Fish Hatchery PS Sewershed (FMZ07) - Phase III</i>
<i>Fish Hatchery PS Sewershed (FMZ10) - Phase I</i>
<i>Loon Lake Sewersheds (FMZ24) - Phase I</i>

**2024/2025**

Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)
<i>Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)</i>
<i>Bissett PS Sewersheds</i>
Rehabilitation: Capital Projects
<i>Fish Hatchery PS Sewershed (FMZ10) - Phase II</i>
<i>Loon Lake Sewersheds (FMZ24) - Phase II</i>

*\*Subject to change due to data review supporting refresh of prioritization matrix*

## **10.10 National Water and Wastewater Benchmarking Initiative (NWWBI)**

The Nova Scotia Utility and Review Board approved Halifax Water participation in the Canadian National Water and Wastewater Benchmarking Initiative (NWWBI) as a recommendation from a previous rate review process. The Canadian NWWBI was started in 1998 and has since grown to include about 45 of Canada's most progressive municipal and regional water, wastewater, and stormwater utilities from coast to coast.

The success of the initiative comes from how data is collected to ensure quality. To guarantee that data is collected on a like-for-like basis between utilities, significant effort is placed on the definition of each performance measure and the data items that are collected. Halifax Water has participated in the initiative since 2014 and has been refining the data collection process in that time.

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Initial data collection efforts in the first three years of participation were challenging and NWWBI consultants cautioned Halifax Water that initial years would require extra effort around data collection. The effort was front loaded and entering the fifth year of data collection, Halifax Water has a more streamlined approach to data collection.

There have been several enhancements to the NWWBI program in recent years. In 2018, a new web-based data collection portal was launched. The objective of the new system is to help simplify the data collection process and ultimately reduce the workload burden of data collection. Additionally, the data collection deadline date has changed aligning better with our business processes particularly with financial year end.

Halifax Water has participated in the NWWBI survey for the past five years. Internal data collection procedures have matured quickly and will continue to streamline as Cityworks is implemented across the service areas.

The results of the annual surveys reveal industry trends and identify individual diversions from normal. Halifax Water reviews the trends and diversions to identify areas of improvement within the business. Generally Halifax Water is not an outlier in any particular business area for which data is collected and compared. Over the next few years, the NWWBI program will continue to be monitored to determine the strategic benefits to our organization of information received.

## **10.11 Talent Management**

Halifax Water uses the term talent management to describe strategic workforce management activities to ensure the right people are in the right place, at the right time, and at the right price to execute the business of the utility.

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**Figure 15: Talent Management Cycle**



Talent Management encompasses a variety of Human Resource strategies to ensure Employees continue to feel valued and are ready for more challenging careers as they become available. Employee engagement is a vital piece for a successful talent management program and continues to be a focus for Halifax Water. Another focus will be to create a culture of feedback which is necessary in developing employees at all levels of the organization. Halifax Water recognizes that a workplace which is psychologically safe and healthy is another key component in managing talent and, therefore, will be embarking on many initiatives to create a workplace that is psychologically healthy and safe for all.

## **10.12 Performance Measurement**

Halifax Water's overall performance is assessed against the Corporate Balanced Scorecard (CBS). Halifax Water has been utilizing a corporate balanced scorecard (CBS) to measure utility performance since 2001. Each year the Halifax Water Board sets organizational indicators and reviews performance results. Adjusting the CBS targets to ensure they are relevant and challenging, keeps the utility focused on continuous improvement

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There are eight Critical Success Factors (CSFs) derived from Halifax Water's vision statement (shown in Appendix A) and under each of the CSFs, there are organizational indicators to track performance and allow for the establishment of targets. The following lists the current CSFs and corresponding results for the organizational indicators under each category.

**1. High Quality Drinking Water**

- Adherence with Water Quality Master Plan - Percentage of sites achieving targets
- Bacteriological tests - Percentage free from Total Coliform
- Customer satisfaction about water quality - Percentage from customer survey

**2. Service Excellence**

- Customer satisfaction with service - Percentage from customer survey
- Water service outages - Number of connection hours/1000 customers
- Wastewater service outages – Number of connection hours/1000 customers
- Average speed of answer – Percentage of calls answered within 20 seconds

**3. Responsible Financial Management**

- Operating expense/revenue ratio percentage
- Annual cost per customer connection – Water
- Annual cost per customer connection – Wastewater

**4. Effective Asset Management**

- Water leakage control – target leakage allowance of 160 litres/service connection/day
- I&I reduction - Number of inspections on private property for discharge of stormwater into the wastewater system
- Peak flow reduction from wet weather management capital projects
- Hours of unplanned outages in GIS and Cityworks
- Capital budget expenditures - Percentage of budget spend by end of fiscal year

**5. Workplace Safety and Security**

- Average score on internal safety audits
- NS Labour and Advanced Education compliance - # of Incidents with written compliance orders
- Lost time accidents -Number of accidents resulting in lost time per 100 employees
- Safe driving - Number of traffic Accidents per 1,000,000 km driven
- Training - Number of employees trained or re-certified before due date



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**6. Regulatory Compliance**

- Percentage of public health and environmental regulatory infractions resulting in an environmental warning report, summary offense ticket, ministerial order, or prosecution
- Percentage of WWTFS complying with NSE approval permits

**7. Environmental Stewardship**

- Number of ICI properties inspected by Pollution Prevention each year
- Energy management kwh/m<sup>3</sup> reduction associated with capital projects
- Bio-solids residual handling - % of sludge meeting bio-solids concentration targets

**8. Motivated and Satisfied Employees**

- Percentage of grievances resulting in arbitration
- Percentage of jobs filled with internal candidates
- Employee satisfaction survey result
- Average number of days absenteeism

**11. SAFETY & SECURITY**

**11.1 Occupational Health & Safety Programs**

Halifax Water's Occupational Health and Safety Program is based on the Internal Responsibility System (IRS), which is the foundation of the Nova Scotia Occupational Health and Safety Act. The IRS is an internal system that provides for direct responsibility for health and safety for all staff in an organization.

The Safety and Security Division of Regulatory Services has principal duties and responsibilities as part of the IRS as follows:

- Assisting in formulating and supervising the execution of the utility's Occupational Health and Safety Program, and assist management to fulfill, to the greatest degree possible, its responsibilities for safety.
- Coordinating and/or providing safety training to staff in an effort to prevent incidents, minimize losses, increase productivity and efficiency, and ensure compliance with safety legislation and policies.
- Conducting safety audits in the workplace to identify safety hazards and recommend control measures.



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- Assisting in the development and maintenance of a system of incident investigation, reporting, and follow-up.
- Providing program education for job safety.
- Acting as a resource to the Joint Occupational Health and Safety Committee (JOHSC).
- Liaising with federal, provincial, and local safety organizations by taking part in the activities and services of these groups.

Halifax Water has established and maintains an Occupational Health and Safety Program in consultation with the Joint Occupational Health and Safety Committees (JOHSC). Halifax Water's JOHSC's continue to mature and grow in knowledge and ability and will continue to be a large part of creating a positive workplace safety culture.

Halifax Water is a signatory of the Nova Scotia Health and Safety Leadership Charter which represents a commitment from industry leaders across Nova Scotia to the continuous growth of a positive workplace safety culture. Mental health and psychological health and safety are increasingly being recognized as an important component of occupational health and safety. In 2020/21 Regulatory Services and Human Resources will be working together to further psychological health and safety initiatives and all Halifax Water employees will receive psychological health and safety training.

In 2020, to assist with the management of the safety program, it is proposed to review the applicability of the **ISO 45001** International Standard that specifies requirements for an occupational health and safety (OH&S) management system, with guidance for its use, to enable an organization to proactively improve its OH&S performance in preventing injury and ill-health. Implementing ISO 45001 would be a multi-year initiative within the period covered by the Five-Year Business Plan.

## **11.2 Corporate Security Program**

Halifax Water's Security Program is based on enterprise asset protection and is designed to protect three types of assets: people, property, and information. It also considers intangible assets such as the organization's reputation, relationships, and creditworthiness. The program has been developed to take an all-hazards approach, be it from natural, intentional, or accidental hazards, when reviewing risks to the organization.

Halifax Water uses the three basic elements of a physical security system to protect its assets.

**Protection:** The protection element is the physical barrier that delays the determined adversary and the opportunist in accomplishing their goals. Halifax Water uses barriers such as building fabric, fences, doors, door hardware, and containers to protect its assets.

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**Detection:** The detection element indicates and may also verify an actual or attempted overt or covert penetration. Halifax Water uses intrusion alarms, access control systems, CCTV, and patrols to protect its assets.

**Response:** This element is the reaction to an attempted or actual penetration. Halifax Water works closely with local and national police and security agencies to ensure a rapid response to events.

Halifax Water will be updating its Security Plan and will be providing training to all employees based on their roles and responsibilities.

### **Emergency Management Planning**

Safe and reliable drinking water, sanitation and environmental protection are vital to the sustainability of communities within HRM. In recognition of this, Halifax Water maintains an Emergency Management Plan (EMP), as required by the provincial Emergency Management Act.

The purpose of the EMP is to establish an organizational structure and procedures for response to water and wastewater/stormwater incidents. It assigns roles and responsibilities for the activation and implementation of the plan during an emergency, using the Incident Command System (ICS). The preparation and exercising of an EMP can save lives, reduce risk to public health, enhance system security, minimize property damage, and lessen liability.

With the challenges posed by climate change, such as more frequent, intense storms, heat waves, drought, extreme flooding and sea levels it is important that Halifax Water continues to exercise the actions contained within the Emergency Response Plan, both internally and with external partners.

Halifax Water continues to liaise with the municipality with respect to flooding events and will encourage the municipality to complete an updated response plan to extreme flooding events. Halifax Water will assist in the development of the plan, providing information on critical infrastructure, known drainage restrictions and flood prone areas.

The Municipality has developed a GIS based Situational Awareness to assist in tracking and monitoring impacts to the systems/infrastructure during an emergency. Halifax Water is exploring the development of its own tool and potentially integration with the Municipality's in the coming years.

## **12. BUSINESS RISKS & MITIGATION STRATEGIES**

### **12.1 Enterprise Risk Management**

In 2019 Halifax Water completed an Enterprise Risk Management (ERM) Framework, and the Halifax Water Board approved an ERM Policy, and a risk appetite and tolerance matrix. There are seven broad risk categories outlined in the policy, which align very closely to the Corporate Balanced Scorecard critical success factors. The risk categories and critical success factors may both change over time. In future, there will be consideration of the alignment. The more closely the risk categories and critical success factors align the less opportunity there will be for confusion or goal misalignment.

The ERM Policy will be rolled out in 2020, and Halifax Water will begin risk based reporting to the Halifax Water Board. It will take 2 – 3 years to fully embed ERM at Halifax Water; and an additional resource is required to coordinate enterprise risk management, and well as internal audit functions. Compliance with policies and standard operating procedures (SOPs) is important to help manage risk. Halifax Water will add capacity to conduct internal audits with a focus on promoting policy and SOP compliance.

### **12.2 Nova Scotia Environment (NSE) Regulatory Compliance**

#### **Wastewater:**

Since the last Five-Year Business Plan was completed, a number of upgrades, optimizations, system enhancements and one decommissioning has occurred to achieve compliance with the WSER for all WWTFs.

Halifax Water meets and communicates regularly with NSE staff, with the objective of achieving consensus on priorities. Regulatory compliance plans have been updated.

Funding of capital improvements for a number of the wastewater treatment facilities has already been approved, or are in process in the Five-Year Capital Budget, namely:

- Decommissioning of the Timberlea WWTF, with diversion to Halifax
- Upgrades to the Mill Cove WWTF for increased capacity
- On-going studies for the management of Sanitary Sewer Overflows (SSOs) and Combined Sewer overflows (CSOs)

Halifax Water continues to take advantage of the seasonal disinfection program, allowing for enhanced and easier maintenance of the ultraviolet disinfection systems at Eastern Passage, Dartmouth, Halifax and Herring Cove WWTF.

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**Water:**

The Approvals for the water treatment facilities expired in 2018, with interim approvals issued by NSE. Renewal applications have been submitted to NSE and updated permits have been provided or are being finalized this year.

The Bennery Lake withdrawal permit requires options for the continued supply of water to the Airport and Aerotech areas be established. A master plan will be completed in 2020 to review alternatives to the continued use of Bennery Lake. The water withdrawal permit for the Pockwock system expires in 2021 staff are currently preparing the supporting documents required to obtain the renewal of the permit.

Upgrades are planned for JD Kline (Pockwock) and Lake Major water treatment facilities to improve ease operability, asset renewal and continued compliance. These projects will be completed over two phases at each facility.

With the extension of water services to the Fall River area, Halifax Water completed an extension of the watermain to the Miller Lake Water system. This will allow for the decommissioning of the Miller Lake system in 2019 and the customers will be included in the Pockwock water system.

**System Assessments:**

Halifax Water is committed to supplying safe and clean water, and effective wastewater collection and treatment. In support of these goals, Halifax Water undertakes assessments of all water and wastewater systems, in conformance with NSE regulations.

It is a regulatory requirement that Water System Assessments be completed every ten years with the latest reports for all water systems submitted to NSE in 2013, except for Bomont, which was prepared in 2015. Assessments of municipal drinking water systems are conducted to evaluate the capability of the system to consistently and reliably deliver an adequate quantity of safe drinking water; to verify compliance with regulatory requirements; and provide preliminary costs and timelines to address any identified deficiencies and/or concerns. Corrective Action Plans are in place where required by NSE, as follow-up to the Water System Assessments.

Wastewater System Assessments (similar to water system assessments) are currently not a regulatory requirement. However, Halifax Water regularly reports to NSE on the performance of some components of the wastewater system for conformance with regulatory requirements. Additionally, Halifax Water conducts wet weather flow studies on parts of the wastewater system. These studies are similar to system assessments, but are not as comprehensive.

## **12.3 Climate Change**

Climate change is a documented global phenomenon. Climate data indicates a global warming progression since the beginning of the industrial era. The Intergovernmental Panel on Climate Change forecasts continued warming with global increases of between 2 and 4 degrees Celsius or more by the end of this century. Changes will be gradual, progressive, and will impact communities and natural systems well before the end of the century. Climate change may have a number of effects on the water cycle and natural water systems, with resulting impacts on water, wastewater and stormwater operations and infrastructure.

### **12.3.1 Overview**

Climate change effects may include:

- greater weather variability (more extreme wet-weather events and more dry-weather periods),
- greater intensity of precipitation during extreme events,
- greater risk of hurricanes in the Maritimes,
- increased stormwater runoff,
- increased risk of flooding and sea level rise of up to 1 metre by 2100,
- decreased water supplies during dry weather, and
- ecological changes from nuisance or disease-causing organisms.

Consequently, the impact to utilities may include:

- increased stormwater flows during extreme events,
- increased risk of erosion,
- increased flows during snow melt events,
- increased flows within combined systems during extreme events (increased risk of inflow/infiltration and overflows for wastewater systems),
- increased water demand and storage requirements during dry summer weather,
- increased uncertainty regarding water supply,
- reservoir replenishment and groundwater recharge due to uncertainty of local annual precipitation patterns,
- increased risk of power failures during extreme weather events, and
- infrastructure impacts due to sea-level rise.

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These effects and impacts of climate change will require that water/wastewater/stormwater utilities be proactive in planning for contingencies and emergencies.

### **12.3.2 Mitigation Strategies**

Climate change mitigation involves actions that reduce the rate of climate change. Halifax Water's mission statement, "To provide world-class services for our customers and our environment" declares our commitment to good environment stewardship. As good stewards of the environment, it is not enough to simply adapt to the effects of climate change but to pro-actively participate in limiting or preventing greenhouse gas emissions.

Halifax Water is working and delivering on numerous projects that will contribute to the mitigation of climate change:

- Increasing energy efficiency through the Energy Management Program (Section 9)
- Renewable-Energy Generation
- Solar Energy
- Wind Energy
- Wastewater Effluent Heat Recovery
- In-line hydro power turbine

Halifax Water is also an active participant in HRMs "HalifACT 2050: Acting on Climate Together" initiative. HalifACT 2050 is a collaborative project to bring together the municipal government, industry, academia, and community groups to develop a plan to reduce emissions, and adapt to climate change.

### **12.3.3 Adaptation Strategies**

#### **Vulnerability to Climate Change Assessment Framework**

The Infrastructure Master Plan, referenced in Section 7, included development of a Vulnerability to Climate Change Assessment Framework.

The Vulnerability to Climate Change Risk Assessment Framework was developed based on a review of best practices and the existing body of knowledge.

The Vulnerability to Climate Change Assessment Framework was developed such that it can be applied consistently across assets groups to complete vulnerability assessments of existing infrastructure. In addition to assessing the vulnerability of Halifax Water's infrastructure, the framework includes the development of action plans and implementation of climate adaptation measures.

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Stage 1, Assessment Stage, of the Vulnerability to Climate Change Assessment Framework follows an existing framework: The Public Infrastructure Engineering Vulnerability Committee (PIEVC). This developed in Canada framework was chosen as it provides a step by step guide to evaluating municipal assets vulnerability and responses to the impacts of changing climate and aligns with the ISO 31000 Risk Assessment standards.

Beginning in the next capital year, Halifax Water plans to conduct a PIEVC assessment for each asset class already delimited by the Asset Management Plans (Section 7.1.2). The Asset Management Plans are a report card on the state of the infrastructure in each asset class. Their goal is to provide information to decision makers supporting reinvestment decisions for those assets. The Climate Change Vulnerability and Risk appendix to the asset management plan will provide additional information to decision makers on the climate change risks to existing infrastructure in each class.

The Vulnerability to Climate Change Assessment will also create a formalized body of knowledge to be used when designing new or upgrades to infrastructure in that asset class. This body of knowledge of climate change factors specific to our region will be used to supplement national design standards resulting in better designs that adapt to climate change in the Halifax context.

### **Updated Design Standards**

The Infrastructure Master Plan included recommended some immediate changes to Design and Construction Specifications to begin adapting new infrastructure to climate change. Specifically, this includes:

- a modified Intensity-Duration-Frequency (IDF) curve for calculating rainfall for design, and
- guidelines on sea level rise including storm surge and wave run-up.

These updated design standards were used in the development of the Infrastructure Master Plan and will also be included in Halifax Water's Design and Construction Specification when it is next published in 2020.

### **Investing in Canada Infrastructure Program**

The Government of Canada has created the "Investing in Canada Infrastructure Program" (ICIP) to fund investments in infrastructure. The funding plan identifies five priority investment streams: Public Transit, Green Infrastructure, Social Infrastructure, Rural and Northern Communities, and Trade and Transportation Infrastructure.

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The Green Infrastructure stream includes three sub-streams: climate change mitigation; adaptation, resilience, disaster mitigation; and, environmental quality. To qualify for funding, proposed projects must meet at least one of the following outcomes:

- Climate Change Mitigation
- Adaptation, Resilience and Disaster Mitigation
- Environmental Quality

Several of Halifax Water’s planning projects are likely to meet the requirements for the Green Infrastructure stream.

In conjunction with the Investing in Canada Infrastructure Program, the Government of Canada has created the “Climate Lens” assessment requirement. The Climate Lens requirement consists of two components: The Green House Gas (GHG) Mitigation Assessment, and the Climate Change Resilience Assessment. Proponents could be asked to undertake one or both types of assessment, depending on the program, funding stream, and the estimated total eligible cost of the project”. Projects must have completed the relevant Climate Lens assessments complete with an attestation signed by a certified or qualified party when applying for ICIP funding.

Halifax Water is undertaking a project to identify projects that may qualify for funding through the Investing in Canada Infrastructure Program and complete the required Climate Lens assessments. This will result in a selection of projects that are ready for application when the next round funding is released.

## **12.4 WSER Regulations**

On February 14, 2009, the Canadian Council of Ministers of the Environment (CCME) adopted a national strategy for the management of municipal wastewater. The strategy advocates a risk-based approach to management of wastewater effluent whereby requirements are based on environmental and health-risk assessments that are to be carried out for all treatment facilities. However, the strategy also includes a prescriptive approach with a requirement for a uniform minimum standard for all effluent equivalent to secondary treatment. Halifax Water’s inland treatment facilities that discharge to fresh water already provide secondary or better treatment, as does the Mill Cove facility in Bedford and the Eastern Passage facility. However, the three Halifax Harbour Solutions Project (HHSP) facilities are advanced-primary. Upgrading to secondary level is required for the HHSP facilities under the WSER, with estimated capital costs in the order of \$286 M. As outlined in Section 5 of this Business Plan (Wastewater System Effluent Regulations), the upgrade deadlines could be up to 30 years for Halifax and Dartmouth WWTFs under Transitional Authorizations sought under the WSER, due to high-risk CSOs. The Herring Cove WWTF currently is able to meet the WSER discharge limits since it is well under capacity, although



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it was designed as an advanced-primary facility. As growth in the Herring Cove sewershed brings the facility closer to its rated capacity, effluent quality may come closer to exceeding WSER limits. In this case, advance planning for an upgrade will be required so that the facility remains compliant.

A more immediate operational/regulatory issue with Halifax Water's wastewater system is wet weather flow and resultant overflows into the environment as detailed in Section 5. Many of the sewers in the municipality are combined, built many decades ago with many greater than 100 years in age. Combined sewers have not been permitted since the early sixties, but even the older, separate sanitary sewers experience significant I&I problems.

Of the approximately 166 wastewater pumping stations owned by Halifax Water, approximately 35 stations experience overflows during wet weather or high rain events. Many of these overflows go to inland receiving waters and, as such, represent higher environmental and health risks than marine discharge of primary treated effluent. As an initial step, a program is underway to provide sensors to detect overflow conditions and estimate volumes for the sanitary sewer overflows. Eighteen such installations are complete. Halifax Water staff are utilizing a combination of flow monitoring and estimating of overflows to provide the additional flow volumes.

Much of the capital and operating budgets have been allocated to mitigate these wet weather flow problems based on a priority-ranking process. It is preferred that resources be allocated based on risk and assessed priority, rather than on the basis of a national standard (the CCME/WSER) that does not consider local conditions. Identification of funding mechanisms and cost-sharing arrangements with senior levels of government will be critical now that the WSER regulations are in force.

## **12.5 Pension Plan**

Halifax Water has a defined benefit pension plan (Halifax Water Employees' Pension Plan) which was redesigned effective January 1, 2016 to make the plan more affordable and sustainable for current and future Halifax Water employees. Pension plan re-design was achieved through collective bargaining. In 2018, the employer and the employee contributions on pensionable earnings totaled \$6.2 M. The contribution rates were 10.34% for the employees and 9.85% for the employer. From 2019 - 2021, the contribution rates will be 10.34% for both the employees and the employer.

The financial position of the plan, based on the most recent audited financial statements, is shown in Figure 16 below. As at December 31, 2018 there were \$126 M in assets, and \$124 M in pension obligations, for a surplus of \$2 M. Assets of the Plan are invested as part of the Halifax Regional Municipality Master Trust, and represent 6.2% of the Master Trust's assets. The next actuarial valuation is required by January 1, 2022.

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**Figure 16: Pension Plan Statement of Financial Position as of December 31, 2018**

Statement of financial position December 31				
	2018	2017	Change	
			\$	%
Net assets available for benefits (note 4)	\$126,458,630	\$119,731,882	\$6,726,748	5.6%
Pension obligations (note 5)	\$124,371,400	\$121,473,083	\$2,898,317	2.4%
Surplus (Deficiency)	\$2,087,230	(\$1,741,201)	\$3,828,431	219.9%

Halifax Water also has almost 100 employees that joined the utility as part of the 2007 Wastewater/Stormwater transfer, that are members of the HRM Pension Plan.

## 12.6 Development Pressures and Obligations

As growth is a strategic driver of the Infrastructure Master Plan, Halifax Water continues to work closely with the development community to facilitate infrastructure necessary for a rapidly growing municipality. The Municipality completed the last Regional Plan update in 2014 with a current focus on the completion of the Centre Plan. In that regard, Halifax Water project managed the Local Wastewater Collection System Assessment for HRM in support of the potential growth within the city centre and is currently coordinating with the Municipality on the implementation of the required projects.

Staff recently updated the Bedford West and Geizer Hill Capital Cost Contribution plan to reflect the modifications respective servicing scenarios and population projections. Applications are currently before the Nova Scotia Utility and Review Board (NSUARB).

The land owners of the Port Wallace Master Plan area are currently seeking secondary planning approvals and Halifax Water have been providing technical support in the evaluation of whether the Port Wallace area will include a possible new capital cost contribution charge and the required implementation of the servicing strategies.

Halifax Water is currently engaged with the Municipality to support their replacement of the permitting software, HANSEN and move to a digital platform for development approvals.

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## **12.7 Biosolids**

The WWTF upgrades at Aerotech, Eastern Passage and installation of dewatering equipment at Mill Cove WWTF has strengthened Halifax Water's capacity to dewater sludge from its facilities. Additionally, Halifax Water has been successfully worked with Nova Scotia Environment for elimination of the permitting requirements to dewater sludge at various facilities. These initiatives have provided required flexibility thereby reducing the risk of a dewatering facility malfunction and as a result the overall plant operational risks have reduced.

The Biosolids Processing Facility (BPF) is operated by Walker Environment Group with overall responsibility for operating the facility to produce a soil amendment in conformance with Canadian Food Inspection Agency (CFIA) regulations and marketing the product for beneficial reuse. The current asset management plan developed in cooperation with the contractor addresses the parts replacement/upgrade needs of the facility. The BPF is also approaching its design capacity. With population growth and the improvement in performance of treatment plants, the WWTFs are producing an increased quantity of sludge. The contract agreements with Walker Environmental expires at the end of March 2021. Staff are currently reviewing the overall operation, while simultaneously working on the capacity upgrade requirements and a new operating contract. The future BPF could utilize completely different technology with a different operating contractor. In light of the recent industry trends with focus on resource recovery from Biosolids, Halifax Water is exploring all aspects of resource recovery when considering alternatives for biosolids processing. Since this will potentially be a long-term contract, there is a medium level risk with potential changes, considering the complexities associated with the management of biosolids.

## **12.8 Halifax Harbour Solutions Project (HHSP) Facilities**

Climate change is considered to be one of the main challenges to urban wastewater systems in future decades as these Wastewater systems are vulnerable to extreme precipitation events; earlier snowmelt runoff, increased flooding and storm-induced wastewater system failures often lead to environment pollution and put public health at risk. The HHSP, specifically Halifax and Dartmouth operate as combined treatment systems and are most vulnerable to climate changes. When issuing new or updated operational permits Nova Scotia Environment requires that facilities comply with the New Atlantic Canada Design Guidelines. Once the guidelines are finalized the effect of the new guidelines will be taken into consideration for future IRP and Compliance Plan updates along with Halifax Water's infrastructure asset vulnerability to climate change assessments.

Currently the Halifax and Dartmouth WWTFs are operating under WSER transitional authorization that expires on December 31, 2040. At such time the facility will be required to achieve the WSER Baseline Minimal Effluent Quality Standards that are currently more stringent than existing regulations. The Herring Cove WWTF is required to comply with

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the WSER as of June 2015 although existing NSE permits are less stringent the facility can maintain compliance due existing flows and loadings less than the facilities design capacity. To help reduce and eliminate non-compliance with existing Approvals to Operate Halifax Water has developed a Compliance Plan as a part of the IRP to address its long-term compliance needs.

To further strengthen the Compliance Plan, in June 2019 Dalhousie University and Halifax Water have signed a Memorandum of Understanding that will direct research initiatives to the advancement of wastewater effluent quality for the protection of public and environmental health. The initial phase of the partnership will focus on improving wastewater effluent quality from the enhanced primary treatment Harbour Solutions Wastewater Treatment Facilities located in Halifax, Dartmouth and Herring Cove to align with the Federal Wastewater Systems Effluent Regulations. This will be accomplished through bench-, pilot-, and full-scale optimization of coagulation/flocculation processes, tracer studies, computational fluid dynamic work to understand the tank hydraulics, application of innovative UV disinfection technology, and assessment of contaminants of emerging concern. The initial phase of the project will span three years to address research needs surrounding the increasing complexity of Canada's wastewater and address the current operational challenges. The program will provide training of highly qualified personnel to address regulatory challenges, outline cost effective methods to meet the Federal effluent regulations, provide advancements in wastewater treatment beneficial to Halifax Water and the industry, as well as align with the research efforts at Dalhousie University for Clean Technology, Energy Efficiency, Environment Protection, Clean Water and Sanitation Sustainable Development Goals.

Additionally, Halifax Water has recommended and is on the process of implementing strategies to address compliance deficiencies are outlined below.

Halifax Water is undertaking the following activities to address ongoing cause of the non-compliances related to disinfection:

- All Trojan UV 3000+ system ultraviolet disinfection lamps and sleeves were replaced during the 2018/19 winter season. Additionally, Halifax Water will be changing the lamps and sleeves on a set time frame rather than relying on UV transmittance.
- Investigating potential modifications to the UV channels by replacing the hydraulic leveling system with motorized weir gates with electrical actuators to ensure lamps remain submerged and reduce scaling on the sleeves.
- Removal of the existing UV baffles and increase UV dose and exposure time by reducing channel velocities by adding additional UV modules and controls within buildout footprint of the existing channels.
- Address the need for improved screenings capture to reduce material being caught up on the screens and allowing of the lamp sleeves to be automatically cleaned efficiently.

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Halifax Water acknowledges that the challenges associated with the combined system and is currently planning process improvement to maintain optimal and realistic removal efficiencies with the existing infrastructure. The following activities are being implemented to ensure existing permit compliance related to cBOD and TSS:

- Review of coagulation and flocculation process, i.e.: conducting additional jar testing to arrive at optimum dose across the various design flow regimes and investigate alternative coagulants.
- Further review of data and influent pump/s optimization to enhance hydraulics through the plant.
- Conduct computation fluid dynamics modeling to help improve hydraulic balancing both through passive modifications (baffles, weirs etc.) and active modifications (flow dosing compensation).
- Replacing the chemical feed pumps with pumps that have a wider ranges of flow to meet both high chemical demand periods and low chemical demand periods.
- Relocating the chemical application points to more evenly distribute chemicals to both Densadeg trains, and to both coagulation and flocculation tanks in each train, during times of dry weather flow.
- Investigate setting up two separate chemical feed systems: one to handle low flow conditions and one to handle high flow conditions if a single pump does not meet turndown requirements.
- Implement flow monitoring to each treatment train and reactors to ensure adequate process chemicals are injected to achieve optimal coagulation and flocculation.
- Assessment of existing tube settlers for optimal surface area to allow for floc to settle and assess alternative clarifications enhancements that allow for easier maintenance and eliminate blockage.
- The Harbour Solutions facilities are were not designed to treat soluble BOD as that requires secondary level of treatment. During periods of unusually low flows, the influent soluble BOD increases which results in CBOD concentrations over the permit values. Additionally, the coagulation/flocculation process is negatively impacted by the wide range of flows typical of a combined sewer system. Ultimately this will have to be addresses as we move to comply with the deadline of the transitional authorization:
- Assess through ongoing research the implications of enhanced removal on secondary treatment requirements such as low alkalinity and effects on nitrification, sludge residual handing requirements, changes in influent wastewater characteristics, aeration system implications and installation issues.

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Short-term initiatives relevant to the Harbour Solutions WWTF for the 2020-21 to 2024-25 Business Plan include:

- Preliminary Screening Improvements
- Coagulating Dosing System Upgrades;
- Hydraulic Balancing Improvements;
- Disinfection Upgrades,
- Odour Control Asset Renewal; and
- Solids Dewatering Upgrades.

## **12.9 Small to Medium Wastewater Treatment Facilities**

Halifax Water has seven community based WWTFs in the communities of Springfield Lake, Frame Subdivision, Middle Musquodoboit, Uplands Park, North Preston, Fall River and Wellington. Besides these facilities, there are other medium sized facilities located in the Aerotech Business Park and at Beechville-Lakeside-Timberlea. The compliance with NSE permits has improved at all of these facilities either by virtue of upgrades, asset renewal and process optimization. Aerotech and Frame WWTF are equipped with leading edge Membrane Bioreactor technology while other facilities have seen improvement via peak flow reductions through Wet Weather Management program. These efforts will continue in the future. As regional development encroaches on these systems, there are opportunities to connect them to the larger core systems as identified in the IMP and IRP. The risk of non-compliance with the NSE permits have lowered when compared with previous business plan.

## **12.10 Energy Costs**

Through its Energy Management Program, Halifax Water has committed to an ongoing focus on sustainability and energy efficiency throughout the utility, including water and wastewater operations. This program serves to define the goals, objectives, accountabilities, and structure for activities related to responsible energy use.

The Water and Wastewater/Stormwater departments operating budgets are significantly impacted by energy costs that are expected to increase over the life of this business plan and beyond. Figure 17 provides projected energy cost impacts over the next five years:

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**Figure 17: Projected Energy Cost Increases and Budget Impacts**

Year	Electricity	Heating Fuel Oil	Natural Gas	Water Budget Impact	Wastewater Budget Impact	Total Budget Impact
2019/20	3.0%	5.0%	10.0%	\$76,000	\$168,000	\$244,000
2020/21	6.0%	3.0%	10.0%	\$141,000	\$301,000	\$442,000
2021/22	2.0%	2.0%	2.0%	\$7,000	\$22,000	\$29,000
2022/23	2.0%	2.0%	2.0%	\$34,000	\$78,000	\$112,000
2023/24	2.0%	2.0%	2.0%	\$28,000	\$66,000	\$94,000
2024/25	2.0%	2.0%	2.0%	\$28,000	\$68,000	\$97,000

Notes:

(1) Projected electricity rate increases based on NSPI 2020 – 2022 Fuel Stability Plan and NSUARB rate application dated June 27, 2019, and on historical trends.

(2) Projected HFO rate increases based on historical trends from 2012 to present day.

(3) Projected Natural Gas rate increases based on historical trends from 2012 to present day.

The Energy Management Action Plan identifies energy reduction targets for Water and Wastewater Operations over a five-year planning period. Targets will be reviewed each year and adjusted for future years based on the previous year's performance, operating and capital budget allocations, and anticipated energy price increases.

Water and Wastewater Operation's energy-reduction targets over the next five years are outlined in Figure 18:

**Figure 18: Energy Reduction Targets**

Year	Water Operations Projected Savings		Wastewater Operations Projected Savings	
	Energy Reduction Target	Energy Savings (kWh <sub>e</sub> )	Energy Reduction Target	Energy Savings (kWh <sub>e</sub> )
2019/20	3.0%	576,000	3.0%	1,209,000
2020/21	2.0%	372,000	2.0%	782,000
2021/22	2.0%	365,000	2.0%	766,000
2022/23	2.0%	357,000	2.0%	751,000
2023/24	2.0%	350,000	2.0%	736,000
2024/25	2.0%	343,000	2.0%	721,000

As a result of Halifax Water's Energy Management Action Plan, presented with the last general rate application, Halifax Water was able to reduce revenue requirements associated with energy by 2%. Presently the Five-Year Business Plan operating budgets do not incorporate the energy reduction targets outlined in Figure 18. As future electricity rates become known with greater certainty and the energy savings of various initiatives are measured, budgets will be adjusted on an annual basis. The projected savings shown above are also contingent on the availability of human and capital resources as approved in the annual operating and capital budgets. As capital budgets are approved or amended, actual energy savings may need to be adjusted on an annual basis.

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To date, a number of potential energy-management opportunities (EMOs) have been identified through low to mid-level energy audits in a number of facilities.

For Water Operations and Corporate facilities, EMOs include HVAC system upgrades, retro-commissioning of PRV- station HVAC systems, lighting retrofits; reactive power correction, variable frequency drive upgrades, pumping system performance upgrades, and new construction design review for energy efficiency.

For Wastewater Operations, EMOs include effluent stream heat recovery, energy recovery from biosolids, retro-commissioning of WWTF and pumping station HVAC systems, UV disinfection system upgrades, UV system channel isolation, variable frequency drive upgrades, and new construction design review for energy efficiency.

A number of these EMOs have been successfully implemented, and some have been partially funded through Efficiency Nova Scotia's various programs.

As new or existing facility construction projects occur, those projects are also evaluated for energy efficiency improvements. Recently completed projects include the new Aerotech Wastewater Treatment Facility, the Eastern Passage WWTF upgrade, the Bedford West Trunk Sewer and Pumping Station Upgrade, the Lakeside/Bayer's Lake PS Upgrade, the Bedford pump station upgrade, and the Herring Cove sanitary pump station. Energy efficiency is now an integral part of the overall project evaluation and design process ensuring improvements are incorporated prior to the construction phase of a given project.

A number of Halifax Water's standard design specifications have also been reviewed to ensure energy efficiency is taken into account in any future new construction activities (e.g., wastewater pumping stations, booster stations, treatment plants).

## **12.11 Chemical Costs**

**Water treatment** chemicals represent 30% of the cost of running our large water treatment facilities, totally approximately \$3 M per year.

Chemicals for water treatment are a secondary markets for many chemical manufactures. For example, chlorine and caustic soda markets are driven by the demand for PVC plastic in the construction and home building industries. Phosphates for corrosion control, and fluoride are secondary markets to the agriculture industry. As a result, demand created by these primary industries can put cost pressure on chemicals consumed by water utilities.

In the last couple of years, after about five years of stable market prices, we have experienced two consecutive years of double digit increases for coagulants due to market consolidation. Caustic Soda Caustic soda has also seen greater and inflation rate increases the last two years



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As we begin to look at upgrading treatment process due to lake recovery, this presents an opportunity to select processes which are viable with a wide range of treatment chemical options, thereby opening broader markets for the purchase of treatment chemicals. We will also look for opportunities to use bulk delivered commodity chemicals rather than proprietary or packaged chemicals.

**Wastewater and Stormwater Services** uses chemicals for wastewater treatment, sludge processing, and odour control. The chemicals represent 13% of the cost of running our WWTFs, at approximately \$2,750,000 per year.

All of the WWTFs use UV systems for disinfection with the exception of one community plant in Timberlea which uses chlorine based products. The cost fluctuation risk is mitigated by the very small quantities that is required. Halifax Water has seen stable prices for wastewater treatment chemicals over the last 5 years. Alum and polymers are the largest share of the cost and quantity. The recent contract for polymers is a 3 year term and the price per kilogram is 6% lower than the 2017-18 pricing. As mentioned above, alum is a commodity product. Halifax Water has experienced stable pricing over the years, and it is expected to remain stable over the 5 year period.

Wastewater Collection Services use Bioxide for odour control in the collection system. This proprietary product is proven in the industry to be most effective. Currently, this product is used in Dartmouth at an approximate cost of \$150,000 per year. The utility will continue to explore other opportunities or make system enhancements in order to reduce this cost. However, it is expected that the chemical price will remain stable in the near future.

## **12.12 Lake Recovery**

Lake recovery will ultimately require modifications or upgrades to the Pockwock and Lake Major plants. It is also possible that the Bennery lake plant will require upgrades, however that plant has completed a multi-year optimization program that should equip it well enough to deal with water quality challenges for the next several years.

A three pronged approach has been implemented to deal with lake recovery as follows:

**Immediate:** Operational improvements have been made at all three treatment plants to make them more robust and better equipped to deal with treatment challenges. This includes upgrading and adding instrumentation to provide better information for operators, upgrading chemical delivery systems, and instituting a filter surveillance program so that operators have the best available information about filter performance.

**Short-term:** Several short-term plant improvements are planned, or have been completed, which will improve plant performance. This includes upgrading filter media and underdrains and installing air scour at Pockwock, and continuing through a ten year upgrade program at

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Lake Major which will make the plant more flexible and provide better quality water. Lake Major projects include replacing clarifier plates and tubes, and planning for construction of a new intake and pumping station.

**Medium-term:** Preparation for plant upgrades have begun on a number of fronts. Recently, design team have been procured to plan out the process upgrade projects. As mentioned above, understanding the impact of lake recovery and studying the impact on the plants makes up two of three research themes through the NSERC Industrial Research Chair with Dalhousie University. Halifax Water was also successful in an application to the Tailored Collaboration Program through the Water Research Foundation which will provide guidance on designing a new plant process while water quality is changing. This project will be completed in early 2020 and the outcome will inform the plant upgrade design teams. All of these activities will position the utility to begin a plant upgrade process for Pockwock and Lake Major in the next 2-4 years, while achieving interim process in the short-term.

### **12.13 External Funding**

The federal and provincial governments have a current bilateral agreement for infrastructure funding under the *Investing in Canada Infrastructure Program* (ICIP). The five-year business plan was developed with assumptions with respect to external funding from provincial or federal government partners under the ICIP. The Five-Year Business Plan assumes \$51,657,700 in external funding broken down as follows:

- Water - \$39,411,200
- Wastewater - \$11,972,370
- Stormwater - \$274,130

It is anticipated that the federal and provincial governments will announce another round of infrastructure funding in 2020 for implementation beginning in 2021/22.

### **12.14 Flood Plain Delineation**

The Municipality has completed a municipal wide flood risk assessment study for the identified high risk areas across the Municipality. The outcome of the completed study was two detailed studies for the Sackville Rivers and Shubenacadie watersheds. The Sackville study focuses on creating a mitigation plan along the system based on the completed studies. As for the Shubenacadie watershed, the plan is to have a consultant create updated flood mapping for the watershed from Lock 2 to Lock 5. Halifax Water operational and engineering staff will be providing much needed input relating to system knowledge as these and other projects progress.

**HALIFAX WATER**  
**Five-Year Business Plan**  
**2020/21 to 2024/25**

This information will assist HRM in the planning exercises relating to the placement for new development projects. As well, it will allow for risk assessments and emergency planning to occur relating to existing critical infrastructure and transportation routes.

Halifax Water cost shared this exercise with the Municipality in relation to the National Disaster Mitigation plan to prioritize known drainage issues and flood prone areas. Halifax Water continues to engage with the Municipality on projects where a joint benefit can be achieved with the implementation of mitigation strategies and programs.

## **12.15 Financial Risks**

Some of the most significant risks facing Halifax Water relate to infrastructure, therefore there are financial risks also - insufficient revenues to meet the projected operating requirements, and insufficient capital funding to meet the IRP recommended level of spend.

Halifax Water has experienced net metered consumption decreases of 24.7% over the past seventeen years. On average, the annual reduction is 1.64% which has been managed through changing rate structures, diversifying revenues (stormwater with a different billing determinant), controlling costs, and increasing rates.

## **13. RECOMMENDATIONS FOR RATE APPLICATIONS**

Halifax Water maintains a long range financial model that projects future impacts on revenue requirements, but not rates. It is not possible to accurately project rates, as updated demand analyses and rate studies would have to be conducted for each service prior to an application.

The projected five-year financial model indicates that water and wastewater rate increases will be required after the 2019/20 fiscal year. Halifax Water is planning to submit an application to increase rates for water and wastewater service in February 2020, for rate increases over a two year test period.

A rate application to adjust stormwater rates is also planned for late 2020, with rates to take effect April 1, 2021.

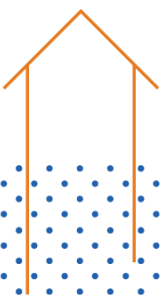


# **Appendix A**

## **Mission, Vision & Values**

### **&**

## **Corporate Balanced Scorecard**



**STRAIGHT from  
the SOURCE**



## **Our Mission:**

*“To provide world class services  
for our customers and our environment”*

## **Our Vision:**

- *We will provide our customers with high quality water, wastewater, and stormwater services.*
- *Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.*
- *We will fully engage employees through teamwork, innovation, and professional development.*

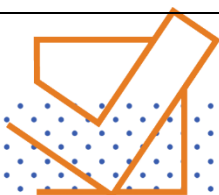
## **Our Values:**

Halifax Water promotes a culture where:

- *All Interactions are respectful, courteous, and civil*
- *We respect confidentiality of people and transparency of process*
- *We have an inclusive environment*
- *We lead by example*
- *We are positive and collaborative*
- *We treat employees and customers equitably*
- *We have a safe, accessible work environment*
- *We are accountable for our actions & behaviours*



Corporate Balanced Scorecard		
Organizational Indicators	2018/19 Result	2019/20 Target
<b>High Quality Drinking Water</b>		
1. Adherence with 5 objectives of Water Quality Master Plan for all water systems - Percentage of sites achieving targets	64/100	80 - 100/100
2. Bacteriological tests - Percentage free from Total Coliform	99.97%	99.3%
3. Customer satisfaction about water quality - Percentage from customer survey	89%	85%
<b>Service Excellence</b>		
4. Customer satisfaction with service - Percentage from customer survey	96%	90%
5. Water service outages - Number of connection hours/1000 customers	203	200
6. Wastewater service outages – Number of connection hours/1000 customers	2.06	8
7. Average speed of answer – Percentage of calls answered within 20 seconds * Revised in 2019/20. Was previously average call wait time.	N/A	60 – 65%
<b>Responsible Financial Management</b>		
8. Operating expense/revenue ratio percentage	0.764	0.815
9. Annual cost per customer connection – Water	\$477	\$517
10. Annual cost per customer connection – Wastewater	\$684	\$708
<b>Effective Asset Management</b>		
11. Water leakage control – target leakage allowance of 160 litres/service connection/day	172	160-170
12. I&I reduction - Number of inspections on private property for discharge of stormwater into the wastewater system	932	900
13. Peak flow reduction from wet weather management capital projects * New in 2019/20	N/A	34-38 l/sec
14. Hours of unplanned outages in GIS and Cityworks	70.85%	95-97%
15. Capital budget expenditures - Percentage of budget spend by end of fiscal year	68.4%	80-90% approved
<b>Workplace Safety and Security</b>		
16. Average score on internal safety audits *New in 2019/20	N/A	85-95%
17. NS Labour and Advanced Education compliance - # of Incidents with written compliance orders	1	0-2
18. Lost time accidents -Number of accidents resulting in lost time per 100 employees	2.5	2.0-3.0



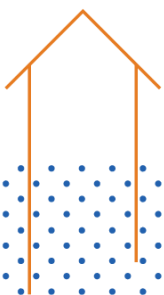
19. Safe driving - Number of traffic Accidents per 1,000,000 km driven	4.3	4
20. Training - Number of employees trained or re-certified before due date	81%	80-90%
21. Percentage of completed safety talks	81%	80-90%
<b>Regulatory Compliance</b>		
22. Percentage of public health and environmental regulatory infractions resulting in an environmental warning report, summary offense ticket, ministerial order, or prosecution	3	0-2
23. Percentage of WWTFs complying with NSE approval permits	94.9%	95-100%
<b>Environmental Stewardship</b>		
24. Number of ICI properties inspected by Pollution Prevention each year	528	500
25. Energy management kwh/m <sup>3</sup> reduction associated with capital projects	4.7%	3%
26. Bio-solids residual handling - % of sludge meeting bio-solids concentration targets	99.5%	92-97%
<b>Motivated and Satisfied Employees</b>		
27. Percentage of grievances resulting in arbitration	0	0
28. Percentage of jobs filled with internal candidates	63%	80%
29. Employee satisfaction survey result	B	A-
30. Average number of days absenteeism	7.8	<7





## Appendix B

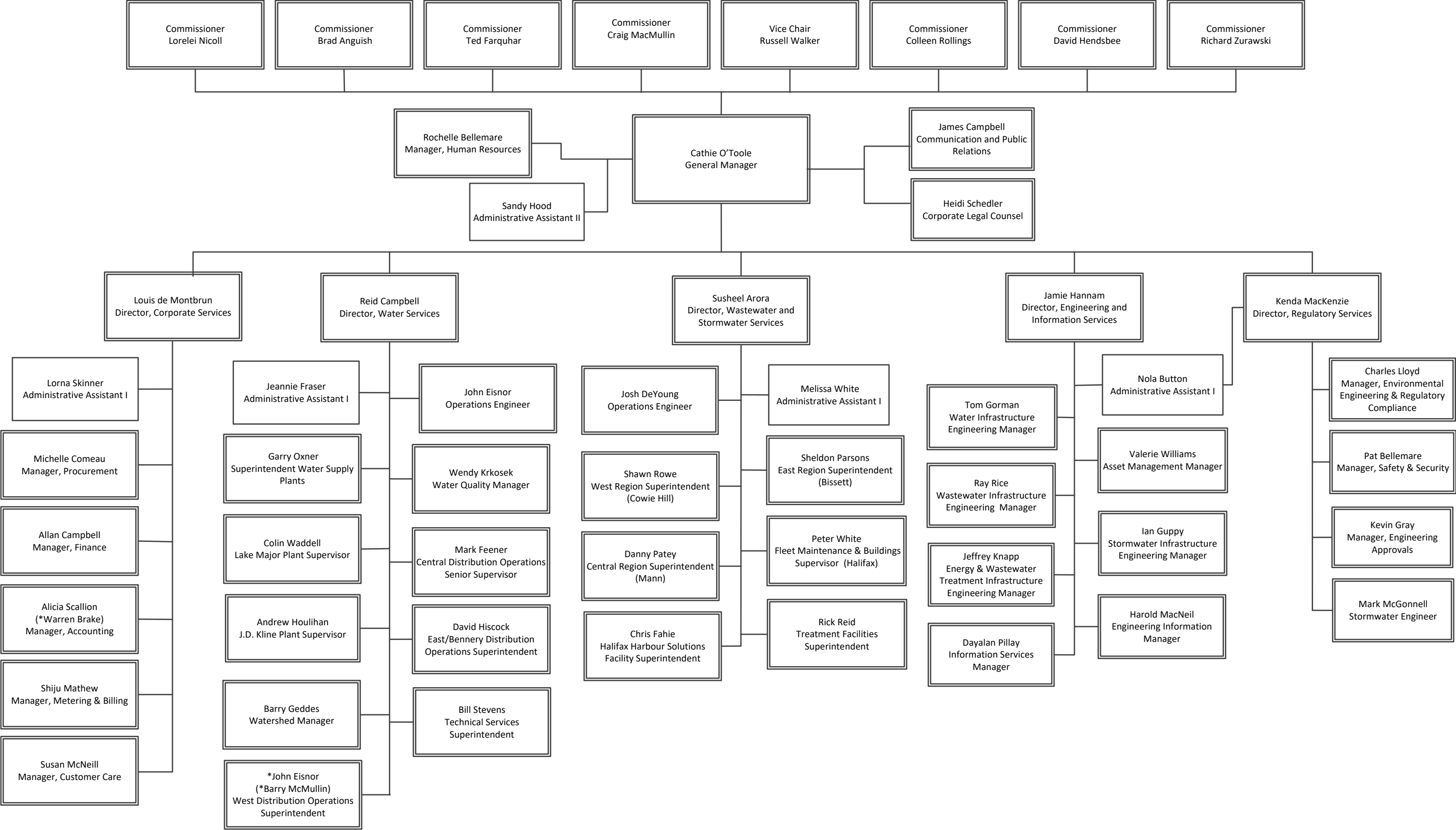
# Organizational Structure



**STRAIGHT from  
the SOURCE**



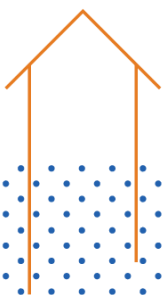
# HALIFAX WATER ORGANIZATIONAL STRUCTURE



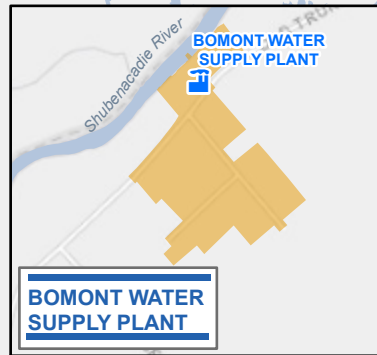
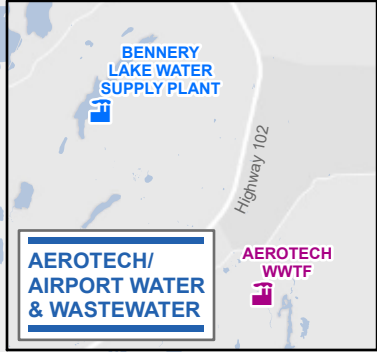
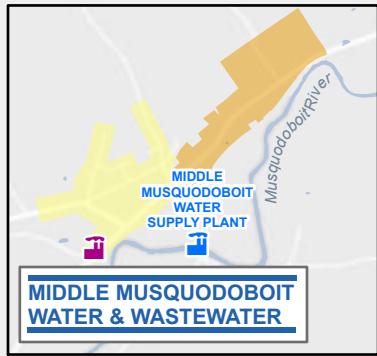


## Appendix C

# Water, Wastewater & Stormwater Service Districts and Supporting Infrastructure



**STRAIGHT from  
the SOURCE**



# SERVICE DISTRICTS AND SUPPORTING INFRASTRUCTURE

## WATER-WASTE-STORM

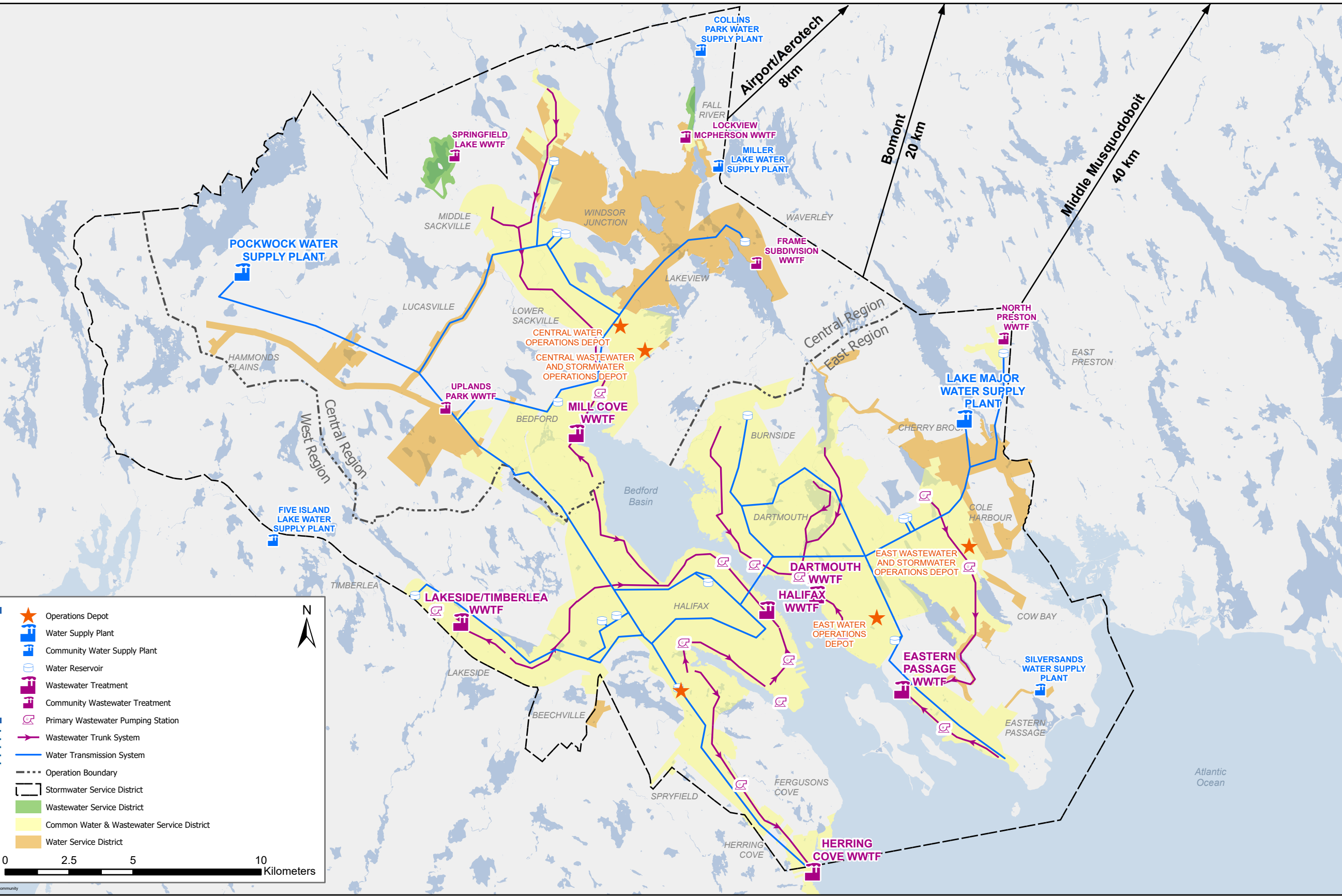
- ★ Operations Depot
- Water Supply Plant
- Community Water Supply Plant
- Water Reservoir
- Wastewater Treatment
- Community Wastewater Treatment
- Primary Wastewater Pumping Station
- Wastewater Trunk System
- Water Transmission System
- Operation Boundary
- Stormwater Service District
- Wastewater Service District
- Common Water & Wastewater Service District
- Water Service District

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Kilometers

STRAIGHT from the SOURCE

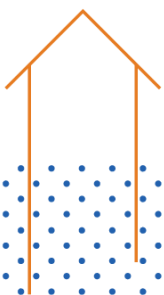
Halifax Water





# Appendix D

## Projected Capital Budgets for 2020/21 to 2024/25



**STRAIGHT from  
the SOURCE**

<div>2020 - 21 to 2024 - 25</div> <div>Capital Expenditure Program</div>	TOTALS					
	All \$ in 000's					
	Y1	Y2	Y3	Y4	Y5	Y1 to Y5
	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Totals
Water / Wastewater / Stormwater Budget Summary						
Water - Land	\$100	\$100	\$100	\$100	\$100	\$500
Water - Transmission	\$10,453	\$6,738	\$7,894	\$8,122	\$11,036	\$44,243
Water - Distribution	\$5,277	\$6,595	\$6,495	\$6,320	\$6,495	\$31,182
Water - Structures	\$10,980	\$9,520	\$11,197	\$5,360	\$7,400	\$44,457
Water - Treatment Facilities	\$15,129	\$38,418	\$30,438	\$25,496	\$23,846	\$133,327
Water - Energy	\$200	\$200	\$200	\$200	\$200	\$1,000
Water - Security	\$50	\$50	\$50	\$50	\$50	\$250
Water - Equipment	\$103	\$50	\$50	\$50	\$50	\$303
Water - Corporate Projects	\$6,638	\$12,485	\$12,051	\$3,623	\$3,718	\$38,515
<i>Sub Total - Water</i>	\$48,930	\$74,156	\$68,475	\$49,321	\$52,895	\$293,777
Wastewater - Trunk Sewers	\$500	\$14,025	\$2,000	\$2,000	\$2,000	\$20,525
Wastewater - Collection System	\$14,473	\$24,407	\$22,165	\$31,582	\$26,560	\$119,187
Wastewater - Force mains	\$825	\$1,000	\$1,000	\$1,000	\$16,100	\$19,925
Wastewater - Structures	\$8,415	\$9,343	\$8,144	\$5,900	\$11,677	\$43,479
Wastewater - Treatment Facilities	\$5,525	\$9,841	\$13,286	\$39,771	\$29,804	\$98,227
Wastewater - Energy	\$75	\$600	\$600	\$600	\$600	\$2,475
Wastewater - Security	\$200	\$200	\$200	\$200	\$0	\$800
Wastewater - Equipment	\$255	\$145	\$145	\$145	\$145	\$835
Wastewater - Corporate Projects	\$8,180	\$13,434	\$12,751	\$6,246	\$6,188	\$46,799
<i>Sub Total - Wastewater</i>	\$38,448	\$72,995	\$60,291	\$87,444	\$93,074	\$352,252
Stormwater - Pipes	\$2,380	\$3,992	\$14,469	\$5,474	\$6,101	\$32,416
Stormwater - Culverts/Ditches	\$3,107	\$2,930	\$2,125	\$2,950	\$2,445	\$13,557
Stormwater - Structures	\$1,900	\$2,100	\$500	\$1,000	\$1,000	\$6,500
Stormwater - Security	\$0	\$0	\$0	\$0	\$0	\$0
Stormwater - Equipment	\$0	\$0	\$0	\$0	\$0	\$0
Stormwater - Corporate Projects	\$1,750	\$2,827	\$2,999	\$1,017	\$1,360	\$9,953
<i>Sub Total - Stormwater</i>	\$9,137	\$11,849	\$20,093	\$10,441	\$10,906	\$62,426
TOTALS - Water/Wastewater/Stormwater	\$96,514	\$158,999	\$148,859	\$147,205	\$156,874	\$708,451

Five Year Capital Budget - Water

Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Water - Land									
3.033	Watershed Land Acquisition	HRM	\$100	\$100	\$100	\$100	\$100	\$500	\$0
Water - Land -- T O T A L S			\$100	\$100	\$100	\$100	\$100	\$500	\$0
Water - Transmission									
3.042	Critical Valve Replacement Program	HRM	\$300	\$300	\$300	\$300	\$300	\$1,500	\$0
3.503	Chain Control Valve Upgrade Program	West	\$45					\$45	\$0
3.581	Transmission Main Monitoring System Pilot	HRM	\$200					\$200	\$0
3.550	Burnside Connexor - Transmission Main Corridor - Rock Trench	East/Central			\$815			\$815	\$0
3.549	Chain Control Transmission - Existing Peninsula Low Upsize	West	\$100	\$2,013			\$1,728	\$3,841	\$0
3.552	Chain Control Transmission - Existing Peninsula Intermediate Upsize	West	\$100	\$1,358			\$1,192	\$2,650	\$0
3.553	Peninsula Intermediate Looping - Quinpool Rd to Young St	West					\$431	\$431	\$3,888
3.562	Geizer 158 to Lakeside High Looping	West					\$225	\$225	\$2,000
3.564	Herring Cove Rd Looping - McIntosH Street	West	\$228					\$228	\$0
3.568	Tacoma PRV Chamber	East	\$420					\$420	\$0
3.291	Port Wallace Transmission Main - Caledonia Section	East	\$6,000					\$6,000	\$0
3.571	Highway 118 Crossing - Shubie Park to Dartmouth Crossing	East			\$300	\$5,763		\$6,063	\$0
3.554	North End Feeder Replacement	West	\$200	\$200	\$1,731	\$1,731	\$6,919	\$10,781	\$16,595
3.572	New Primary Feed to Sackville High	Central						\$0	\$4,953
3.574	Cobequid Looping	Central				\$223	\$223	\$446	\$1,784
3.551	Wellington Connector - Transmission Main Corridor - Rock Trench	Bennery			\$505			\$505	\$0
3.399	Cogswell Interchange - Water Transmission Main Realignments	West	\$2,850	\$2,850	\$2,850			\$8,550	\$0
3.504	Burnside Expansion Phase 13 - Watermain Oversizing Cost Share	East			\$1,220			\$1,220	\$0
3.045	Bedford West CCC - Various Phases	Central	\$5	\$2	\$28	\$5	\$18	\$58	\$0
3.260	Morris (Russell) Lake Estates CCC	East		\$15				\$15	\$0
3.261	Lakeside Timberlea CCC	West	\$5			\$100		\$105	\$0
3.343	Northgate Oversizing	Central			\$145			\$145	\$0
Water - Transmission -- T O T A L S			\$10,453	\$6,738	\$7,894	\$8,122	\$11,036	\$44,243	\$29,220
Water - Distribution									
3.022	Water Distribution - Main Renewal Program	HRM	\$3,525	\$5,000	\$5,175	\$5,000	\$5,175	\$23,875	\$0
3.067	Valves Renewals	HRM	\$125	\$125	\$125	\$125	\$125	\$625	\$0
3.068	Hydrants Renewals	HRM	\$75	\$75	\$75	\$75	\$75	\$375	\$0
3.069	Service Lines Renewals	HRM	\$100	\$100	\$100	\$100	\$100	\$500	\$0
3.390	Lead Service Line Replacement Program	HRM	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$5,000	\$0
3.294	Automated Flushing Program	HRM	\$20	\$20	\$20	\$20	\$20	\$100	\$0
3.334	Coburg Road Bridge Watermain Replacement	West	\$300					\$300	\$0
3.501	South Street CN Bridge Watermain Installation	West	\$25	\$275				\$300	\$0
3.296	Water Sampling Station Relocation Program	HRM	\$10					\$10	\$0
3.513	Meadowbrook PRV Chamber - Replace PRV Valves	Central	\$35					\$35	\$0

Five Year Capital Budget - Water									
Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
3.569	Fall River Rechlorination Station	Central	\$25					\$25	\$0
3.573	Spring Garden Road - Water Design Services	West	\$37					\$37	\$0
<b>Water - Distribution -- T O T A L S</b>			<b>\$5,277</b>	<b>\$6,595</b>	<b>\$6,495</b>	<b>\$6,320</b>	<b>\$6,495</b>	<b>\$31,182</b>	<b>\$0</b>
<b>Water - Structures</b>									
3.262	Chambers, Pumping Stations and Distribution Monitoring Asset Renewal Program	HRM	\$0	\$350	\$350	\$350	\$350	\$1,400	\$0
3.512	Eaglewood Pumping Station - New Pump Control Panel	Central	\$35					\$35	\$0
3.514	Steel Reservoir Climbing Systems - Safety Upgrades	HRM	\$225	\$225				\$450	\$0
3.116	Bedford South (Hemlock) Reservoir CCC	West	\$10,160					\$10,160	\$0
3.309	Cowie Hill Reservoir Replacement	West	\$200	\$8,040				\$8,240	\$0
3.288	Akerley Reservoir Rehabilitation	East		\$300	\$5,100			\$5,400	\$0
3.515	Meadowbrook Reservoir Overflow Pipe Replacement	Central	\$70					\$70	\$0
3.517	Mount Edward Control Chamber - Extension of Power Supply	East	\$20					\$20	\$0
3.508	Beaver Bank Reservoir Rehabilitation	Central			\$720			\$720	\$0
3.509	Aerotech Reservoir Rehabilitation	Aerotech			\$200	\$2,160		\$2,360	\$0
	Aerotech Storage	Aerotech		\$400	\$4,352			\$4,752	\$0
3.511	Stokil Reservoir Rehabilitation	Central					\$300	\$300	\$5,330
3.510	Mount Edward 2 Steel Reservoir Rehabilitation	East				\$300	\$5,100	\$5,400	\$0
3.453	Geizer 123 Reservoir Rehabilitation	West			\$150	\$2,400		\$2,550	\$0
3.454	Robie Street Reservoir Rehabilitation	West				\$150	\$1,650	\$1,800	\$0
3.523	Lake Major Dam - Site Improvements	East	\$240					\$240	\$0
3.528	Beaver Bank Booster Station - Pump Upgrades	Central	\$30	\$180				\$210	\$0
3.561	Prince Albert PRV Chamber Replacement	East		\$25	\$325			\$350	\$0
<b>Water - Structures -- T O T A L S</b>			<b>\$10,980</b>	<b>\$9,520</b>	<b>\$11,197</b>	<b>\$5,360</b>	<b>\$7,400</b>	<b>\$44,457</b>	<b>\$5,330</b>
<b>Water - Treatment Facilities</b>									
	<b>JD Kline Water Supply Plant:</b>								
3.264	JD Kline WSP Upgrade Program	W/C				\$300		\$300	\$0
3.541	JD Kline WSP - Process Upgrades - Phase 1 - New Clarifier and Pre-Treatment	W/C	\$1,475	\$16,220	\$12,535	\$3,690		\$33,920	\$0
3.542	JD Kline WSP - Process Upgrades - Phase 1 - Backwash Optimization	W/C	\$1,700	\$1,700				\$3,400	\$0
3.543	JD Kline WSP - Process Upgrades - Phase 1 - Building Improvements	W/C	\$110	\$1,440	\$1,000			\$2,550	\$0
3.544	JD Kline WSP - Process Upgrades - Phase 1 - Raw Water Pumping Station	W/C			\$670	\$5,975	\$6,900	\$13,545	\$1,725
3.545	JD Kline WSP - Process Upgrades - Phase 1 - Lagoon Upgrades	W/C				\$740	\$3,900	\$4,640	\$3,840
3.546	JD Kline WSP - Process Upgrades - Phase 1 - Pilot Plant Replacement	W/C					\$150	\$150	\$1,550
3.141	JD Kline WSP - Pumping Station - Raw Water Valve Actuators Replacement	W/C	\$100	\$100	\$100			\$300	\$0
3.428	JD Kline WSP - Caustic Tank Liner Replacements	W/C	\$25					\$25	\$0
3.465	JD Kline WSP - Low Lift Pump Replacements	W/C	\$1,120	\$1,000				\$2,120	\$0
3.351	JD Kline WSP - Replace Westinghouse Electrical Panels	W/C	\$8	\$8	\$8	\$8	\$8	\$40	\$0
3.530	JD Kline WSP - Alum Tank Liner Replacement	W/C	\$45					\$45	\$0
3.531	JD Kline WSP - New Ultrasonic Level Transmitter	W/C	\$10					\$10	\$0

Five Year Capital Budget - Water									
Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
3.472	JD Kline WSP - Replace Floc Tank Valve Actuators	W/C	\$35					\$35	\$0
3.374	JD Kline WSP - Replace Filter Isolation Gates Program	W/C	\$300	\$300	\$300	\$300	\$300	\$1,500	\$0
3.463	JD Kline WSP - New Fluoride Supply Line	W/C		\$15				\$15	\$0
3.431	JD Kline WSP - Fluoride Tank Liner Replacement	W/C		\$19				\$19	\$0
3.475	JD Kline WSP - Low Lift Station Intake Structure Concrete Rehabilitation	W/C			\$160			\$160	\$0
	<b>Lake Major Water Supply Plant:</b>								
3.532	Lake Major WSP - Phase 1 - Temporary Side Stream	East	\$3,320	\$2,990	\$1,330			\$7,640	\$0
3.533	Lake Major WSP - Phase 1 - New Clarifiers and Pre-Treatment	East	\$1,770	\$9,290	\$7,520	\$1,770		\$20,350	\$0
3.534	Lake Major WSP - Phase 1 - Filtration System Replacement	East	\$370			\$4,055	\$4,055	\$8,480	\$0
3.535	Lake Major WSP - Phase 1 - Raw Water Pump Station	East	\$265	\$665	\$4,380	\$5,710	\$4,250	\$15,270	\$0
3.536	Lake Major WSP - Phase 1 - Building Additions	East	\$184	\$2,396	\$1,660			\$4,240	\$0
3.537	Lake Major WSP - Phase 1 - New Pilot Plant	East			\$150	\$1,550		\$1,700	\$0
3.538	Lake Major WSP - Phase 1 - Residuals Management	East				\$738	\$3,908	\$4,646	\$3,834
3.162	Lake Major WSP - Butterfly valve replacement program	East	\$350	\$350				\$700	\$0
3.507	Lake Major WSP - New Boat Launch	East	\$42					\$42	\$0
3.321	Lake Major WSP - Replace Fluoride Tank and Piping	East	\$250					\$250	\$0
3.557	Lake Major WSP - Sludge Drying Beds Improvements	East	\$500	\$500				\$1,000	\$0
3.526	Lake Major WSP - Roof Replacement	East	\$400					\$400	\$1,000
3.506	Lake Major WSP - Driveway Pavement Renewal	East		\$0				\$0	\$390
3.560	Lake Major WSP - Emergency Pumps - Sitework Preparations	East	\$320					\$320	\$0
3.524	Lake Major WSP - Fuel Storage for Generator at Low Lift Station	East	\$135					\$135	\$0
	<b>Bennery Lake Water Supply Plant:</b>								
3.267	Bennery Lake WSP - Upgrade Program	Bennery	\$0	\$225	\$225	\$0	\$225	\$675	\$0
3.477	Aerotech Booster Station Capital Upgrades	Aerotech	\$200	\$800				\$1,000	\$0
3.488	Bennery Lake WSP - Surge Anticipator Valves Replacement	Bennery	\$100					\$100	\$0
3.486	Bennery Lake WSP - Access Road Upgrade	Bennery	\$1,500					\$1,500	\$0
3.489	Bennery Lake WSP - Manganese Removal Strategy	Bennery			\$100	\$435		\$535	\$0
	<b>Non - Urban Core Water Supply Plant:</b>								
3.266	Non-Urban Core WSP Upgrade program	HRM		\$150	\$150	\$150	\$150	\$600	\$0
3.582	Bomont Equipment Upgrade	HRM	\$150					\$150	\$0
3.518	Pump Replacement Program - Small Systems	HRM	\$45					\$45	\$0
3.455	Reservoir Mixing and Residuals Management Upgrade Program	HRM	\$300	\$250	\$150	\$75		\$775	\$0
<b>Water - Treatment Facilities -- T O T A L S</b>			<b>\$15,129</b>	<b>\$38,418</b>	<b>\$30,438</b>	<b>\$25,496</b>	<b>\$23,846</b>	<b>\$133,327</b>	<b>\$12,339</b>
<b>Water - Energy</b>									
3.221	Energy Management Capital Program (Water)	HRM	\$100	\$100	\$100	\$100	\$100	\$500	\$0
3.107	Chamber HVAC Retro-Commissioning Program	HRM	\$100	\$100	\$100	\$100	\$100	\$500	\$0
<b>Water - Energy -- T O T A L S</b>			<b>\$200</b>	<b>\$200</b>	<b>\$200</b>	<b>\$200</b>	<b>\$200</b>	<b>\$1,000</b>	<b>\$0</b>



Five Year Capital Budget - Water									
Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Water - Security									
4.009	Security Upgrade Program	HRM	\$50	\$50	\$50	\$50	\$50	\$250	\$0
Water - Security -- T O T A L S			\$50	\$50	\$50	\$50	\$50	\$250	\$0
Water - Equipment									
3.101	Miscellaneous Equipment Replacement	HRM	\$50	\$50	\$50	\$50	\$50	\$250	\$0
3.502	Leak Detection Equipment	HRM	\$8					\$8	\$0
3.516	Purchase Hydraulic Saws	HRM	\$45					\$45	\$0
Water - Equipment -- T O T A L S			\$103	\$50	\$50	\$50	\$50	\$303	\$0
TOTALS - Water			\$42,292	\$61,671	\$56,424	\$45,698	\$49,177	\$255,262	\$46,889

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Wastewater - Trunk Sewers									
2.526	Wastewater Trunk Sewer Asset Renewal Program	HRM			\$2,000	\$2,000	\$2,000	\$6,000	\$0
2.822	Odour Level of Service and Optimization Review	West	\$100					\$100	\$0
2.467	Kearney Lake Road Wastewater Sewer Upgrades	West						\$0	\$4,100
2.584	Fairview Cove Trunk Sewer	West	\$400	\$14,025				\$14,425	\$0
Wastewater - Trunk Sewers -- T O T A L S			\$500	\$14,025	\$2,000	\$2,000	\$2,000	\$20,525	\$4,100
Wastewater - Collection System									
2.052	Integrated Wastewater Projects - Program	HRM	\$2,000	\$1,700	\$1,800	\$1,700	\$1,840	\$9,040	\$0
2.168	Wastewater System - Trenchless Rehabilitation Program	HRM	\$3,000	\$2,000	\$2,000	\$2,000	\$2,000	\$11,000	\$0
2.504	Collection System Asset Renewal Program	HRM			\$0	\$500	\$500	\$1,000	\$0
2.830	Eastern Passage RDII Reduction Program FMZ24	East				\$862	\$707	\$1,569	\$0
2.831	Eastern Passage RDII Reduction Program FMZ37	East		\$1,364	\$1,116			\$2,480	\$0
2.832	Mill Cove RDII Reduction Program FMZ07 & FMZ40	Central		\$3,271	\$2,500	\$1,241		\$7,012	\$0
2.833	Mill Cove RDII Reduction Program FMZ10	Central				\$157	\$1,414	\$1,571	\$0
2.834	Ellenvale area RDII Reduction Program	East			\$370	\$1,667	\$1,667	\$3,704	\$0
2.835	LoWSCA: Canal Street Separation	East			\$184	\$829	\$829	\$1,842	\$0
2.836	Wyse Road Separation Phase 1	East	\$386	\$1,737	\$1,737			\$3,860	\$0
2.837	Wyse Road Separation Phase 2	East			\$280	\$1,261	\$1,261	\$2,802	\$0
2.838	Albro Lakes Watershed Separation	East	\$811	\$3,650	\$3,650			\$8,111	\$0
2.839	Eastern Passage Gravity Pressure Sewer	East		\$300	\$2,037	\$5,843	\$5,843	\$14,023	\$11,686
2.840	Eastern Passage Gravity Pressure Sewer - Install new pump out stations	East				\$168	\$168	\$336	\$1,340
2.841	Local network upgrades on Beaver Bank Road - Design (and North of Glendale Drive)	Central	\$176	\$138	\$939	\$939		\$2,192	\$0
2.842	Local network upgrades on Beaver Bank Road. At Galloway Drive	Central	\$0		\$100	\$670	\$670	\$1,440	\$0
2.843	Local network upgrades on Beaver Bank Road. By Windgate Drive	Central	\$0		\$111	\$750	\$750	\$1,611	\$0
2.844	Atlantic Street Upgrade	East		\$50		\$383	\$383	\$816	\$3,015
2.845	Pleasant Street Upgrade	East				\$77	\$690	\$767	\$0
2.852	Maynard Lake and Clement Street Wetland Separation	East			\$642	\$4,540	\$1,155	\$6,337	\$453
2.692	Cogswell Redevelopment - Sewer Relocation	West	\$1,000	\$1,000	\$1,000			\$3,000	\$0
2.557	Punch Bowl PS Elimination	West	\$100	\$2,320				\$2,420	\$0
2.746	Sewer Relocation at South Street CN Bridge	West	\$450					\$450	\$0
2.437	Hines Road Rider Sewer Extension	East	\$80	\$400				\$480	\$0
2.356	Auburn Avenue PS Elimination	West		\$60	\$645			\$705	\$0
2.357	Manhole Renewals WW	HRM	\$25	\$25	\$28	\$28	\$28	\$134	\$0
2.358	Lateral Replacements WW (non-tree roots)	HRM	\$1,720	\$1,750	\$1,785	\$1,820	\$1,856	\$8,931	\$0
2.563	Lateral Replacements WW (tree roots)	HRM	\$541	\$552	\$567	\$582	\$594	\$2,836	\$0
2.223	Wet Weather Management Program	HRM	\$350	\$350	\$350	\$350	\$350	\$1,750	\$0
2.074	Bedford West Collection System CCC	West	\$39		\$24			\$63	\$0

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
	- WRWIP PROJECTS							\$0	\$0
2.672	Young Street - Sewer Separation	West	\$100	\$1,430				\$1,530	\$0
2.674	South Park Street - Sewer Separation	West	\$3,270					\$3,270	\$0
2.679	College Street - Sewer Separation	West	\$100	\$2,310				\$2,410	\$0
2.675	Bayers Road Phase 1 - Sewer Separation	West			\$100	\$1,375		\$1,475	\$0
2.743	Spring Garden Road Phase 1 - Sewer Separation	West			\$100	\$1,880		\$1,980	\$0
1.233	Spring Garden Road Phase 2 - Sewer Separation	West				\$100	\$1,570	\$1,670	\$0
2.742	Windsor - Almon - Sewer Separation	West				\$100	\$2,285	\$2,385	\$0
2.744	Young Street Pocket - Sewer Separation - Side Streets	West			\$100	\$1,760		\$1,860	\$0
2.526	Prince Albert Road Sewer Separation - Side Streets	East	\$325					\$325	\$0
Wastewater - Collection System -- T O T A L S			\$14,473	\$24,407	\$22,165	\$31,582	\$26,560	\$119,187	\$16,494
Wastewater - Force mains									
2.080	Force main Replacement Program	HRM		\$400	\$1,000	\$1,000	\$1,000	\$3,400	\$0
2.823	Akerley Blvd Force main Replacement	East	\$65	\$600				\$665	\$0
2.819	Pumping Station Oil Tank Replacements	HRM	\$60					\$60	\$0
2.820	Morris Lake Force main Investigation and Rehabilitation	East	\$500					\$500	\$0
2.608	New Timberlea Pump Station Force main System	West	\$200				\$15,100	\$15,300	\$0
Wastewater - Force mains -- T O T A L S			\$825	\$1,000	\$1,000	\$1,000	\$16,100	\$19,925	\$0
Wastewater - Structures									
2.420	Emergency Pumping Station Pump Replacements	HRM	\$250	\$250	\$250	\$250	\$250	\$1,250	\$0
2.442	Wastewater Pumping Station Component Replacement Program - West Region	West	\$200	\$200	\$200	\$200	\$200	\$1,000	\$0
2.443	Wastewater Pumping Station Component Replacement Program - East Region	East	\$200	\$200	\$200	\$200	\$200	\$1,000	\$0
2.444	Wastewater Pumping Station Component Replacement Program - Central Region	Central	\$250	\$250	\$250	\$250	\$250	\$1,250	\$0
2.476	Wastewater Pumping Station Asset Renewal Program	HRM			\$0	\$4,000	\$4,000	\$8,000	\$0
2.818	Jamieson Pumping Station - Automatic Bar Screen	East	\$60	\$840				\$900	\$0
2.853	Fairfield Holding Tank - Concept Design	West	\$150					\$150	\$0
2.824	Bruce Street Pumping Station Relocation	East	\$150	\$1,380				\$1,530	\$0
2.827	Wastewater Pumping Station Generator Plug/Switch Installations	HRM	\$125					\$125	\$0
2.825	First Lake Pumping Station Upgrades	Central	\$70	\$640				\$710	\$0
2.654	PS Control Panel / Electrical Replacement	HRM	\$725					\$725	\$0
2.829	Armcrest Pumping Station - Piping and Valve Upgrades	Central	\$71					\$71	\$0
2.005	Autoport Pleasant Street PS Replacement	East	\$3,000					\$3,000	\$0
2.660	Bissett PS Component Upgrade	East	\$50	\$1,200				\$1,250	\$0
2.655	Roach's Pond PS Component Upgrade	West	\$550					\$550	\$0
2.088	Russell Lake PS Upgrade	East	\$0	\$2,475				\$2,475	\$0
2.093	Windmill Road PS Replacement	East	\$1,355					\$1,355	\$0
2.665	CSO Upgrade Program	HRM	\$300	\$300	\$1,000	\$1,000	\$1,000	\$3,600	\$0

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
2.459	William's Lake PS Rehabilitation	West	\$100		\$2,710			\$2,810	\$0
2.740	Duffus PS CSO - Modification	West	\$100		\$2,240			\$2,340	\$0
2.846	Upgrade Quigley Corner Pumping Station	East	\$287	\$1,294	\$1,294			\$2,875	\$0
2.847	Optimize Quigley Corner Pumping Station	East	\$22	\$314				\$336	\$0
2.609	New Timberlea Pumping Station	West	\$400				\$5,560	\$5,960	\$0
2.617	WRWIP_YoungeStreet: Upgrade Young Pumping Station Capacity - Pumps_YNG_PS	West					\$217	\$217	\$1,952
Wastewater Structures -- T O T A L S			\$8,415	\$9,343	\$8,144	\$5,900	\$11,677	\$43,479	\$1,952
Wastewater - Treatment Facility									
2.056	Plant Optimization Program	HRM	\$125	\$125	\$125	\$125	\$125	\$625	\$0
2.522	Emergency Wastewater Treatment Facility equipment replacements	HRM	\$400	\$400	\$400	\$400	\$400	\$2,000	\$0
2.668	Wastewater Research Program Pilot Plant	HRM	\$300					\$300	\$0
2.564	Carbon Media Replacement	HRM		\$50			\$50	\$100	\$0
2.849	HHSP - OCS H2S Analysers	HRM	\$60					\$60	\$0
2.720	Harbour WWTFs - Outfall Inspection Program	HRM					\$30	\$30	\$0
2.701	HHSP - OCS Wet Scrubber Chlorine Analyzers	HRM	\$60					\$60	\$0
	Halifax Wastewater Treatment Facility:								
2.506	Halifax WWTF - Asset Renewal Program	West			\$750	\$750	\$750	\$2,250	\$0
2.532	Halifax WWTF - Duct Work Replacement	West	\$50	\$50	\$50	\$50	\$50	\$250	\$0
2.765	Halifax WWTF - Raw Water Pump Refurbishment	West	\$50	\$50	\$50	\$50	\$50	\$250	\$0
2.767	Halifax WWTF - Fixed Gas Meters - Replacement	West	\$150					\$150	\$0
2.768	Halifax WWTF - New Coagulant Dosing System	West	\$100					\$100	\$0
2.769	Halifax WWTF - New Polymer Dosing System	West	\$40					\$40	\$0
2.770	Halifax WWTF - Sludge Pumps - New Mechanical Seals	West	\$60					\$60	\$0
2.706	Halifax WWTF - Desadeg Hydraulic Optimization	West	\$100					\$100	\$0
2.762	Halifax WWTF - Fine Screens - Replace with Perforated Plate Screens	West		\$1,900				\$1,900	\$0
2.772	Halifax WWTF - Grit System - Parts Replacements and New Screws	West	\$50	\$150				\$200	\$0
2.773	Halifax WWTF - Industrial Water System - Replacement	West	\$50	\$0				\$50	\$0
2.774	Halifax WWTF - UV Disinfection System - New Modules and PLC Upgrade	West			\$900			\$900	\$0
2.775	Halifax WWTF - UV Disinfection System - New Automatic Level Controls	West			\$500			\$500	\$0
2.776	Halifax WWTF - Sludge Dewatering - Fournier Press Upgrades	West	\$50	\$1,000				\$1,050	\$0
2.777	Halifax WWTF - Densadegs - Sludge Scraper Rebuilds (x2)	West		\$100				\$100	\$0
2.778	Halifax WWTF - Densadegs - Mixer Gearbox Rebuilds	West		\$70	\$70	\$70		\$210	\$0
2.779	Halifax WWTF - Densadegs - Lamella Tube Settler Upgrades	West		\$800				\$800	\$0
	Dartmouth Wastewater Treatment Facility:								
2.507	Dartmouth WWTF - Asset Renewal Program	East	\$0	\$500	\$500	\$500	\$500	\$2,000	\$0
2.502	Dartmouth WWTF - Duct Work Replacement	East	\$50	\$50	\$50	\$50	\$50	\$250	\$0
2.781	Dartmouth WWTF - Fine Screens - New Perforated Plate Screens	East	\$1,800					\$1,800	\$0

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
2.783	Dartmouth WWTF - New Coagulant Dosing System	East	\$100					\$100	\$0
2.784	Dartmouth WWTF - New Polymer Dosing System	East	\$40					\$40	\$0
2.707	Dartmouth WWTF - Densadegs - CFD Analysis and Flow Diversion Vanes	East	\$110					\$110	\$0
2.785	Dartmouth WWTF - Heat Exchangers - Refurbishment	East	\$40					\$40	\$0
2.787	Dartmouth WWTF - Sludge Pumps - New Mechanical Seals	East	\$60					\$60	\$0
2.788	Dartmouth WWTF - UV Disinfection System - New Modules and PLC Upgrade	East		\$775				\$775	\$0
2.789	Dartmouth WWTF - UV Disinfection System - New Automatic Level Controls	East		\$500				\$500	\$0
2.790	Dartmouth WWTF - Fournier Press - Sludge Dewatering Upgrade	East				\$800		\$800	\$0
2.791	Dartmouth WWTF - Desadegs - Lamella Tube Settler Replacements	East	\$300	\$300				\$600	\$0
2.850	Dartmouth WWTF - Ballasted Flocculation Pilot	East	\$75					\$75	\$0
2.855	Dartmouth WWTF - Industrial Water System Replacement	East	\$50					\$50	\$0
2.851	Dartmouth WWTF - New Coarse Screen	East					\$400	\$400	\$0
	Herring Cove Wastewater Treatment Facility:								
2.508	Herring Cove WWTF - Asset Renewal Program	West	\$0	\$250	\$250	\$250	\$250	\$1,000	\$0
2.639	Herring Cove WWTF - Duct Work Replacement Program	West	\$50	\$50	\$50	\$50	\$50	\$250	\$0
2.794	Herring Cove WWTF - Spare Sludge Tank Mixer	West	\$25					\$25	\$0
2.795	Herring Cove WWTF - Sludge Pumps - New Mechanical Seals	West	\$40					\$40	\$0
2.796	Herring Cove WWTF - New Coagulant Dosing System	West	\$30					\$30	\$0
2.797	Herring Cove WWTF - Heat Exchangers - Refurbishment	West	\$40					\$40	\$0
2.798	Herring Cove WWTF - Waste Oil System - New Waste Oil Tank	West	\$15					\$15	\$0
2.799	Herring Cove WWTF - Electrical System - Spare Transfer Switch	West	\$40					\$40	\$0
2.856	Herring Cove WWTF - Industrial Water System Replacement	West	\$50					\$50	\$0
2.800	Herring Cove WWTF - Densadegs - Lamella Tube Settler Replacement	West		\$400				\$400	\$0
2.801	Herring Cove WWTF - Fine Screens - New Perforated Plate Screens	West			\$1,500			\$1,500	\$0
2.802	Herring Cove WWTF - UV Disinfection System - New Automatic Level Controls	West				\$400		\$400	\$0
2.803	Herring Cove WWTF - Ballasted Flocculation Upgrades	West				\$3,500		\$3,500	\$0
	Mill Cove Wastewater Treatment Facility:								
2.505	Mill Cove WWTF - Asset Renewal Program	Central		\$350	\$350			\$700	\$0
2.804	Mill Cove WWTF - OCS Carbon Replacements	Central	\$0	\$40	\$40			\$80	\$0
2.640	Mill Cove WWTF - Process Upgrades - Preliminary + Detailed Design	Central		\$901	\$901			\$1,802	\$0
2.817	Mill Cove WWTF - Plant Upgrade - Design and Contract Admin	Central			\$5,850	\$5,850		\$11,700	\$0
2.805	Mill Cove WWTF - Plant Upgrade - Construction and Commissioning	Central				\$25,499	\$25,499	\$50,998	\$25,500
	Eastern Passage Wastewater Treatment Facility:								
2.666	Eastern Passage WWTF - Asset Renewal Program	East	\$0	\$150	\$150	\$150	\$150	\$600	\$0
2.468	Eastern Passage WWTF - Process Upgrade Program	East	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2.646	Eastern Passage WWTF - Secondary Launder Covers	East	\$150					\$150	\$0
2.806	Eastern Passage WWTF - Carbon Replacement	East	\$0	\$120				\$120	\$0

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
2.807	Eastern Passage WWTF - UV Disinfection System - Spare Parts	East		\$40				\$40	\$0
2.808	Eastern Passage WWTF - New Yard Tractor	East				\$12		\$12	\$0
	Aerotech Wastewater Treatment Facility:								
2.667	Aerotech WWTF - Asset Renewal Program	Aerotech		\$150	\$200	\$250	\$250	\$850	\$0
2.809	Aerotech WWTF - Road Rehabilitation	Aerotech	\$25					\$25	\$0
2.810	Aerotech WWTF - Bioreactors - Short Circuiting Modifications	Aerotech	\$200					\$200	\$0
2.811	Aerotech WWTF - Lab - HVAC Modifications	Aerotech	\$75					\$75	\$0
2.812	Aerotech WWTF - Centrifuge - Rebuild	Aerotech	\$50		\$50		\$50	\$150	\$0
2.814	Aerotech WWTF - Lagoon Dredging	Aerotech					\$600	\$600	\$0
	Timberlea Wastewater Treatment Facility:								
2.509	Asset Renewal Program	West		\$50	\$50			\$100	\$0
2.647	Decommissioning	West				\$500		\$500	\$0
2.816	Timberlea WWTF - Grit System - Chain and Bucket Replacement	West	\$50					\$50	\$0
	Community Wastewater Treatment Facility:								
2.050	Community WWTFs - Asset Renewal Program	HRM	\$0	\$250	\$250	\$250	\$250	\$1,000	\$0
2.761	Springfield Lake - Driveway Refurbishment	HRM	\$15					\$15	\$0
	Biosolids Processing Facility:								
2.126	Biosolids Processing Facility - Asset Renewal Program	HRM				\$250	\$250	\$500	\$0
2.857	Biosolids Processing Facility - Building Upgrades	HRM	\$250					\$250	\$0
2.732	Biosolids Processing Facility - Conveyor CS1 Liners	HRM	\$30					\$30	\$0
2.733	Biosolids Processing Facility - Biofilter Media	HRM	\$50		\$50		\$50	\$150	\$0
2.815	Biosolids Processing Facility - Dryer Upgrades	HRM	\$70					\$70	\$0
2.734	Biosolids Processing Facility - Serpentix Conveyor Refurbishment	HRM		\$30				\$30	\$0
2.735	Biosolids Processing Facility - Live Bottom Bin Rebuild	HRM		\$150				\$150	\$0
2.513	Biosolids Processing Facility - Silo Painting	HRM		\$90				\$90	\$0
2.736	Biosolids Processing Facility - CS1 Conveyor Replacement	HRM			\$200			\$200	\$0
2.737	Biosolids Processing Facility - Scissor Lift Replacement	HRM				\$15		\$15	\$0
Wastewater - Treatment Facility -- T O T A L S			\$5,525	\$9,841	\$13,286	\$39,771	\$29,804	\$98,227	\$25,500
Wastewater - Energy									
2.362	Energy Management Capital Program (Wastewater)	HRM		\$500	\$500	\$500	\$500	\$2,000	\$0
2.491	Pump Station HVAC Retro-Commissioning Program	HRM		\$100	\$100	\$100	\$100	\$400	\$0
2.650	HHSP - BAS + HVAC Recommissioning	HRM	\$50					\$50	\$0
2.651	Wastewater Pump Stations - NSPI Meter Relocations	HRM	\$25					\$25	\$0
Wastewater - Energy -- T O T A L S			\$75	\$600	\$600	\$600	\$600	\$2,475	\$0
Wastewater - Security									
4.008	Security Upgrade Program	HRM	\$200	\$200	\$200	\$200		\$800	\$0
Wastewater - Security -- T O T A L S			\$200	\$200	\$200	\$200	\$0	\$800	

Five Year Capital Budget - Wastewater									
Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Wastewater - Equipment									
2.161	I&I Reduction (SIR) Program Flow Meters and Related Equipment	HRM	\$25	\$25	\$25	\$25	\$25	\$125	\$0
2.451	Miscellaneous Equipment Replacement	HRM	\$120	\$120	\$120	\$120	\$120	\$600	\$0
2.821	Duffus Street PS Flow Meter Replacement	West	\$110					\$110	\$0
Wastewater - Equipment -- T O T A L S			\$255	\$145	\$145	\$145	\$145	\$835	\$0
TOTALS - Wastewater			\$30,268	\$59,561	\$47,540	\$81,198	\$86,886	\$305,453	\$48,046

Five Year Capital Budget - Stormwater									
Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Stormwater - Pipes									
1.108	Stormwater Pipe Asset Renewal Program	HRM				\$4,000	\$4,700	\$8,700	\$0
1.140	Stormwater Main Sewer Lining - Program	HRM		\$100	\$100	\$100	\$100	\$400	\$0
1.038	Integrated Stormwater Projects - Program	HRM	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$5,000	\$0
1.102	Manhole Renewals SW	HRM	\$15	\$16	\$16	\$17	\$17	\$81	\$0
1.103	Catchbasin Renewals SW	HRM	\$60	\$63	\$65	\$68	\$70	\$326	\$0
1.135	Lateral Replacements SW	HRM	\$12	\$13	\$13	\$14	\$14	\$66	\$0
1.204	National Disaster Mitigation Program	HRM		\$50	\$100	\$200	\$200	\$550	\$0
1.134	Stormwater Quality Compliance Needs Assessment from IRP	HRM			\$75	\$75		\$150	\$0
1.145	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Irishtown Rd to Harbour	East	\$25	\$350	\$11,000			\$11,375	\$0
1.034	Raymond Street, Phase 2 - Storm Sewer Rehabilitation	East	\$100	\$1,000	\$750			\$1,850	\$0
1.188	Cogswell Redevelopment - SW Sewer Relocation	West	\$955	\$1,350	\$1,350			\$3,655	\$0
1.201	Stormwater Pipe Condition Inspections (CSP)	HRM	\$50	\$50	\$0	\$0	\$0	\$100	\$0
1.223	Rocky Lake and Bedford Highway Intersection Storm Sewer Upgrade	West	\$75					\$75	\$0
1.224	Thistle Street Storm Drainage System Upgrade - Preliminary Engineering	East	\$50					\$50	\$0
1.227	Stormwater System Upgrade near Civic #1681 Waverley Road	East	\$38					\$38	\$0
Stormwater - Pipes -- T O T A L S			\$2,380	\$3,992	\$14,469	\$5,474	\$6,101	\$32,416	\$0
Stormwater - Culverts/Ditches									
1.104	Driveway Culvert Replacement Program	HRM	\$1,200	\$930	\$925	\$950	\$945	\$4,950	\$0
1.109	Cross Culvert Renewal Program	HRM	\$0	\$2,000	\$1,200	\$2,000	\$1,500	\$6,700	\$0
	Street Specific Culvert Replacement:								
1.205	Kipawa Crescent	Central	\$400					\$400	\$0
1.125	Coronet Avenue Driveway Culvert Replacement Project	West	\$925					\$925	\$0
1.147	Cole Harbour Road (near #1560) - Culvert Replacement	East	\$350					\$350	\$0
1.183	St Margarets Bay Rd, near Civic 2797 - Culvert Replacement	West	\$80					\$80	\$0
1.228	Blue Forest Lane, near civic 42	Central	\$38					\$38	\$0
1.229	Devils Hill Rd at Boulderbrook Lane	West	\$38					\$38	\$0
1.231	Ketch Harbour Rd, near civic 31	West	\$38					\$38	\$0
1.232	Waverley Rd, near civic 832	East	\$38					\$38	\$0
Stormwater - Culverts/Ditches -- T O T A L S			\$3,107	\$2,930	\$2,125	\$2,950	\$2,445	\$13,557	\$0
Stormwater - Structures									
1.133	Ellenvale Run Retaining Wall System - Replacement	East			\$500	\$1,000	\$1,000	\$2,500	\$0
1.225	Ellenvale Run Retaining Wall - Phase 2	East	\$1,900					\$1,900	\$0
1.226	Ellenvale Run Retaining Wall - Phase 3 (Wanda Lane)	East		\$2,100				\$2,100	\$0
Stormwater - Structures -- T O T A L S			\$1,900	\$2,100	\$500	\$1,000	\$1,000	\$6,500	\$0
TOTALS - Stormwater			\$7,387	\$9,022	\$17,094	\$9,424	\$9,546	\$52,473	\$0



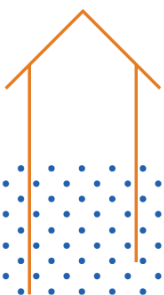
Five Year Capital Budget - Corporate Projects									
Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Corporate - Information Technology									
4.031	IT Strategic Projects	HRM				\$3,770	\$4,150	\$7,920	\$0
4.097	Analytics Decision Support System	HRM	\$335	\$350	\$150			\$835	\$0
4.102	Approval Forms Framework	HRM		\$280	\$250			\$530	\$0
4.111	Asset Condition	HRM	\$125	\$190	\$190			\$505	\$0
4.151	Capital Planning	HRM	\$100	\$500	\$1,000	\$100		\$1,700	\$0
4.105	Cityworks Upgrade	HRM		\$200		\$200		\$400	\$0
4.083	Computerized Maintenance Management System (CMMS) Enhancements	HRM	\$1,000	\$500	\$1,000	\$100		\$2,600	\$0
4.011	Desktop Computer Replacement Program	HRM	\$350	\$350	\$350	\$350	\$350	\$1,750	\$0
4.146	Disaster Recovery	HRM	\$630					\$630	\$0
4.147	Document Management SharePoint Rollout	HRM	\$300					\$300	\$0
4.149	Electronic Content Management Linkage	HRM			\$200			\$200	\$0
4.126	Full Enterprise Data Warehouse	HRM	\$200	\$300	\$300			\$800	\$0
4.153	General Analytic Tool	HRM		\$400				\$400	\$0
4.131	HR Training and Benefits	HRM		\$320				\$320	\$0
4.012	Network Upgrades	HRM	\$280	\$280	\$280	\$280	\$280	\$1,400	\$0
4.101	Mobile Devices and Applications	HRM		\$600				\$600	\$0
4.095	New CRM with Integration	HRM		\$200	\$1,000			\$1,200	\$0
4.121	New Payroll System	HRM	\$230					\$230	\$0
4.048	SAP Rate Structure Support	HRM	\$220		\$220		\$220	\$660	\$0
4.150	Enterprise Resource Planning Solution	HRM	\$2,630	\$1,580	\$200	\$200		\$4,610	\$0
4.130	Team Collaboration	HRM			\$230			\$230	\$0
4.107	Customer Portal	HRM	\$50	\$50				\$100	\$0
4.152	Security Projects	HRM	\$300	\$100				\$400	\$0
Corporate - Information Technology -- T O T A L S			\$6,750	\$6,200	\$5,370	\$5,000	\$5,000	\$28,320	\$0
Corporate - GIS									
4.040	GIS Data Program	HRM	\$100	\$250	\$100	\$250	\$100	\$800	\$0
4.115	GIS Data Build - Services (ICI)	HRM	\$150	\$150	\$0	\$0	\$0	\$300	\$0
4.010	Sewer Service Entry	HRM	\$250	\$150	\$0	\$0	\$0	\$400	\$0
4.116	GIS Data Project	HRM	\$150	\$0	\$100	\$0	\$200	\$450	\$0
4.038	GIS Hardware/Software Program	HRM	\$50	\$50	\$50	\$50	\$50	\$250	\$0
4.039	GIS Application Support Program	HRM	\$150	\$150	\$150	\$150	\$150	\$750	\$0
4.059	Utility Network modeling/Data Modeling	HRM	\$50	\$250	\$250	\$50	\$50	\$650	\$0
4.118	Engineering Drawing Database	HRM	\$100	\$50		\$100	\$50	\$300	\$0
4.155	Stormwater Biling Imagery Acquisition and Analysis	HRM	\$350		\$350		\$350	\$1,050	\$0
Corporate - GIS -- T O T A L S			\$1,350	\$1,050	\$1,000	\$600	\$950	\$4,950	\$0
Corporate - Asset Management									
4.020	Asset Management Program Development	HRM		\$100	\$100	\$100	\$100	\$400	\$0

Five Year Capital Budget - Corporate Projects									
Project ID	Project Name	Region	All \$ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
2.523	Wastewater Sewer Condition Assessment	HRM	\$215	\$220	\$225	\$230	\$235	\$1,125	\$0
1.156	Storm Sewer Condition Assessment	HRM	\$95	\$100	\$105	\$110	\$115	\$525	\$0
2.043	Corporate Flow Monitoring Program	HRM	\$1,870	\$2,000	\$2,000	\$2,000	\$2,000	\$9,870	\$0
4.113	Vulnerability to Climate Change Risk Assessment - Asset Class Pilot	HRM	\$250	\$275	\$250			\$775	\$0
2.562	Outfall Assessment Project	HRM	\$20					\$20	\$0
4.140	SSO Management Program	HRM	\$100					\$100	\$0
4.141	System Constraints Analysis HRM (Was East Additional Flow Monitoring)	HRM	\$252					\$252	\$0
4.143	Safe Yield Study	HRM	\$200					\$200	\$0
4.144	New Hydraulic Water Model (InfoWater)	HRM	\$200					\$200	\$0
4.145	Transmission Main Risk Assessment and Prioritization Framework	HRM	\$50					\$50	\$0
Corporate - Asset Management -- T O T A L S			\$3,252	\$2,695	\$2,680	\$2,440	\$2,450	\$13,517	\$0
Corporate - Facility									3
2.176	East/Central Regional Operational Facility	East	\$2,000	\$16,000	\$16,000			\$34,000	\$0
4.077	Building Capital Improvements	West	\$185	\$100	\$100	\$100	\$100	\$585	\$0
3.221	Energy Managerment Capital Program	HRM	\$100	\$100	\$100	\$100	\$100	\$500	\$0
Corporate - Facility -- T O T A L S			\$2,285	\$16,200	\$16,200	\$200	\$200	\$35,085	\$0
Corporate - SCADA & Other Equipment									
4.093	GPS Units - Replacement	HRM	\$70					\$70	\$0
4.004	SCADA Control System Enhancements	HRM	\$100	\$100	\$100	\$100	\$100	\$500	\$0
4.136	ICS Cyber Security Enhancements	HRM	\$100					\$100	\$0
4.137	Halifax Harbour Solutions Radio Upgrade	HRM	\$60					\$60	\$0
4.138	Wastewater Community Plants SCADA System Relocation	HRM	\$45					\$45	\$0
4.139	PI System Enhancements	HRM	\$100					\$100	\$0
4.154	Customer Meters - New and Replacement	HRM	\$500	\$415	\$500	\$575	\$545	\$2,535	\$0
Corporate - SCADA & Other Equipment -- T O T A L S			\$975	\$515	\$600	\$675	\$645	\$3,410	\$0
Corporate - Fleet									
4.006	Fleet Upgrade Program - Stormwater	HRM	\$269	\$354	\$297	\$327	\$315	\$1,562	\$0
4.006	Fleet Upgrade Program - Wastewater	HRM	\$1,076	\$1,416	\$1,188	\$1,308	\$1,260	\$6,248	\$0
4.007	Fleet Upgrade Program - Water	HRM	\$610	\$315	\$466	\$335	\$445	\$2,171	\$0
Corporate - Fleet -- T O T A L S			\$1,955	\$2,085	\$1,951	\$1,970	\$2,020	\$9,981	\$0
TOTALS - Corporate Projects			\$16,567	\$28,745	\$27,801	\$10,885	\$11,265	\$95,263	\$3



# Appendix E

## Projected Operating Budgets for 2020/21 to 2024/25



**STRAIGHT from  
the SOURCE**

**HALIFAX WATER**  
**CONSOLIDATED SUMMARY OF ESTIMATED REVENUE & EXPENSES**  
**PROPOSED 5 YEAR BUSINESS PLAN**  
**APRIL 1, 2020 to MARCH 31, 2025**  
(in thousands )

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	BUSINESS PLAN				
			APR 1/20 MAR 31/21	APR 1/21 MAR 31/22	APR 1/22 MAR 31/23	APR 1/23 MAR 31/24	APR 1/24 MAR 31/25
OPERATING REVENUE	\$138,413	\$138,727	\$138,618	\$138,123	\$137,632	\$137,145	\$136,663
OPERATING EXPENSES	\$105,731	\$115,088	\$118,110	\$123,631	\$128,761	\$131,998	\$135,962
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	\$32,682	\$23,639	\$20,508	\$14,492	\$8,871	\$5,148	\$700
FINANCIAL REVENUE							
INVESTMENT INCOME	\$1,156	\$816	\$86	\$86	\$86	\$86	\$86
MISCELLANEOUS	\$742	\$553	\$532	\$535	\$537	\$539	\$541
	\$1,898	\$1,369	\$619	\$621	\$623	\$625	\$628
FINANCIAL EXPENSES							
LONG TERM DEBT INTEREST	\$7,430	\$8,181	\$8,823	\$10,124	\$12,654	\$15,254	\$17,417
LONG TERM DEBT PRINCIPAL	\$20,516	\$19,822	\$21,880	\$24,203	\$28,150	\$32,131	\$36,180
AMORTIZATION DEBT DISCOUNT	\$199	\$202	\$228	\$271	\$328	\$401	\$439
DIVIDEND/GRANT IN LIEU OF TAXES	\$4,999	\$5,147	\$6,113	\$6,638	\$6,705	\$6,772	\$6,840
MISCELLANEOUS	\$45	\$22	\$32	\$32	\$31	\$31	\$31
	\$33,190	\$33,374	\$37,076	\$41,268	\$47,868	\$54,588	\$60,906
OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES	\$1,390	(\$8,366)	(\$15,949)	(\$26,156)	(\$38,374)	(\$48,815)	(\$59,578)

\* 2019/20 Operating Budget was approved by the Halifax Water Board on January 31, 2019.

\*\* 2020/21 Operating Budget was approved by the Halifax Water Board on January 30, 2020.

**HALIFAX WATER**  
**ESTIMATED REVENUE AND EXPENSES - WATER OPERATIONS**  
**PROPOSED 5 YEAR BUSINESS PLAN**  
**APRIL 1, 2020 to MARCH 31, 2025**  
**( in thousands )**

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	BUSINESS PLAN				
			APR 1/20 MAR 31/21	APR 1/21 MAR 31/22	APR 1/22 MAR 31/23	APR 1/23 MAR 31/24	APR 1/24 MAR 31/25
<b>OPERATING REVENUE</b>							
METERED SALES	\$48,040	\$47,744	\$48,069	\$47,904	\$47,738	\$47,574	\$47,409
FIRE PROTECTION	\$7,074	\$7,074	\$7,074	\$7,074	\$7,074	\$7,074	\$7,074
PRIVATE FIRE PROTECTION SERVICES	\$869	\$873	\$884	\$893	\$903	\$912	\$922
BULK WATER STATIONS	\$227	\$292	\$303	\$303	\$303	\$303	\$303
CUSTOMER LATE PAY./COLLECTION FEES	\$244	\$223	\$238	\$238	\$238	\$238	\$238
MISCELLANEOUS	\$98	\$179	\$177	\$177	\$177	\$177	\$177
	<u>\$56,552</u>	<u>\$56,387</u>	<u>\$56,746</u>	<u>\$56,590</u>	<u>\$56,434</u>	<u>\$56,279</u>	<u>\$56,125</u>
<b>OPERATING EXPENSES</b>							
WATER SUPPLY & TREATMENT (including Small Systems)	\$9,747	\$10,808	\$10,562	\$10,910	\$11,272	\$11,647	\$11,982
TRANSMISSION & DISTRIBUTION	\$10,014	\$11,127	\$11,282	\$12,283	\$12,633	\$12,994	\$13,248
OTTER LAKE CONTRACT	\$20	\$26	\$28	\$29	\$30	\$31	\$32
TECHNICAL SERVICES (SCADA)	\$889	\$1,037	\$1,029	\$1,060	\$1,093	\$1,127	\$1,157
ENGINEERING & INFORMATION SERVICES	\$3,749	\$3,901	\$4,162	\$4,280	\$4,402	\$4,527	\$4,618
REGULATORY SERVICES	\$679	\$1,142	\$1,195	\$1,233	\$1,273	\$1,313	\$1,350
CUSTOMER SERVICE	\$2,524	\$2,918	\$2,758	\$2,839	\$2,923	\$3,009	\$3,076
ADMINISTRATION & PENSION	\$3,986	\$4,355	\$4,112	\$4,230	\$4,351	\$4,477	\$4,571
DEPRECIATION	\$9,046	\$9,955	\$10,993	\$11,971	\$13,082	\$13,488	\$13,555
	<u>\$40,655</u>	<u>\$45,270</u>	<u>\$46,121</u>	<u>\$48,837</u>	<u>\$51,059</u>	<u>\$52,614</u>	<u>\$53,589</u>
<b>OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES</b>	<u>\$15,898</u>	<u>\$11,117</u>	<u>\$10,625</u>	<u>\$7,754</u>	<u>\$5,376</u>	<u>\$3,665</u>	<u>\$2,536</u>
<b>FINANCIAL REVENUE</b>							
INVESTMENT INCOME	\$521	\$367	\$39	\$39	\$39	\$39	\$39
MISCELLANEOUS	\$559	\$431	\$394	\$395	\$397	\$399	\$401
	<u>\$1,080</u>	<u>\$798</u>	<u>\$432</u>	<u>\$434</u>	<u>\$436</u>	<u>\$438</u>	<u>\$440</u>
<b>FINANCIAL EXPENSES</b>							
LONG TERM DEBT INTEREST	\$1,924	\$2,238	\$3,127	\$3,983	\$5,484	\$6,996	\$8,027
LONG TERM DEBT PRINCIPAL	\$7,181	\$5,165	\$6,465	\$7,564	\$9,548	\$11,450	\$13,138
AMORTIZATION DEBT DISCOUNT	\$85	\$67	\$84	\$108	\$136	\$173	\$173
DIVIDEND/GRANT IN LIEU OF TAXES	\$4,999	\$5,147	\$5,654	\$5,710	\$5,767	\$5,825	\$5,883
MISCELLANEOUS	\$24	\$12	\$2	\$2	\$1	\$1	\$1
	<u>\$14,214</u>	<u>\$12,630</u>	<u>\$15,332</u>	<u>\$17,368</u>	<u>\$20,936</u>	<u>\$24,445</u>	<u>\$27,223</u>
<b>OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES</b>	<u>\$2,764</u>	<u>(\$715)</u>	<u>(\$4,275)</u>	<u>(\$9,180)</u>	<u>(\$15,124)</u>	<u>(\$20,343)</u>	<u>(\$24,247)</u>

\* 2019/20 Operating Budget was approved by the Halifax Water Board on January 31, 2019.

\*\* 2020/21 Operating Budget was approved by the Halifax Water Board on January 30, 2020.

**HALIFAX WATER**  
**ESTIMATED REVENUE AND EXPENSES - WASTEWATER OPERATIONS**  
**PROPOSED 5 YEAR BUSINESS PLAN**  
**APRIL 1, 2020 to MARCH 31, 2025**  
**( in thousands )**

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	BUSINESS PLAN				
			APR 1/20 MAR 31/21	APR 1/21 MAR 31/22	APR 1/22 MAR 31/23	APR 1/23 MAR 31/24	APR 1/24 MAR 31/25
<b>OPERATING REVENUE</b>							
METERED SALES	\$69,901	\$70,031	\$70,365	\$69,994	\$69,625	\$69,258	\$68,893
WASTEWATER OVERSTRENGTH AGREEMENTS	\$75	\$50	\$30	\$30	\$30	\$30	\$30
LEACHATE	\$330	\$394	\$387	\$395	\$403	\$411	\$419
CONTRACT REVENUE	\$87	\$86	\$86	\$86	\$86	\$86	\$86
SEPTAGE TIPPING FEES	\$764	\$760	\$505	\$530	\$556	\$584	\$613
DEWATERING FACILITY/ SLUDGE LAGOON	\$210	\$210	\$0	\$0	\$0	\$0	\$0
AIRLINE EFFLUENT	\$143	\$160	\$105	\$105	\$105	\$105	\$105
CUSTOMER LATE PAY./COLLECTION FEES	\$186	\$164	\$176	\$176	\$176	\$176	\$176
MISCELLANEOUS	\$185	\$139	\$136	\$136	\$136	\$136	\$136
	<u>\$71,881</u>	<u>\$71,993</u>	<u>\$71,790</u>	<u>\$71,451</u>	<u>\$71,116</u>	<u>\$70,785</u>	<u>\$70,457</u>
<b>OPERATING EXPENSES</b>							
WASTEWATER COLLECTION	\$11,676	\$10,972	\$11,847	\$12,167	\$12,496	\$12,835	\$13,184
WASTEWATER TREATMENT PLANTS (including Small Systems)	\$19,459	\$20,463	\$20,571	\$21,156	\$21,761	\$22,385	\$23,030
DEWATERING FACILITY/ SLUDGE MGMT	\$226	\$636	\$404	\$421	\$438	\$455	\$473
BIOSOLIDS TREATMENT	\$27	\$101	\$101	\$103	\$105	\$107	\$109
LEACHATE CONTRACT	\$286	\$325	\$337	\$346	\$355	\$365	\$375
TECHNICAL SERVICES (SCADA)	\$1,450	\$1,784	\$1,652	\$1,703	\$1,755	\$1,809	\$1,858
ENGINEERING & INFORMATION SERVICES	\$3,783	\$3,556	\$3,769	\$3,876	\$3,986	\$4,099	\$4,181
REGULATORY SERVICES	\$886	\$1,434	\$1,537	\$1,585	\$1,636	\$1,688	\$1,735
CUSTOMER SERVICE	\$2,057	\$2,536	\$2,352	\$2,421	\$2,492	\$2,566	\$2,623
ADMINISTRATION & PENSION	\$3,242	\$3,606	\$3,405	\$3,502	\$3,603	\$3,706	\$3,784
DEPRECIATION	\$12,986	\$13,921	\$15,072	\$16,113	\$17,195	\$17,187	\$18,429
	<u>\$56,079</u>	<u>\$59,334</u>	<u>\$61,045</u>	<u>\$63,393</u>	<u>\$65,821</u>	<u>\$67,203</u>	<u>\$69,780</u>
<b>OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES</b>	<u>\$15,801</u>	<u>\$12,659</u>	<u>\$10,745</u>	<u>\$8,059</u>	<u>\$5,295</u>	<u>\$3,582</u>	<u>\$677</u>
<b>FINANCIAL REVENUE</b>							
INVESTMENT INCOME	\$520	\$367	\$39	\$39	\$39	\$39	\$39
MISCELLANEOUS	\$183	\$122	\$139	\$139	\$140	\$140	\$141
	<u>\$703</u>	<u>\$489</u>	<u>\$178</u>	<u>\$178</u>	<u>\$179</u>	<u>\$179</u>	<u>\$179</u>
<b>FINANCIAL EXPENSES</b>							
LONG TERM DEBT INTEREST	\$4,939	\$5,133	\$4,772	\$4,970	\$5,707	\$6,202	\$7,028
LONG TERM DEBT PRINCIPAL	\$12,015	\$12,965	\$13,442	\$14,277	\$15,768	\$16,984	\$18,810
AMORTIZATION DEBT DISCOUNT	\$103	\$113	\$124	\$136	\$158	\$181	\$207
DIVIDEND/GRANT IN LIEU OF TAXES	\$0	\$0	\$398	\$804	\$812	\$820	\$828
MISCELLANEOUS	\$21	\$10	\$30	\$30	\$30	\$30	\$30
	<u>\$17,077</u>	<u>\$18,220</u>	<u>\$18,766</u>	<u>\$20,217</u>	<u>\$22,474</u>	<u>\$24,216</u>	<u>\$26,903</u>
<b>OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES</b>	<u>(\$573)</u>	<u>(\$5,072)</u>	<u>(\$7,843)</u>	<u>(\$11,980)</u>	<u>(\$17,001)</u>	<u>(\$20,455)</u>	<u>(\$26,047)</u>

\* 2019/20 Operating Budget was approved by the Halifax Water Board on January 31, 2019.

\*\* 2020/21 Operating Budget was approved by the Halifax Water Board on January 30, 2020.

**HALIFAX WATER**  
**ESTIMATED REVENUE AND EXPENSES - STORMWATER OPERATIONS**  
**PROPOSED 5 YEAR BUSINESS PLAN**  
**APRIL 1, 2020 to MARCH 31, 2025**  
**( in thousands )**

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	BUSINESS PLAN				
			APR 1/20 MAR 31/21	APR 1/21 MAR 31/22	APR 1/22 MAR 31/23	APR 1/23 MAR 31/24	APR 1/24 MAR 31/25
<b>OPERATING REVENUE</b>							
STORMWATER SITE RELATED SERVICE	\$5,906	\$6,351	\$6,047	\$6,047	\$6,047	\$6,047	\$6,047
STORMWATER RIGHT-OF-WAY SERVICE	\$3,835	\$3,835	\$3,835	\$3,835	\$3,835	\$3,835	\$3,835
CUSTOMER LATE PAY./COLLECTION FEES	\$118	\$66	\$106	\$106	\$106	\$106	\$106
MISCELLANEOUS	\$120	\$95	\$92	\$92	\$92	\$92	\$92
	<u>\$9,980</u>	<u>\$10,347</u>	<u>\$10,081</u>	<u>\$10,081</u>	<u>\$10,081</u>	<u>\$10,081</u>	<u>\$10,081</u>
<b>OPERATING EXPENSES</b>							
STORMWATER COLLECTION	\$4,901	\$5,750	\$5,779	\$5,935	\$6,095	\$6,260	\$6,429
TECHNICAL SERVICES (SCADA)	\$49	\$39	\$42	\$44	\$45	\$46	\$48
ENGINEERING & INFORMATION SERVICES	\$624	\$1,122	\$1,273	\$1,309	\$1,346	\$1,384	\$1,412
REGULATORY SERVICES	\$1,587	\$1,505	\$1,627	\$1,679	\$1,733	\$1,788	\$1,838
CUSTOMER SERVICE	\$335	\$273	\$304	\$312	\$322	\$331	\$339
ADMINISTRATION & PENSION	\$527	\$586	\$554	\$570	\$586	\$603	\$615
DEPRECIATION	\$974	\$1,208	\$1,365	\$1,554	\$1,755	\$1,768	\$1,913
	<u>\$8,997</u>	<u>\$10,484</u>	<u>\$10,943</u>	<u>\$11,402</u>	<u>\$11,881</u>	<u>\$12,181</u>	<u>\$12,594</u>
<b>OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES</b>	<u>\$983</u>	<u>(\$137)</u>	<u>(\$862)</u>	<u>(\$1,321)</u>	<u>(\$1,800)</u>	<u>(\$2,100)</u>	<u>(\$2,513)</u>
<b>FINANCIAL REVENUE</b>							
INVESTMENT INCOME	\$116	\$82	\$9	\$9	\$9	\$9	\$9
MISCELLANEOUS	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	<u>\$116</u>	<u>\$82</u>	<u>\$9</u>	<u>\$9</u>	<u>\$9</u>	<u>\$9</u>	<u>\$9</u>
<b>FINANCIAL EXPENSES</b>							
LONG TERM DEBT INTEREST	\$567	\$810	\$924	\$1,170	\$1,463	\$2,057	\$2,362
LONG TERM DEBT PRINCIPAL	\$1,320	\$1,692	\$1,973	\$2,362	\$2,834	\$3,697	\$4,232
AMORTIZATION DEBT DISCOUNT	\$11	\$22	\$20	\$27	\$34	\$46	\$58
DIVIDEND/GRANT IN LIEU OF TAXES	\$0	\$0	\$62	\$125	\$126	\$127	\$128
MISCELLANEOUS	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	<u>\$1,899</u>	<u>\$2,524</u>	<u>\$2,978</u>	<u>\$3,683</u>	<u>\$4,457</u>	<u>\$5,927</u>	<u>\$6,780</u>
<b>OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES</b>	<u>(\$800)</u>	<u>(\$2,579)</u>	<u>(\$3,832)</u>	<u>(\$4,996)</u>	<u>(\$6,249)</u>	<u>(\$8,018)</u>	<u>(\$9,284)</u>

\* 2019/20 Operating Budget was approved by the Halifax Water Board on January 31, 2019.

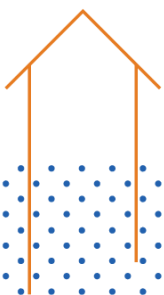
\*\* 2020/21 Operating Budget was approved by the Halifax Water Board on January 30, 2020.



# **Appendix F**

## **Water Quality Master Plan**

### **Version 3.0**



**STRAIGHT from  
the SOURCE**





# **Water Quality Master Plan**

**V3.0**

**September 2016**

Reid Campbell and Wendy Krkosek

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## 1 Introduction

Halifax Water has consistently produced drinking water that has safeguarded public health and achieved regulatory compliance, despite the challenges that occur as regulations become more stringent, infrastructure ages and once current technologies are eclipsed by more modern designs to meet the new regulatory environment. One important tool Halifax Water uses is water quality strategic planning which is formally executed through a Water Quality Master Plan (WQMP). Water quality master planning describes the process whereby a water utility assesses the public's expectations for water quality and the direction of water quality regulations and trends, sets corresponding water quality goals and then plans for necessary capital or operational improvements.

In 2006, Halifax Water completed its first formal WQMP. This plan was designed to set goals for water quality that exceed regulatory requirements and to set a path for Halifax Water to achieve those goals while treating water at an optimal cost. In 2011, the WQMP Version 2.0 was created and focused mainly on upgrades and investigations concerning the JD Kline Water Treatment Plant; Halifax Water's most mature treatment facility.

WQMP Version 3.0 has a shift in focus away from one plant in particular and focuses more on source water quality and its impact on treatment processes and distribution system water quality as a whole. There are two main drivers for this change in focus. Firstly, recent research indicates that lakes in Nova Scotia may be experiencing a recovery from acid rain, as sulphur emissions have drastically decreased over the past few years. Recovery results in higher pH, increased productivity, and increased total organic carbon. Both the Lake Major and J.D. Kline plants have been dealing with recent changing source water quality which has been challenging the treatment process at both plants, resulting in higher chemical usage and increased stress on treatment processes. WQMP V3.0 will focus efforts on identification of lake recovery processes, what this means for future source water quality, and also how to provide effective and robust treatment with existing infrastructure in the short term, while developing a plan for capital upgrades to address changing source water quality and aging infrastructure in the long term. Secondly, with the recent events in Flint Michigan around lead exposure in homes, outcomes of research with Dalhousie University, and a shift in the industry approach (via American Water Works Association policy) towards managing lead in the distribution system, WQMP V3.0 will focus on developing a plan for removal of both public and private lead service lines by 2050, while concurrently optimizing corrosion control treatment. It is likely that a Canadian regulatory requirement will be adopted in the coming years in this direction and Halifax Water wants to ensure they are at the forefront of this change in industry approach. Lead is a shared responsibility between the utility and the homeowner, and as such, the focus will be a shift away from sampling and towards public engagement and policy as new ways of engaging the public in uptake of replacement programs will need to be identified and pursued.

Implementation of the WQMP is a combined effort between Halifax Water staff and a research partnership with Dr. Graham Gagnon at Dalhousie University, and ultimately consulting engineers and contractors who design and construct identified necessary changes. The NSERC/Halifax Water Industrial Research Chair in Water Quality and Treatment is an integral part of conducting the research that leads to internal policy and operational changes, treatment optimization opportunities, and ensures that

Halifax Water is at the forefront of water quality research and active in the development of best practice for water utilities.

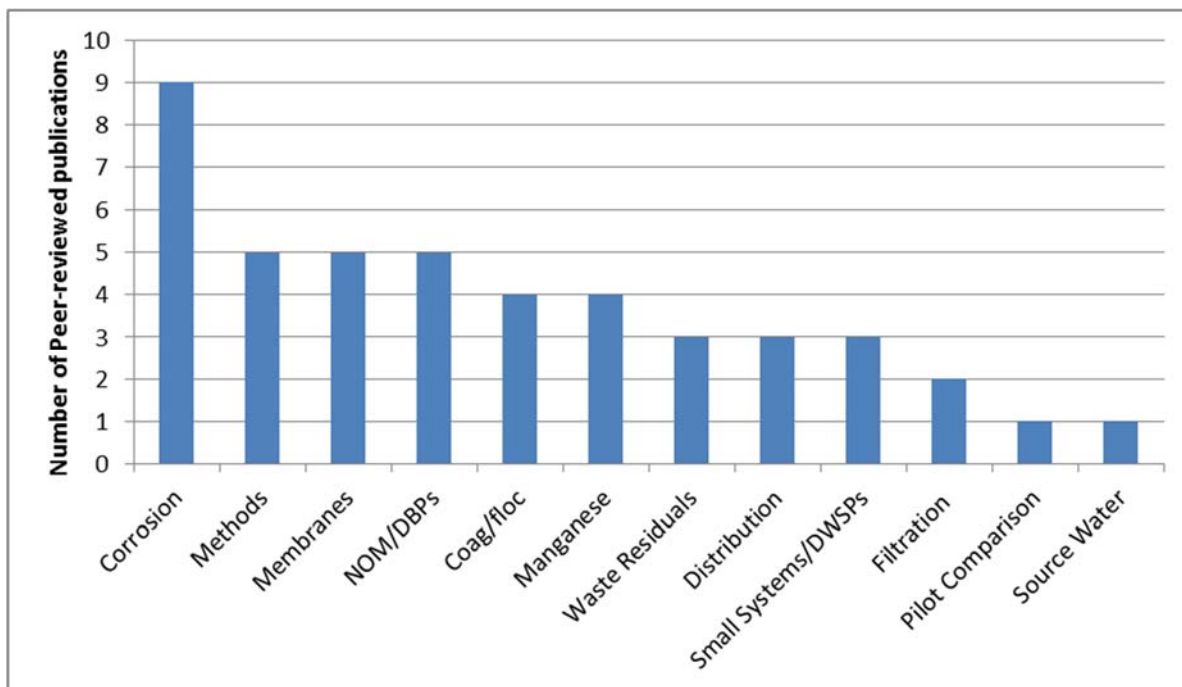
## 2 Research Accomplishments

Numerous research accomplishments since inception of the IRC program have led to both public health benefits and cost savings for Halifax Water. The following table provides an overview of some of the major discoveries and their associated impacts to Halifax Water of water quality research with the Dalhousie Research Chair. Many of these discoveries form the basis of the direction of WQMP V3.0.

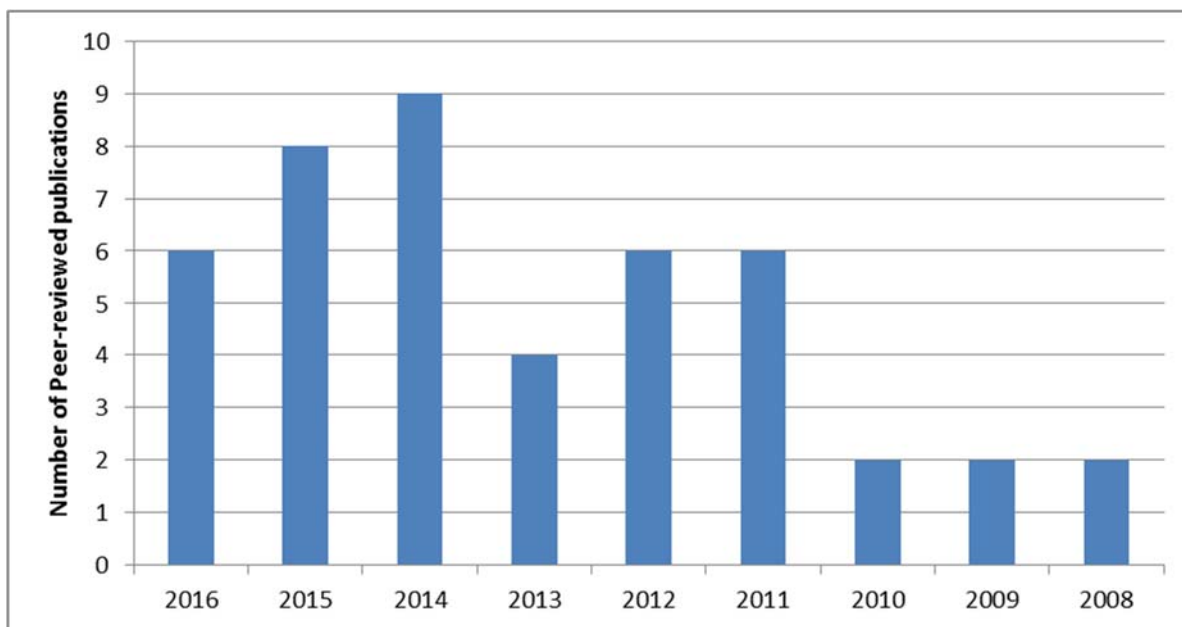
Discovery	Impact to Halifax Water
<b>A) Identification of Lake Recovery.</b> Discovered through assessment of plant data over a 20-year period that both Pockwock and Lake Major are experiencing increased pH, color and TOC due to decreases in sulphur deposition.	<ul style="list-style-type: none"> <li>Increased dosing of coagulant at both Lake Major and J.D. Kline but J.D. Kline is pushing the limits of a direct filtration plant</li> <li>Decreased filter run times</li> <li>Potential explanation for algal occurrence and geosmin</li> </ul>
<b>B) Development of NOM Monitoring Tools.</b> Developed a new method for oxygen demand in water industry: peCOD. Developed a new model for Fluorescence excitation-emission matrix (FEEM) analysis.	<ul style="list-style-type: none"> <li>peCOD is a new tool for assessing NOM that has ideal applications for oxidation processes, and shows promise for detecting subtle changes in organic profiles over traditional TOC/DOC techniques.</li> <li>FEEM models will lead to online tools for improved treatment operation</li> </ul>
<b>C) Coagulant Mixing.</b> Demonstrated that coagulation mixing energy can be reduced by 4-5 times without compromising NOM removal	<ul style="list-style-type: none"> <li>Outside of pumping, mixing represents the highest energy costs to water plants</li> <li>Applied new particle analysis technology to demonstrate discovery</li> </ul>
<b>D) Biological Removal of NOM in Direct Filtration.</b> Successfully demonstrated that biofiltration can be applied in a direct filtration plant without pre-oxidation	<ul style="list-style-type: none"> <li>Biofiltration reduced THM concentrations by 40% for Halifax Water</li> <li>Bio filtration was reliable under broad temperature range (4-25°C)</li> <li>Reduced chlorine costs by \$30,000 per year</li> </ul>
<b>E) Monitoring Biological Filtration.</b> Demonstrated that biomass measurements of ATP evolve operationally and within filter cycles	<ul style="list-style-type: none"> <li>Applied ATP as an emerging monitoring technology for biofiltration</li> <li>Developed protocols to demonstrate appropriate ATP range and application to be used as performance monitoring tools moving forward</li> </ul>
<b>F) Partial Lead Service Lines.</b> Demonstrated that PLSLs are an inappropriate solution for Halifax Water	<ul style="list-style-type: none"> <li>Research based on 5-years of water sample analysis by Dalhousie students</li> <li>Led to policy change at Halifax Water in 2012, partials are no longer conducted unless part of an existing disruption.</li> <li>Neither PVC or copper provide decreased lead concentrations post PLSLs</li> </ul>
<b>G) Lead Exposure.</b> Demonstrated that current	<ul style="list-style-type: none"> <li>Halifax Water now uses a 4L profile sampling to</li> </ul>

Health Canada guideline for sampling does not give true indication of lead exposure	monitor lead concentrations rather than a first draw sample.
<b>H) Impact of Iron on Lead.</b> Developed a fundamental understanding of the relationship between iron particles and lead	<ul style="list-style-type: none"> <li>Established that cast iron water mains interact with lead materials</li> <li>Developed new analytical method for quantifying colloidal lead in water and a new procedure to evaluate iron mineral and lead interaction</li> <li>Allows Halifax Water to target specific areas of the distribution for future LSL replacement programs</li> </ul>
<b>I) Role of Phosphate in Distribution System.</b> Demonstrated that phosphate has a significant role in stabilizing iron particles and controlling lead release	<ul style="list-style-type: none"> <li>Halifax Water increased phosphate dose to reduce lead in water and continues to study the impact of this increase in customers' homes</li> </ul>
<b>J) Lead Release in Large Buildings</b> Showed how localized lead release can be in large buildings and demonstrated long-term risks of fountains to children with researchers from École Polytechnique	<ul style="list-style-type: none"> <li>Halifax Water has developed sampling protocols for large buildings</li> <li>Halifax Water was part of a national survey of lead management in Canada</li> </ul>
<b>K) Avoided Unintended Consequences of Disinfectant Changeover.</b> Demonstrated that conversion from free chlorine to chloramines would lead to increased lead exposure	<ul style="list-style-type: none"> <li>Halifax Water was able to avoid negative consequences of lead exposure by avoiding a planned disinfectant changeover</li> </ul>
<b>L) Filter-to-Waste.</b> Demonstrated that there was no public health benefit to implementing filter-to-waste at J.D. Kline.	<ul style="list-style-type: none"> <li>NSE accepted evaluation, which saved Halifax Water from a \$5 Million capital investment. Led to changes in NSE Treatment Standard</li> <li>Implemented zero cost filter resting procedures in place of filter-to-waste</li> </ul>

In addition to these major discoveries, the IRC has published a total of 45 peer reviewed publications since 2006 that are directly related to Halifax Water operations or research questions. Of these publications, 5 have been in the Journal of the American Water Works Association, which is the most widely read journal by utilities in North America. The two figures below show the publications by year and also by topic area. Research through the IRC has generated 111 conference posters or presentations provided by IRC staff and students since 2006. Dr. Gagnon has trained 20 PhDs, 50 MASc students, 6 Post Doctoral students and numerous undergrad students. Four of these graduate students are now employed with Halifax Water, several more are working as consultants for key local firms, and a few are employed in government, at both the provincial and federal levels. Bi-annual symposia are held twice per year where research findings and current issues are transferred to Halifax Water Engineering and Water Services staff. Furthermore, treatment plant operators are trained by Dalhousie twice per year on specific relevant operational issues. This knowledge transfer between the Chair and Halifax Water staff ensures the utility is at the forefront of water research discovery and engages and elevates staff to be able to address complex operational issues with a solid knowledge base.



**Figure 1** – Number of peer-reviewed publications by the IRC since 2006, by topic area.



**Figure 2** – Number of peer-reviewed publications by the IRC by year since 2006.

### 3 WQMP Direction

The overall water quality goals identified in the original WQMP remain on the priority list of Halifax Water. There are also other water quality objectives that the utility has identified as being significant to improving or strengthening water quality management and performance within the utility. Efforts will also be placed on shifting the focus of Halifax Water's strategic planning partially away from long term WQ goals and more towards what can be done to support treatment plant operations and improve water quality from a day to day perspective.

Over the course of the last five years, several water quality challenges have emerged that will challenge Halifax Water's ability to meet its water quality goals on an ongoing basis. These challenges are listed as follows:

- Changing Source Water Quality. Due to lake recovery from reductions in acid rain, and the effects of climate change, Halifax Water's primary water sources are undergoing a quality change that will challenge the capabilities of our treatment plants.
- Water Treatment. The effects of aging plants, and source water quality changes are requiring Halifax Water to look at the effectiveness of our treatment processes. There is a need to determine if the current processes are suitable for long term efforts and also to come up with short term solution to provide effective robust treatment capability while long term solutions are explored.
- Lead. Research has revealed that removing lead service lines from the system, combined with optimal corrosion control is the best way to protect customers from exposure to lead.
- Data. Halifax Water has accumulated an immense resource of water quality data. The appropriate tools and business processes need to be brought to bear to ensure that water quality is well managed and that the investments in water quality and treatment are sound.

The research and operations plan (Appendix A) is organized according to four themes aligning with these identified challenges.

#### 3.1 Source Water: Lake Recovery and Changing Source Water Quality

Source Water quality is changing as a result of the effects of lake recovery from acid rain and possibly climate change. This is being realized through increased difficulty in operating both the JD Kline and Lake Major water supply plants. It manifests itself in increased chemical costs at Lake Major and in high head loss and shorter filter runs at JD Kline. JD Kline is now operating near the margins of its design capability. The major emphasis of this theme will include:

- Identification of Changing Source Water Quality. Existing water and air quality data will be mined and analyzed to better understand how the phenomenon affects water quality from both a biological and physical/chemical point of view. Paleolimnological work will be continued to better understand the effects of industrialization on water quality and what the natural or post recovery water quality might be.
- Lake Recovery Monitoring. The water quality response to lake recovery will be evaluated and characterized. This will include evaluation of the effects of lake recovery on algal activity and the

occurrence of taste and odour causing compounds. Existing programs to sample and monitor lakes will be evaluated to ensure that the appropriate monitoring is being undertaken. Also a program to monitor algae throughout the growing season will be developed to understand its occurrence and plan an appropriate response.

- Assessment of Intake Structure Locations. The Lake Major Water Supply Plant optimization study identified diurnally changing source water quality as a limitation on plant performance. A new intake that draws a more consistent water quality is predicted to improve plant performance. Evaluating intake location and design at other facilities, including JD Kline, is also seen as a way to mitigate impacts of changing source water quality broadly and issues like geosmin occurrence more specifically.

## 3.2 Treatment

Treatment processes are being challenged due to the lake recovery phenomenon. It is necessary to develop both long term strategies and short term mitigation approaches to dealing with the effects of changing source water. Additionally, the recently completed Lake Major Water Supply Plant Optimization Study identified over one hundred plant improvements to address process deficiencies and component obsolescence. Further investigation is required to ensure that plant improvements consider other treatment factors and the changing source water. This theme will also include provision for shorter term research that is intended to assist plant operations staff with specific short term treatment challenges that may arise. Major components, listed by plant, include:

- JD. Kline Water Supply Plant. Previous research has identified deficiencies in pre-treatment and flocculation processes. Work will be conducted to further evaluate improvement opportunities and identify physical improvement projects and treatment strategies. Flocculation will be evaluated to consider whether the proposed investment in mechanical flocculation is worthwhile, or whether improved flocculation can be realized with changes to existing hydraulic flocculator operation. Filter performance will be evaluated through a formalized filter surveillance program. Further research will be conducted on passive biofiltration to see if it can be enhanced through changes to pre-oxidation strategies or nutrient addition and through a greater understanding of biofiltration processes. Further work will be conducted on coagulant optimization to improve filter headloss performance and to ensure that the plant can source coagulants that perform optimally and consistently. Further work will be conducted to optimize backwash and air scour cycles and monitoring the effects of new media, underdrains and air scour capability on treatment performance .
- Lake Major Water Supply Plant. A ten year capital program was developed as an output of the Lake Major Optimization Study. Research will be aimed at supporting and enhancing the ten year capital improvement plan and will include research to support determination of a new intake location, premix optimization, coagulant selection, clarification process optimization, possible consideration of biofiltration, manganese optimization, and all aspects of filter operation and filter performance. This theme will also support improvements in the process waste system.



- Bennery Lake Water Supply Plant. This plant is nearing the end of an optimization cycle. Remaining significant improvements include installation of plate settlers, the establishment of filter surveillance, and continued optimization of manganese optimization.

### 3.3 Distribution System Water Quality

Historically, within Halifax Water and the water industry as a whole, distribution system water quality has received less attention than treatment process operations and performance. Recently, there has been an increased focus on possible risk factors to public health associated with distribution systems, a good example of this is the recent attention being focused on the health risks associated with lead pipe in the distribution system and the lack of understanding of the appropriate methods to replace such materials without presenting additional health risks to people directly affected by replacement efforts. In light of the increasingly stringent regulations surrounding distribution water quality, and to remain loyal to the multi-barrier approach to water quality management, Halifax Water will direct efforts towards actively monitoring and assessing both distribution system water quality and physical integrity, and understanding the interrelationships between the two. Establishing a baseline of distribution water quality, hydraulic and integrity information will allow the utility to integrate water quality and hydraulic goals into the operation of the distribution system and focus attention on identifying and mitigating areas that are a high risk for contamination or sensitive to significant water quality fluctuations. The results of the monitoring program will be used to improve distribution system practices and implement another layer of protection to public health. The main components of this theme include:

- Lead. Based on operational experience and previous research, Halifax Water has determined that the removal of lead service lines and optimized corrosion control treatment are required to protect customers from exposure to lead. This will be realized through operationally adopting the 2015 recommendations of the National Drinking Water Advisory Council (NDWAC). The program will support this transformational initiative while continuing to grow the understanding of the occurrence of lead in our local systems in order to continue to optimize corrosion control practices.
- Distribution System Water Quality and Integrity Monitoring. Programs to monitor the integrity of distribution system water quality will be continued. This will include incorporation of the Partnership for Safe Water distribution program. Success of a recent fluoride tracer study in the Lake Major system conducted to understand water age will be translated to other systems. This will provide staff with an understanding of hydraulics and impacts on water quality throughout the distribution system. Programs to monitor biological water quality will be evaluated and operational strategies to optimize disinfection residuals will be identified and implemented. Development of water quality integrity protocols through distribution systems events will also be developed to ensure continuous safe water delivery.
- Disinfection Efficiency and Minimizing Disinfection By Product Formation. Significant work has been done in monitoring and minimizing DBP formation. However, there is further opportunity for improvement in this area, including work on chlorine age in water storage facilities and optimal chlorine dosing.

### 3.4 Data Management

Better tools and processes are required to use and integrate the large quantity of water quality data that exists. Enhanced data management tools will allow for better monitoring, day to day operational decisions and sound investment in process improvements. Data management tools and business processes will be explored and integrated.

## 4 Water Quality Goals

Water Quality Goals are based on the outcomes of previous terms of the WQMP combined with what has been achieved by other “best in class” utilities that have adopted similar programs. These goals are intended to ensure that Halifax Water not only meets current regulatory requirements, but will be well positioned to meet predicted regulatory changes and maintain water quality that well exceeds the current regulatory requirements. Though many of these goals remain the same, there are some additional goals being added to this version of the WQMP to reflect overall direction and focus of the WQMP and to set a standard for the associated research tasks. Many of these goals are a product of the utility’s commitment to adapting a more proactive approach to water quality management, monitoring and optimization.

Halifax Water has developed both global and specific water quality goals. The global goals are very general and are intended to describe the overall objectives of the specific water quality goals. The specific goals clearly define measurable objectives associated with priority water quality targets identified by Halifax Water.

### 4.1 Overall Objectives:

#### 4.1.1 Compliance

- Full compliance with Guidelines for Canadian Drinking Water Quality.
- Full permit compliance

#### 4.1.2 Source Water Quality

- Proactively protect our source water quality.
- Monitor source water quality to provide early warning of potential problems.

#### 4.1.3 Water Quality and Treatment

- Adapt a pro-active approach to water quality monitoring and operations.
- Develop indicators of pending non-compliance events.
- Provide required training to improve operator knowledge of operational, treatment and water quality objectives.
- Actively optimize treatment processes through monitoring and assessing the relationships between treatment operations and finished water quality.
- Develop facility specific water quality and operational goals.

#### 4.1.4 Distribution System Water Quality

- Integrate water quality goals into the operation of the distribution system.
- Actively monitor and understand water quality and physical integrity in the distribution system.

- Identify distribution system contamination vulnerabilities and clearly identify communication plans, responsibilities and accountabilities.

#### 4.1.5 Customer Expectations

- Maintain customer perception of water quality that exceeds corporate strategic objectives.
- Incorporate our understanding of customer perspectives when developing overall water quality goals.

## 4.2 Specific Goals:

### 4.2.1 Particle/Precursor Removal Goals

*These goals describe HW's efforts to optimize the basic treatment process to improve particle removal, which is the fundamental pathogen barrier, while at the same time also optimizing for TOC removal.*

- 2 to 3 log removal of giardia by filtration
- 3/4/4 log removal for giardia/viruses/cryptosporidium
- Individual filter turbidity values <0.1NTU: 95%, 0.3 NTU: 100%

**DBP Goals:** *These goals describe how HW will improve disinfection which is one of the primary barriers to protect public health, while at the same time also lowering disinfection by-products such as THM's and HAA's.*

- THM's < 80 ug/L (LRAA)
- HAA's < 60 ug/L (LRAA)

### 4.2.2 Distribution Water Quality Goals

*These goals recognize that water quality is managed not only at the treatment plant but also to the customers tap. They also recognize that the distribution system and water quality can positively or negatively affect each other.*

- Minimum distribution chlorine residual of 0.2 mg/L at all locations
- Develop and achieve distribution system HPC targets
- Maintain 90<sup>th</sup> percentile residential lead levels below 15-µg/L
- Removal of 100 public lead service lines per year
- Removal of all public and private lead service lines by 2050

### 4.2.3 Waste Treatment Goals

*These goals recognize that plant waste processing is a significant operating cost and that waste management costs can be impacted by process changes. While secondary to public health issues, plant process improvements must also consider the impact on waste treatment.*

- Optimize residual disposal costs
- Achieve wastewater permit requirements

## 5 Overall Strategy to Achieve Goals

Based on the research findings to date and an overview of industry best practices, Halifax Water has identified a number of tasks to be carried out to achieve the goals outlined above and to address facility specific and system wide operational and treatment challenges that have been identified since the initial WQMP was completed. Some tasks will serve to achieve multiple goals and others are focused on very specific research tasks pertaining to the optimization of a specific treatment process. These tasks take the form of several different types of activities such as the following:

- Pilot scale research studies.
- Consultant studies.
- Data collection and surveillance techniques.
- Development/evaluation of long-term monitoring programs.
- Best practice adoption.
- Operational changes.
- Training programs.

Some tasks will be completed by means of a well-defined research project over a relatively short period of time and others, specifically treatment and distribution monitoring and optimization programs, will require a significantly larger time commitment. Such programs encompass multiple planning, development and implementation stages which may include identifying and setting achievable and realistic goals, the development and implementation of monitoring programs, baseline performance assessments, operator training programs, and the development of optimization plans, to name a few.

All of the tasks have been organized into the WQMP research and operations plan (Appendix A). Justification and description of the themes in this plan were provided in section 3. As tasks are completed, process changes, some resulting in capital projects, will be identified. These modifications will be scheduled as resources and financing allow.

## 6 Research Plan and Execution

The overall program will be governed by a steering committee consisting of staff from Halifax Water and Dalhousie University. The steering committee will periodically review research projects and progress. The steering committee will meet quarterly to review research proposals for upcoming research and the results of previous and ongoing research. At this time, Dalhousie will present detailed research results in a seminar format to the steering committee and Halifax Water staff that are directly impacted by the particular research tasks. Technical reports will be submitted as requested for specific research tasks. Bi-annual symposia will be held to update a broader group of Halifax Water Operations and Water Services staff on relevant research.

Depending on the specific research and expertise requirements, individual research tasks will be executed either internally by Halifax Water staff or externally by the Dalhousie University research team or external consultants, as required. An outline of parties responsible for each task is provided in Appendix B.

## 6.1 Halifax Water Research Team

Tasks that involve the optimization of day-to-day process operations or monitoring programs will be completed internally using in-house staff and resources. The Water Quality Manager has been assigned a leadership role in the provision of high quality drinking water; specifically related to treatment, water quality and distribution operations optimization, monitoring and research. This person will play a lead role in conducting water quality research, solving water quality, treatment and distribution problems, pro-actively monitoring and improving treatment and distribution operations and methodologies, and developing, implementing and monitoring water quality plans.

The Water Quality Manager has the role of advocate for the development and implementation of water quality strategic plans and research programs. However, implementation of these programs will require cooperation and commitment of several other stakeholders within the utility structure including the general management, plant managers and operations superintendents, distribution superintendents, and all directly impacted operations staff.

As Halifax Water undertakes the transformational lead service line replacement program, a new lead team will be developed at Halifax Water to ensure that adequate resources are put towards the program to achieve goals. The team will report to the Water Quality Manager, and will consist of a Lead Program coordinator, a Data Analyst and a Water Quality Inspector specific to lead. These three staff will work with staff in a variety of other departments, including Operations, GIS, Customer Service, metering, and Water Services to implement new initiatives.



# **Water Quality Master Plan**

**V3.0**

## **Appendix A – Research and Operating Plan**

**September 2016**

Wendy Krkosek, Ph.D., P.Eng.  
Water Quality Manager

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## **Theme 1: Source Water: Lake Recovery and Variable Source Water Quality**

As a result of successful air emissions control, a number of studies have shown evidence of lake recovery from acidification, mainly in parts of Europe and the UK. The impact of recovery is healthier ecosystems as measured by changes in natural organic matter, pH and changes in biological activity and species.

In the fall of 2016, through both an analysis of basic historical data, and noticeable operational changes at both J.D. Kline and Lake Major, it became apparent that there has been a change in source water quality resulting in higher colour, TOC and pH. At J.D. Kline, the source water quality is approaching the upper limits of design for a direct filtration plant, including a TOC of 3.5 mg/L and colour of 20 TCU. At Lake Major, colour has gone from 20 to 45 TCU since commissioning of the plant, and as a result, the alum dose to remove the increased organics has gone from 15 to 50 mg/L over this time frame. These observed changes challenge earlier thinking of scientists studying the recovery from acidification in Atlantic Canada but are consistent with the observations of drinking water operators in the UK and Scandinavia. The Atlantic Canadian studies were published in 2007 and 2011, and many of the changes described have occurred within the past five years, so it is possible that water quality has recently hit a threshold that has allowed for recovery.

Very recent changes to sulphur emissions from marine fuels and continuing conversion of coal plants to natural gas in the Northeastern United States will continue to result in lower sulphur deposition, thus it can be expected that source waters will continue to change, which is expected to produce more challenges for Halifax Water treatment plants.

A large component of the research activities associated with this Water Quality Master Plan involve issues related to lake recovery, including:

- Identifying changes to source water quality,
- Developing appropriate monitoring strategies for changing source water quality,
- Developing operational tools to assist with plant operations in the short term, and
- Developing long term capital plans for robust design or retrofit of existing treatment plants to deal with a moving target of source water quality.

### **Task 1.1 Identification of Changing Source Water Quality**

The major objective of this task is to develop an understanding of possible lake recovery and changing source water quality in Halifax Water's source waters after years of acidification caused by sulphur deposition, and to understand how this phenomenon impacts water chemistry from a drinking water quality standpoint. This research activity will:

- Mine currently available source water and air quality data to understand changing water quality both biologically and chemical/physical including changes to organic matter, pH, sulphate, nutrients, and biological species and richness.
- Expand and update currently available paleolimnological sediment analyses to include key source waters to estimate pre-industrial lake chemistry, and response of lakes to changes in land management practices.

- Determine which source waters and tributaries are susceptible to experiencing algal blooms in the future, and where these blooms may occur.

## **Task 1.2 Lake Recovery Monitoring**

The overall research objective of this task is to identify responses to lake recovery in source water through a comprehensive monitoring program. Building on data mining and related activity conducted in Task 1.1, this research activity will look for changes in water chemistry and biology in response to trends found in task 1.1. Specifically, the objectives are to:

1. Evaluate the effect of lake recovery on algal activity, including algal organic matter (AOM) and the occurrence of commonly affiliated taste and odour compounds, including determination of which source water and tributaries are susceptible to experiencing algal blooms in the future, and potential management options to reduce bloom occurrence.
2. Monitor for trends in organic matter concentration and characterization in response to lake recovery.
3. Review existing watershed and deep lake sampling programs to ensure that parameters of interest are being collected with an appropriate frequency at appropriate locations.
4. Additionally, a program to monitor presence and composition of algae throughout the growing season will be developed for Pockwock, Major and Bennery, to understand areas that are vulnerable to blue/green algae, taste and odour presence and potential algal toxins.

## **Task 1.3 Assessment of Intake Locations and Structures**

Optimizing the location of the intake structures and depth of intakes have been discussed for Lake Major, Bennery Lake, Pockwock Lake and The Shubenacadie River for Bomont. Pockwock and Lake Major both have fixed depth intakes that are susceptible to large daily fluctuations in water temperature which can pose downstream treatment challenges, and the intake at Bennery is susceptible to seasonal fluctuations in manganese concentrations.

### **1.3.1 Lake Major Intake Structure**

The current intake for LMWSP is susceptible to significant diurnal temperature changes that pose operational challenges downstream, particularly with the sludge blanket in the UltraPulsators. A new multi-level intake would allow for control of incoming water quality, thus reducing the operational burden downstream. In order to determine a suitable location, a research program will be initiated that involves monthly sampling year round at different depths at several locations within 200 m of the existing intake to identify an optimum location for a future intake. A bathymetric map will be developed to help in assessment of future intake locations. While conducting the bathymetric assessment, temperature profiling will also be conducted to provide an indication of areas of upwelling which could also provide a more consistent water quality.

A detailed raw water quality investigation of the existing raw water source will be used to understand water quality in terms of NOM, algal activity, and AOM in Lake Major, and to determine whether specific fractions of NOM are more pronounced compared to previous studies. Initially, this research will utilize conventional online water quality measurements in addition to novel online NOM characterization tools

in order to understand the potential changes in NOM composition. Grab samples will be collected from the raw water intake in order to confirm measurements from online instruments. A new at-line system to measure photoelectrochemical oxygen has been installed at Lake Major as part of this initiative.

If the existing transmission main will be used with the new intake, an evaluation of the manganese coating should be undertaken to ensure no negative impacts on raw water quality will occur with a change in intake location.

### **1.3.2 Pockwock Lake Intake Structure**

For Pockwock, there is some discussion as to the impact of the berm location and structure on influent water quality, particularly because high geosmin concentrations are often found at the boat launch next to the berm. A research program will utilize paleolimnological assessment to evaluate the impact of construction of the berm on organic loading in the intake area. Further characterization of geosmin in the area will also be done to provide indication of its impact on raw water quality and whether there are control measures that could mitigate the situation. A bathymetric map will be developed to help in assessment of future intake locations. While conducting the bathymetric assessment, temperature profiling will also be conducted to provide an indication of areas of upwelling which could also provide a more consistent water quality.

### **1.3.3 Bennery Lake Intake Structure**

At Bennery Lake, the stratification in the summer creates an anoxic zone in the hypolimnion which leads to increases in dissolved manganese at the depth of the current drinking water intake. Concentrations increase significantly which poses downstream treatment challenges. There are two potential solutions to this seasonal problem. The first is to install a hypolimnic aeration system to prevent the formation of dissolved manganese at the intake, or to install a multi-level intake, which would allow plant staff to change the intake level to eliminate the elevated manganese levels in raw water and focus on plant removal of TOC. The current plan is to collect background information (bathymetry) and develop a design for an aeration system to submit to Nova Scotia Environment for approval.

Upon installation of the aeration system, a rigorous raw water monitoring program will be developed for 1-2 years to provide baseline water quality data to aid plant staff in understanding seasonal treatment requirements.

### **1.3.4 Bomont Community Water Supply Plant**

Following precipitation events, there is runoff from neighbouring fields which increases turbidity in the Shubenacadie River, resulting in deteriorated water quality, which forces shutdown of the plant. While the plant is offline, water is trucked into the facility, increasing the cost of providing drinking water to customers. The possibility of installing riverbank filtration will be explored as a way to mitigate the fluctuations in raw water quality, thus eliminating the need for plant shutdown and expense of trucked water.

## **Theme 2: Treatment**

### **Task 2.1 Roadmap for Robust Treatment Plant Design for a Changing Source Water Quality**

Historically, treatment plants have been designed for a specific and narrow range of source water quality, leading to specific unit processes, often with limitations, such as those posed by direct filtration at J.D. Kline. The challenges with treating a moving target of source water quality due to lake recovery, combined with the occurrence of more extreme weather events due to climate change, is leading to a paradigm shift in treatment plant design. The need for more robust and adaptable unit processes for a wider range of water qualities is becoming increasingly important for water utilities. Halifax Water has undertaken a consultant study to look at unit treatment processes for the removal of geosmin, but in looking at geosmin occurrence through the larger lens of lake recovery and changing source water quality, it has become clear that a more holistic approach to design is necessary.

To address this larger design question, Halifax Water will pursue a Tailored Collaboration project with the Water Research Foundation to bring together leading consultants and utilities in North America to develop a roadmap for robust water treatment plant design in a climate of changing source water quality. The outcome of this project will provide a path forward specifically for the J.D. Kline Water Supply Plant, but will also provide value for future considerations at all other Halifax Water surface water treatment plants.

### **Task 2.2 J.D. Kline Water Supply Plant**

The following section describes shorter term operational tasks for optimizing existing treatment strategies to manage changing source water quality as water quality reaches the threshold for direct filtration design parameters, while longer term measures for capital improvements to treatment plant design are explored through the Tailored Collaboration in Task 2.1.

#### **2.2.1 Improvement of pre-mix and pre-oxidation processes**

With an increased TOC load in the raw water and potential changes to iron and manganese cycling, it is possible that a different pre-oxidation step (either higher permanganate dose or alternative oxidant) could provide manganese oxidation as well as provide some pre-oxidation of organics so that organics are in a more assimilable form for biofiltration.

A study conducted in 2016 identified several locations within the pre-mix that could be optimized in terms of chemical addition points, and mixing speeds. Specifically, experiments will be conducted in modified jar tests and at pilot scale to evaluate point of application of polymer to optimize floc formation. Evaluation of the premix process will be conducted to determine whether the point of CO<sub>2</sub> addition can be moved towards the head of the plant and away from concurrent addition with Alum to increase coagulant performance.

#### **2.2.2 Flocculation optimization**

Previous research by the Dalhousie Industrial Research Chair has shown that the conversion to mechanical mixers would provide significant benefit to the existing hydraulic mixing process. However,

this comes at an increased capital cost. Another alternative is to only run 2 of 4 floc trains at one time. As the plant is running under 50% capacity at this time, it is conceivable that running all four 4 floc trains does not provide adequate velocity for collisions and mixing and that speeding the water up by taking two trains offline might enhance mixing and eliminate the need for an increased alum dose and subsequent aluminum breakthrough.

### **2.2.3 Improved filter performance**

#### **2.2.3.1 Filter Surveillance**

The objective of this task is to Implement a filter surveillance program to monitor existing filter performance and backwash routines, and to help identify deficiencies or opportunities for optimization. Samples will be analyzed for typical filter surveillance target parameters (i.e., turbidity and aluminum). However, the investigation will also include measurement of other inorganic and organic potential foulants by performing acid digestion and scans for additional metals (i.e., iron and manganese) and measuring NOM surrogates (i.e., TOC, DOC, PeCOD, UV<sub>254</sub>, FEEM). Analysis of different FEEM regions will provide an indication of the relative fulvic, humic and protein content of NOM. To understand the fouling contribution of biological material, biomass will be quantified using ATP and cell counting, and extracellular polymeric substances (EPS) will be quantified as glucose and as proteins.

Implementation of a filter surveillance program would involve development of a filter surveillance team and data collection templates and procedures so that data is accessible and can be compiled and used by plant and water quality staff.

#### **2.2.3.2 Biofiltration optimization**

Currently the filters at J.D. Kline are running as passive biofilters as there are no chemical or nutrient enhancements to the process. Research using the pilot plant can provide insight on whether addition of pre-oxidants and/or nutrients could provide enhanced organics removal through biofiltration processes. Additionally, monitoring tools and operational controls to measure biofilter performance and health need to be developed and added to operational monitoring programs.

Extracellular polymeric substances (EPS) can contribute to headloss in biofilters. The direct biofiltration process at the JD Kline WTP does not incorporate sedimentation prior to filtration. The purpose of this investigation will be to understand the interaction between floc material and biomass and determine the extent to which alum floc competes with biomass for space in the filter bed and if alum toxicity limits biomass concentration (as measured by ATP), potentially reducing the capability of the filter to perform biodegradation of substrate, or impacts the formation of EPS, potentially contributing to filter clogging.

#### **2.2.3.3 Coagulant optimization**

Research conducted by Knowles in 2011 showed that coagulation with alum as currently practiced provided the longest filter run times combined with minimal downstream unintended consequences. With the change in source water quality, these studies should be revisited. Additionally, the chemical supplier recently changed the supplier and process for alum production from bauxite to trihydrate, which has had an impact on plant performance. Bauxite is being phased out as a type of alum and thus

it is important to determine an appropriate coagulant for the new source water quality which maximizes filter run times while minimizing downstream unintended consequences.

Research at the pilot scale will be conducted to determine whether increasing alum doses or using alternative coagulants can overcome increasing NOM concentrations, while given the constraints of current treatment process design (i.e. particle loads for direct filtration, downstream water quality impacts).

#### **2.2.3.4 Backwash optimization**

Following conversion of the JD Kline WTP filters to biofilters, operational strategies (e.g., backwash, loading rate) have remained fundamentally unchanged. Results following the conversion showed that the biofilters could be operated in the same manner as before and still meet effluent turbidity requirements and previous benchmarks for initial and terminal headloss, loading rate and unit filter run volume. However, recent filter surveillance shows that there is significant material remaining in the lower third of the biofilters, post backwash. Adjustments to the backwash protocol, loading rate and empty bed contact time could potentially optimize this process and increase biofiltration hydraulic performance.

#### **2.2.3.5 Filter media replacement and addition of air scour**

The existing filter media is original to the plant and recent filter assessment by consultants has indicated that both filter media and underdrains require replacement. A capital project is underway to replace both filter media and underdrains in all filters, with a completion date of March 2018. Air scour equipment will be installed at the same time to provide enhanced backwash performance. The filter media design has been altered slightly (slightly larger effective size) to be more compatible with biofiltration processes. New backwash routines for air scour will be developed post installation, and filter health will be monitored using filter surveillance techniques.

### **Task 2.3 Lake Major Water Supply Plant (LMWSP)**

In 2015/16 a Lake Major Water Supply Plant Process Optimization Study was completed by CBCL Limited and HDR Engineering Inc. The report provides an implementation strategy based on recommendations, and research requirements. Halifax Water staff have developed a 10 year Capital Improvement Plan based on this report, which includes both capital upgrades and research requirements. The research requirements over the next five years are highlighted in the following sections.

As described in Theme 1, Lake Major has seen recent changes in source water quality which have resulted in increases in chemical dosage to remove increased organic loads. The LMWSP has been able to adapt to an increased alum dosage of approximately 50 mg/L due to the presence of upflow clarifiers prior to filtration, however the plant is experiencing challenges with coagulant performance, disinfection byproducts and residuals handling. The research and operational tasks presented below detail improvements that can be made to existing operations with enhanced monitoring of process change outcomes and bench-scale testing. The longer term research plan, beyond the scope of this 5 year WQMP, would be to install and operate a pilot plant at Lake Major to further optimize treatment processes once initial improvements have been made.

### **2.3.1 Premix optimization**

There is a need for optimization of pre-mix chemical types and injection location as well as mixing speeds. The impact of increasing mixing intensity will be evaluated as the current mixing speed is below that of rapid mix but above a floc mixing intensity. The current lime system is in need of an overhaul, and prior to this occurring, investigation of the use of soda ash instead of lime for pH/alkalinity control should be explored in more detail at the bench scale.

### **2.3.2 Coagulant changeover**

LMWSP has experienced the same challenges as J.D. Kline with respect to the type of alum used (bauxite versus trihydrate). With the current increased cost of bauxite and eventual discontinuation of the product, it is prudent to perform coagulant changeover studies to develop a suitable process moving forward. This research task will incorporate bench-scale jar testing to evaluate different coagulant types. However, due to the plant configuration as upflow clarification, jar tests can provide good initial insight, but results may not be representative of full-scale operation. Therefore, a way to simulate upflow clarification at the bench scale will be explored to provide more replicable data for comparison to full-scale operation. Further pilot scale testing would then be conducted upon installation of a pilot plant, beyond year 2022. In addition to evaluating filter performance and organics removal with alternative coagulants, impacts on corrosion downstream need to be evaluated to ensure that changing the chloride:sulphate mass ratio does not lead to increased corrosion in the distribution system.

### **2.3.3 Clarification**

The UltraPulsator technology is not seen as ideal for the application of clarification at LMWSP. The current tubes and plates are in need of replacement so a capital inspection and replacement project will be initiated. With installation of a new intake with consistent daily temperatures and water quality, improvements in pre-mix chemistry and injection, optimization of coagulants and replacement of tubes and plates within the UltraPulsators, it is possible that improvements in operation and finished water quality will provide an extended life for the existing units. Enhanced water quality monitoring post tube and plate replacement will be conducted to help with optimizing performance.

### **2.3.4 Manganese oxidation**

LMWSP was originally designed to use potassium permanganate for manganese oxidation. Shortly after plant commissioning, potassium permanganate was shutoff and manganese was oxidized with pre-filtration chlorination. This has allowed the filter media to become coated with manganese dioxide over time which acts as a catalyst for manganese oxidation. Although effective for oxidizing manganese, pre-filter chlorination can lead to increased disinfection byproduct formation through reactions between remaining organics and chlorine prior to filtration. With the anticipation of replacement of filter media, it is a good time to remove the pre-filter chlorination step and provide manganese oxidation at the head of the plant. The filter media has been operating with pre-chlorination for so long that it is likely that manganese from the filter media could leach into finished water if the pre-chlorine is turned off while existing media is still in place. Different manganese oxidation strategies will be tested to determine a suitable process moving forward for post filter media replacement.



### **2.3.5 Improved filter performance**

#### **2.3.5.1 Filter Surveillance**

LMWSP has implemented a filter surveillance program to monitor existing filter performance and backwash routines, and to help identify deficiencies or opportunities for optimization. As mentioned for J.D. Kline, a team and consistent data collection procedures and templates will be developed so that data is accessible and can be compiled and used by plant and water quality staff. In addition to the regular filter surveillance program, additional parameters may be measured periodically to provide a more detailed picture of filter performance. This will be important once new filter media is installed and pre-chlorine is shut off to monitor the conversion to passive biofiltration. In order to monitor the performance of the biofilters, the investigation will also include measurement of other inorganic and organic potential foulants by performing acid digestion and scans for additional metals (i.e., iron and manganese) and measuring NOM surrogates (i.e., TOC, DOC, PeCOD, UV<sub>254</sub>, FEEM). Analysis of different FEEM regions will provide an indication of the relative fulvic, humic and protein content of NOM. To understand the fouling contribution of biological material, biomass will be quantified using ATP and cell counting, and EPS will be quantified as glucose and as proteins.

#### **2.3.5.1 Filter media replacement**

Filter excavation box tests indicate that there is poor stratification of filter media, and that garnet layers are mismatched with sand and anthracite. Additionally, as previously described, there is a likelihood that manganese dioxide has built up on the media due to pre-filter chlorination. Further sieve analysis and characterization of organics and metals through filter surveillance will be conducted to determine whether media should be replaced, or whether washing media to remove manganese dioxide could be adequate to restore filter integrity. Following a conversion in manganese oxidation strategy and media wash or replacement, the filters will then begin to operate as passive biofilters like those at Pockwock. Monitoring of performance and establishment of biofilm will be conducted through filter surveillance.

#### **2.3.5.2 Backwash optimization**

Existing filter surveillance data suggests that media particularly between 18-24 inches is not being sufficiently cleaned, and thus optimizing backwash rates and times to achieve enhanced particle removal would be beneficial. Extended subfluidization terminal wash (ETSW) procedures could also be investigated to determine whether ETSW would reduce filter ripening times. Additionally, upon conversion to passive biofiltration, buildup of EPS and biofilm could lead to changes in filter operation and performance as well as a requirement for different backwash procedures.

### **2.3.6 Waste residuals management study**

The current waste residuals process does not meet the water quality discharge guidelines for aluminum. There are two options moving forward to address this issue. The existing residuals management process could be modified in order to meet the existing water quality discharge guidelines and maximize treatment efficiency, reliability and capacity. Alternatively, the residuals could be discharged to a new sanitary sewer without treatment. Both of these options will be explored in detail from a cost/benefit perspective.



## **Task 2.4      Bennery Lake Water Supply Plant (BLWSP)**

### **2.4.1    Installation of plate settlers**

The sedimentation basins were originally designed to contain plate settlers, but the plates were never installed. The basins currently operate under a high overflow rate and particles are travelling through the sedimentation basin and being deposited in the filters, compromising filter integrity. Plate settlers will be installed in 2016-2017. Upon installation, detailed water quality investigations throughout the treatment train will be conducted to help with process optimization. Installation of the plate settlers will likely improve filter turbidity and runtime and will also require optimization of the backwash process with the new water quality reaching the filters.

### **2.4.2    Filter Surveillance**

The 2013 optimization study completed by Stantec suggests that the media should be evaluated due to its age. Similar to JD Kline, and LMWSP, BLWSP will implement a filter surveillance program to monitor filter performance, health and backwash routines, and to help identify deficiencies or opportunities for optimization, as well as to determine whether media needs to be replaced. The same suite of biotic and abiotic parameters will be evaluated as part of filter surveillance to provide the same breadth of analysis as mentioned for J.D. Kline and LMWSP.

## **Theme 3:    Distribution System Water Quality**

### **Task 3.1      Lead – Implementing NDWAC Recommendations**

In 2015, the USEPA convened the National Drinking Water Advisory Council (NDWAC) to advise the USEPA on how to change the way lead in drinking water is regulated. The NDWAC recommended to the USEPA that the only truly effective solution is for utilities to commit to replacing all lead service lines (public and private) by 2050. To accomplish this, utilities must: develop an accurate inventory of lead service lines, reach out to customers who have lead service lines, work with customers to find a way for them to replace the private portion, and do much more sampling for customers. The NDWAC recommendations were endorsed by the American Water Works Association in March 2016.

Halifax Water has an estimated 2500 public lead service lines, most of which are in Halifax. The number of private lead service lines is unknown but expected to be much higher. Developing strategies for both public and private renewals is a major culture shift, as historically utilities have not taken responsibility for private lead service lines from an ownership, or inventory perspective.

Halifax Water's new approach to manage its customer's exposure to lead is designed to be consistent with the NDWAC recommendations, to the degree they can be applied in Canada and do not conflict with local regulatory requirements. The following five sections describe the research and operational approach that will be taken to address each of the main NDWAC themes:

1. Development of an inventory of lead service lines – both public and private
2. Development of a LSL replacement strategy to meet complete LSL removal by 2050
3. Enhanced public outreach on risks, shared responsibility, results, programs

4. Enhanced customer based sampling, using a variety of types of sampling, chosen from a menu to reflect certain uses. All customer sampling will be used to develop a 3-year continuous 90<sup>th</sup> percentile that must be below a specified system action level.
5. Enhanced water quality parameter monitoring and evaluation of corrosion control treatment.

### **3.1.1 Lead Service Line Inventory**

The NDWAC recommendations require that utilities inventory the amount and location of LSL's and further take the approach that in areas developed before the cessation of LSL's that the service should be assumed to be made of lead unless proven otherwise. This makes development of an inventory complex but is crucial to other programs and ensuring all of the lead service lines are removed by the target date.

For public services, the existing inventory is fairly reliable but is still populated with a number of "unknown" services. The private inventory is much less reliable. This is due to the fact that there is no positive mechanism that requires a customer to contact us upon renewal of a service but also due to the fact that the pre-existing utilities exercised varying and inconsistent levels of attention to the private service lateral database.

As a first step, areas of the distribution system that would have been serviced by a central water system and potentially had lead service lines installed prior to 1960 has been developed. This is a baseline map that can be used to narrow down the presence of lead on a house by house basis. Some techniques that will be used to update the inventory include:

- Analysis of existing records for anything that contains lead or unknown on the public or private portion of the service lines.
- When new meters are being installed as part of the Advanced Metering Infrastructure (AMI) program, all staff that will be in homes will be trained to identify lead service lines, and will report information back to be included in service cards.
- Gathering and recording information anytime there is work done on a sewer line or a service box in the area with potential lead service lines.
- Participation in industry research to explore and test methodologies for non-intrusive identification of LSL material.
- Conducting a pilot trial for successful identification using more invasive techniques (i.e. hydro-vac excavation at the service box) to determine composition of both public and private portions.

### **3.1.2 Lead service line replacement strategy**

HW will develop a strategy for replacing all public and private lead service lines by 2050. The current rate of 20-30- replacements per year will need to be tripled to about 100 per year in order to replace all of the public portions of the lead service line within this timeframe. The number of private renewals requiring replacement per year is expected to be much higher as there are significantly more private than public lead service lines.

Up until 2012, Halifax Water proactively replaced lead service lines in the distribution system in conjunction with municipal street-paving and sidewalk renewal projects, water main replacement

projects and other distribution system infrastructure upgrades. In light of recent national and internal research initiatives, including research with Dalhousie University, which demonstrate the increase in lead concentrations at the tap following partial service line replacements, Halifax Water has changed its policy regarding service line replacements to minimize the occurrence of partial lead service lines in the distribution system. This practice is expected to continue even with the increased replacement goals. Following are some strategies that will be used to increase the number of lead service lines replaced each year, while continuing to avoid partial replacements to protect public health.

- Halifax Water will explore options with the UARB to allow access to private property to replace the full service line during emergency events when Halifax Water replaces the public portion due to a leak or work on the main.
- Halifax Water will develop a business case to present to UARB that will identify potential cost savings of doing full LSL replacement (private and public) in coordination with HRM paving and sidewalk renewal projects. Cost savings on the public portion would include only one mobilization for multiple services, and a significant reduction in reinstatement costs as this would be covered by the HRM paving project. Being able to coordinate with HRM paving projects would allow for a significant increase in the numbers of renewals per year.
- Halifax Water will continue to provide a program where there is a standing contract with several contractors to replace the public portion of the service line in conjunction with the private portion. This program was initiated in 2016, and provides the option to minimize any potential time with a partial replacement between coordination of the private and public renewals, and also streamlines the process for customers.
- Following any disturbance or replacement of a lead service line, home owners will be provided with instructions for appropriate flushing procedures to carry out immediately following disturbance and protocols to follow to minimize lead exposure for a defined period of time following a LSL replacement. Homeowners will also be provided with a pitcher style water filter and cartridges for one year following disturbance. Different pitcher style filters will be tested for removal of high concentrations of lead post-disturbance to ensure filters provided are adequate for the conditions expected.
- A significant barrier to private uptake of lead service line replacement is expected to be financial challenges. HW will develop a financial enabling program for residents to pay for private LSL replacement. HW will work to ensure that financial enabling strategies are accessible to all customers, to ensure that all demographics have access and ability to replace lead service lines. It is expected that challenges will exist with low-income households, long-time homeowners and also rental units.

### **3.1.3 Communications**

Communications and outreach will be critical components to the success of the lead service line replacement program. Customers must have access to transparent, easy to understand information on the risks associated with lead, and programs available to help with getting lead out of the system. Contact with customers will need to occur through the website, through mail-outs and targeted campaigns in areas that may have lead service lines and vulnerable populations. Significant efforts will be placed on meeting with realtor groups, building inspectors and plumbers to disseminate information

about lead service lines. A real estate transaction is a great opportunity to renew service lines. As such, customer service staff will flag any new customers in the lead hot spot areas so that appropriate information can be mailed out to them when they open an account.

A research program will be initiated to determine effective means of customer communications, so that programs put into place will be an effective use of resources and will provide positive outcomes for private side LSL replacement.

#### **3.1.4 Corrosion Control Treatment**

Halifax Water maintains an effective corrosion control program to minimize the corrosion of lead and other materials in the distribution system by controlling pH and using zinc ortho-phosphate for corrosion control.

Recent changes have been made to the corrosion control product and the dose. In 2015, poly phosphate was removed from the product due to research showing it can negatively impact lead release, and in April 2016, the dose was doubled from 0.5 to 1.0 mg/L as PO<sub>4</sub> for both J.D. Kline and Lake Major based on recommendations from consultant reviews of Halifax Water's programs, and research conducted by Dalhousie that shows a decrease in lead concentrations after an increased dose of orthophosphate.

There is a need to further understand the influence of general water chemistry, presence of other metals (i.e. iron, manganese and aluminum) and seasonality on lead release. Research is also required to understand lead phosphate deposition rates following adjustment of orthophosphate dose or changes to source chemicals (i.e. zinc orthophosphate, orthophosphate and phosphoric acid to optimize corrosion control), while balancing costs, minimizing lead release and minimizing unintended consequences.

#### **3.1.5 Water Quality Monitoring**

Currently, the effectiveness of the corrosion inhibitor is monitored by Water Quality Inspectors through:

- biweekly distribution system sampling at 25 sites for pH, orthophosphate, zinc, iron, manganese, alkalinity, chloride, sulphate, aluminum and turbidity
- quarterly monitoring of metal coupons (copper, lead and steel placed at 10 locations in the distribution system; and
- bench and pilot scale research conducted in coordination with Dalhousie University,

Additionally, samples are taken from residential homes through three different programs:

- Annual Health Canada lead and copper residential program
  - 100 homes, half lead and half copper, 4 L profile and a flush sample, in August
- Customer initiated sampling
  - Year-round, 4 L profile and a flush sample, any time of year
- LSL replacement sampling program
  - Pre and 72 hrs, 1 month, 3 months and 6 months post construction samples, 4 L profile and flush sample.

Although this is a robust monitoring program, there is room for improvement through evaluation of the program. There is some question as to the value of the coupon monitoring, which will be explored. Additionally, the corrosion sampling sites should be reviewed to ensure their representation of the system. Finally, customer sampling is the only way to provide an indication of lead concentrations in homes, however it relies on the customer to take the sample, which can lead to sample integrity issues. Furthermore it is difficult to compare data from year to year because customers often opt to replace their service line once they find out their lead concentrations. To provide a more robust and stable way to monitor lead concentrations at the tap, Halifax Water will install permanent lead pipe racks in at least 4 places in the distribution system (one in Dartmouth and three in Halifax) to mimic lead levels at the tap. These pipe racks would be similar to those used by Dalhousie University at J.D. Kline previously but would be located in Halifax Water infrastructure in the distribution system to be more representative of at the tap concentrations. This would allow for routine lead sampling to monitor corrosion control, and would also allow for exploration of different stagnation time sample regimes. Pipe racks would also allow monitoring of changes to corrosion control chemistry and impacts from seasonal variations in water quality, including metals, temperature, etc.

### **Task 3.2      Distribution System Water Quality and Integrity Monitoring**

Halifax Water has a comprehensive program to actively monitor and assess both distribution system water quality and physical integrity, through programs such as HPC monitoring, reservoir water quality monitoring, and corrosion monitoring. Data is currently compiled into technical memos and distributed to appropriate staff for review. The monitoring programs are constantly being reviewed for relevance and completeness and this should continue, to ensure that there is appropriate data collection but also interpretation to help understand and predict water quality in the distribution system. One example would be the use of ATP to monitor biological growth in correlation with HPCs. ATP is a rapid test that can be done within minutes versus 7 days for an HPC test. Therefore, understanding the correlation between ATP and HPCs would be very useful for monitoring biological health when low chlorine residuals are present in the warmer months. ATP data collection has started, but should continue to develop a database that provides relationships between ATP and other water quality parameters in the distribution system.

A fluoride tracer study for LMWSP distribution system showed that water age depends on a number of factors including distance from the plant, time of day and reservoir operation. A fluoride tracer study will be repeated on targeted areas within the LMWSP to determine whether there are operational changes that can be made (operation of valves) to decrease water age to some regions of the distribution system. A fluoride tracer study will also be completed for the JKWSP to provide an overview of water age within the distribution system. Having an indication of water age, particularly at extents of the system and around reservoirs provides valuable information and insight for optimizing water quality, maintaining chlorine residuals and minimizing DBP formation.

As part of the Partnership for Safe Water program, conducting a review of existing chlorine residual monitoring sites and ensuring that sites are representative of the distribution system, including extents, is an important part of understanding distribution system integrity. The fluoride tracer studies will also provide valuable information for assessing the relevance of existing monitoring locations.

### **Task 3.3      Disinfection efficiency and minimizing disinfection byproduct formation**

Although significant work has been done on minimizing distribution system disinfection byproducts both through treatment process changes (removal of pre-chlorine at JDKWSP) and installation of chlorine booster stations on reservoir outflows (North Preston), there is still work that can be done to both reduce DBP formation and also manage reservoir operation to ensure adequate chlorine residuals in all extents of the distribution system, throughout all seasons. Targeted chlorine investigations and review of reservoir monitoring data will provide insight on changes to reservoir operation processes such as installing rechlorination stations, changes in reservoir cycling (volume and timing), installation of mixers, or point of use treatment for removal of disinfection by products that can be implemented to increase disinfection efficiency while minimizing DBP formation.

## **Theme 4: Theme 4: Data Management**

### **Task 4.1 Adoption of a Data Management Tool**

Water Quality Data collected by Halifax Water staff currently gets stored in several different places. Some is entered into WaterTrax, some exists in Pi, and some is stored in spreadsheets at various locations on the K Drive. There is no central place to store, extract and analyze data. Similarly, all water quality data generated by consultants, IRC students and staff is generally contained within reports, student theses, and on personal computers. As this dataset grows, it is becoming clear that there needs to be a mechanism to manage and store all of these data sources, so that data is not lost and both staff and students have access to historical data. This is also becoming increasingly important in the context of Lake Recovery and changing source water quality.

This task will aim to identify, compare, select and integrate a data management approach for water quality data. There exist commercial solutions, provided by companies such as Kisters, EarthFX, Locus Technologies, Aquatic Informatics, Etc. that provide geocoded solutions to water quality data management and analysis. Other options could include development of a Laboratory Information Management System (LIMS), or design of a custom solution. This data management tool will be used to pull all data sources into one central system.

The primary objective of this exercise is to ensure that the valuable resource of water quality data is utilized both as an operational tool to make sound day to day operating decisions and also to ensure that sound investment decisions are made when considering capital improvements to treatment plants and other water quality investments.

## Appendix B - Research and Operations Approach

Theme and Task	Halifax Water Role	Dalhousie Role	Comments
<b>Theme 1: Source Water: Lake Recovery and Variable Source Water Quality</b>			
Task 1.1: Identification of Changing Source Water Quality	Sampling	Research lead	
Task 1.2: Lake Recovery Monitoring	Program Evaluation	Research lead	
Task 1.3: Assessment of Intake Locations and Structures			
Task 1.3.1: Lake Major	Bathymetry	Research lead	
Task 1.3.2: Pockwock Lake	Bathymetry	Research lead	Paleolimnological studies
Task 1.3.3: Bennery Lake	Bathymetry and equipment installation	Research lead	HW and Dal to develop raw water monitoring program
Task 1.3.4: Bomont	Lead investigation		
<b>Theme 2: Treatment</b>			
Task 2.1: Roadmap for Robust Treatment Plant Design for a Changing Source Water Quality	Lead tailored collaboration through WRF	Act as in-kind partner	
Task 2.2: J.D. Kline Water Supply Plant			
Task 2.2.1: Improvement of pre-mix and pre-oxidation processes	Capital improvements	Pilot research lead	
Task 2.2.2: Flocculation Optimization	Implement process changes	Monitoring lead	
Task 2.2.3: Improved Filter Performance			
Task 2.2.3.1: Filter Surveillance	Develop and lead Filter Surveillance Team	Lead filter WQ analysis	
Task 2.2.3.2: Biofiltration Optimization		Lead pilot research	
Task 2.2.3.3: Coagulant Optimization		Lead pilot research	
Task 2.2.3.4: Backwash Optimization	Full-scale testing	Lead pilot research	
Task 2.2.3.5: Filter media replacement and addition of air scour	Capital improvements and filter surveillance	Lead filter WQ analysis	
Task 2.3: Lake Major Water Supply Plant			
Task 2.3.1: Premix Optimization	Capital improvements	Lead bench-scale testing	Bench-scale testing for pH/alkalinity control
Task 2.3.2: Coagulant Changeover		Research Lead	
Task 2.3.3: Clarification	Capital improvements and optimization	Monitoring lead	
Task 2.3.4: Manganese Oxidation		Research Lead	
Task 2.3.5: Improved Filter Performance			
Task 2.3.5.1: Filter Surveillance	Develop and lead Filter Surveillance Team	Lead filter WQ analysis	
Task 2.3.5.2: Filter Media Replacement	Capital improvements	Lead filter WQ analysis	
Task 2.3.5.3: Backwash Optimization	Make process changes	Lead filter WQ analysis	
Task 2.3.6: Waste Residuals Management Study	Lead study		Will utilize previous Dal research
Task 2.4: Bennery Lake Water Supply Plant			
Task 2.4.1: Installation of Plate Settlers	Capital improvements and optimization		
Task 2.4.2: Filter Surveillance	Develop and lead Filter Surveillance Team	Lead filter WQ analysis	
<b>Theme 3: Distribution System Water Quality</b>			
Task 3.1: Lead - Implementing NDWAC Recommendations			
Task 3.1.1: Lead Service Line Inventory	Initiate and manage program, participate in WRF projects		
Task 3.1.2: Lead Service Line Replacement Strategy	Initiate and manage program	Provide technical guidance	
Task 3.1.3: Communications and Outreach	Initiate and manage program	Lead research on customer buy-in	
Task 3.1.4: Corrosion Control Treatment		Research lead	
Task 3.1.5: Water Quality Monitoring	Evaluate and update program		
Task 3.2: Distribution System Water Quality and Integrity Monitoring	Conduct review and research		
Task 3.3: Disinfection Efficiency and Minimizing Disinfection Byproduct Formation	Monitoring lead	Research Lead	
<b>Theme 4: Data Management</b>			
Task 4.1: Adoption of a Data Management Tool	Research, procurement and adoption	Partner as appropriate	Dal to develop integrative data tools





## APPENDIX 7

# Financial Statements

## Halifax Regional Water Commission

March 31, 2021



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## Independent auditor's report

To the Members of the Board of the  
Halifax Regional Water Commission

### Opinion

We have audited the financial statements of the Halifax Regional Water Commission ("Halifax Water"), which comprise the statement of financial position as at March 31, 2021, and the statements of earnings and comprehensive earnings, changes in equity and cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly in all material respects, the financial position of Halifax Water as at March 31, 2021, and its financial performance and its cash flows for the year then ended in accordance with International Financial Reporting Standards (IFRS).

### Basis for opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the financial Statements section of our report. We are independent of Halifax Water in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

### Other matter – supplemental schedules

Our audit was conducted for the purposes of forming an opinion on the financial statements taken as a whole as prepared in accordance with IFRS. Schedules A through E are presented in accordance with the Nova Scotia Utility and Review Board Water Utility Accounting and Reporting Handbook. Such information has been subjected to the auditing procedures applied for the purpose of the audit of the financial statements as a whole as at and for the period ended March 31, 2021.

### Responsibilities of management and those charged with governance for the financial statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with IFRS, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing Halifax Water's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate Halifax Water or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing Halifax Water's financial reporting process.

**Auditor's responsibilities for the audit of the financial statements**

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of Halifax Water's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on Halifax Water's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause Halifax Water to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.



Halifax, Canada  
June 17, 2021

Chartered Professional Accountants

# Halifax Regional Water Commission

## Statement of financial position

March 31 (in thousands)

2021

2020

### Assets

#### Current

Cash and cash equivalents	\$ 48,228	\$ 49,953
Receivables (Note 8)		
Customer charges and contractual	17,155	18,405
Unbilled service revenues	18,246	17,367
Halifax Regional Municipality	2,711	3,668
Inventory	2,003	1,736
Prepays	1,570	1,002
	<u>89,913</u>	<u>92,131</u>
Intangible assets (Note 10)	20,588	18,951
Capital work in progress	30,908	18,104
Utility plant in service (Note 11)	1,280,283	1,281,010
Total assets	<u>1,421,692</u>	<u>1,410,196</u>

Regulatory deferral account (Note 5)	2,620	2,812
<b>Total assets and regulatory deferral account</b>	<b>\$ 1,424,312</b>	<b>\$ 1,413,008</b>

### Liabilities

#### Current

Payables and accruals		
Trade	\$ 12,644	\$ 21,947
Non-trade	6,192	5,384
Interest on long term debt	2,065	2,139
Contractor and customer deposits	2,115	1,622
Current portion of deferred contributed capital (Note 12)	14,580	14,488
Current portion of long term debt (Note 13)	20,559	21,184
Unearned revenue	561	760
	<u>58,716</u>	<u>67,524</u>
Deferred contributed capital (Note 12)	883,916	879,460
Long term debt (Note 13)	204,106	197,962
Employee benefit obligations (Note 4)	73,796	63,365
Total liabilities	<u>1,220,534</u>	<u>1,208,311</u>

### Equity

Accumulated other comprehensive loss	(29,682)	(26,453)
Accumulated surplus	233,460	231,150
Total equity	<u>203,778</u>	<u>204,697</u>
<b>Total liabilities and equity</b>	<b>\$ 1,424,312</b>	<b>\$ 1,413,008</b>

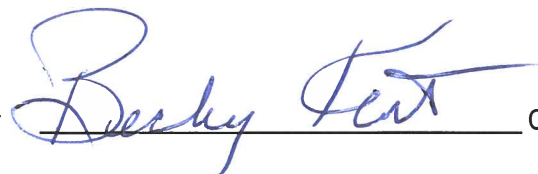
Contingent liabilities (Note 3)

Commitments (Note 6)

Approved by the Board



Commissioner



Commissioner

See accompanying notes to the financial statements.

# Halifax Regional Water Commission

## Statement of earnings and comprehensive earnings

Year ended March 31 (in thousands)

2021

2020

Operating revenues		
Water	\$ 47,631	\$ 47,918
Wastewater	69,605	70,494
Stormwater	8,962	9,196
Public fire protection	7,336	7,074
Private fire protection	1,001	881
Other operating revenue	2,034	2,187
	<u>136,569</u>	<u>137,750</u>
Operating expenditures (Note 14)		
Water supply and treatment	9,987	9,573
Water transmission and distribution	12,031	10,843
Wastewater collection	14,467	13,963
Stormwater collection	4,762	4,808
Wastewater treatment	20,623	20,633
Engineering and information services	8,281	8,436
Regulatory services	3,981	3,781
Customer services	5,081	5,167
Administration services	7,067	7,044
Pension services	7,086	8,382
Depreciation and amortization	48,607	46,410
	<u>141,973</u>	<u>139,040</u>
Loss from operations before financial and other revenues and expenditures	<u>(5,404)</u>	<u>(1,290)</u>
Financial and other revenues		
Interest	215	512
Amortization of contributed capital	18,810	19,025
Other	748	699
	<u>19,773</u>	<u>20,236</u>
Financial and other expenditures		
Interest on long term debt	7,118	7,144
Amortization of debt discount	209	187
Dividend/grant in lieu of taxes	5,951	5,078
Other	(1,411)	202
	<u>11,867</u>	<u>12,611</u>
Earnings for the year before regulatory deferral account depreciation	2,502	6,335
Regulatory deferral account depreciation	<u>(192)</u>	<u>(192)</u>
Earnings for the year	<u>2,310</u>	<u>6,143</u>
Other comprehensive (loss) earnings		
Items that will not be reclassified subsequently to earnings:		
Re-measurement on defined benefit plans	<u>(3,229)</u>	<u>14,756</u>
Total comprehensive (loss) earnings for the year	<u>\$ (919)</u>	<u>\$ 20,899</u>

See accompanying notes to the financial statements.

# Halifax Regional Water Commission

## Statement of changes in equity

Year ended March 31 (in thousands)

	Accumulated other comprehensive income (loss)	Accumulated surplus	Total
Balance, April 1, 2019	\$ (41,209)	\$ 225,007	\$ 183,798
Earnings for the year	-	6,143	6,143
Other comprehensive earnings	14,756	-	14,756
Comprehensive earnings for the year	14,756	6,143	20,899
Balance, March 31, 2020	\$ (26,453)	\$ 231,150	\$ 204,697
Earnings for the year	-	2,310	2,310
Other comprehensive loss	(3,229)	-	(3,229)
Comprehensive earnings (loss) for the year	(3,229)	2,310	(919)
Balance, March 31, 2021	\$ (29,682)	\$ 233,460	\$ 203,778

See accompanying notes to the financial statements.

# Halifax Regional Water Commission

## Statement of cash flows

Year ended March 31 (in thousands)

2021

2020

Increase (decrease) in cash and cash equivalents

### Operating

Comprehensive (loss) earnings for the year	\$ (919)	\$ 20,899
Depreciation and amortization	31,592	29,183
Employee benefit obligation	10,431	(8,965)
Loss (gain) on disposal of utility plant in service	(1,481)	135
	<u>39,623</u>	<u>41,252</u>

### Change in non-cash operating working capital items

Receivables, customer charges and contractual	1,250	(998)
Receivables, unbilled service revenues	(879)	(355)
Receivable from Halifax Regional Municipality	957	(2,805)
Inventory	(267)	321
Prepays	(568)	64
Payables and accruals, trade	(9,303)	4,818
Payables and accruals, non-trade	808	391
Payables and accruals, accrued interest on long term debt	(74)	88
Contractor and customer deposits	493	44
Unearned revenue	(199)	253
	<u>(7,782)</u>	<u>1,821</u>
	<u>31,841</u>	<u>43,073</u>

### Financing

Proceeds from issuance of long term debt	26,700	36,500
Contributed capital and interest	15,952	12,712
Debt issue costs	3	(87)
Principal repayment on Halifax Regional Municipality long term debt	(6,500)	(6,500)
Principal repayments on long term debt	(14,684)	(18,208)
	<u>21,471</u>	<u>24,417</u>

### Investing

Proceeds from sale of utility plant in service	1,576	203
Purchase of capital work in progress	(23,031)	(13,775)
Purchase of utility plant in service and intangible assets	(33,582)	(55,568)
	<u>(55,037)</u>	<u>(69,140)</u>

Net decrease in cash and cash equivalents (1,725) (1,650)

Cash and cash equivalents, beginning of year 49,953 51,603

Cash and cash equivalents, end of year \$ 48,228 \$ 49,953

See accompanying notes to the financial statements.



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# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

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### 1. Nature of operations

The Halifax Regional Water Commission (Halifax Water) is a public utility owned and controlled by the Halifax Regional Municipality (HRM). Halifax Water is responsible for the supply of municipal water, Wastewater and Stormwater Services to the residents of HRM. Halifax Water's principal place of business is 450 Cowie Hill Road, Halifax, Nova Scotia. Halifax Water is exempt from income tax.

### 2. Summary of significant accounting policies

#### (a) Statement of compliance

The financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board (IASB). The principal accounting policies applied in the preparation of these financial statements are set out below. These policies have been consistently applied to all years presented, unless otherwise stated.

The financial statements were authorized for issue by the Board of Commissioners on June 17, 2021.

#### (b) Basis of measurement

Halifax Water's financial statements are prepared on the historical cost basis, except for certain financial instruments measured at fair value. The financial statements are presented in Canadian dollars and all values are rounded to the nearest thousand. The financial statements are presented in accordance with International Accounting Standards (IAS) 1: Presentation of Financial Statements.

#### (c) Regulation

In matters of administrative policy relating to customers, rates and other charges, capital expenditures, depreciation rates and accounting matters, Halifax Water is subject to the jurisdiction of the Nova Scotia Utility and Review Board (NSUARB). Rates and other charges charged to and collected from customers are designed to recover the cost of providing the regulated services. Halifax Water is required to prepare submissions in accordance with the Water Utility Accounting and Reporting Handbook issued by the NSUARB. There are differences in the accounting treatment of certain transactions from IFRS including the accounting of principal debt payments, employee future benefits, depreciation and amortization, gains and losses on the disposal of utility plant in service, and accumulated surplus.

Regulatory assets represent costs incurred that have been deferred as approved by the NSUARB and will be recovered through future rates collected from customers. Halifax Water's regulatory assets are disclosed in Note 5.

#### (d) Utility plant in service

Utility plant in service (Note 11) is recorded at cost, being the purchase price and directly attributable cost of acquisition or construction. Losses or gains related to assets retired, demolished or sold are charged or credited to the statement of earnings.

#### (e) Leased assets

Halifax Water makes use of lease arrangements for office space and equipment and assesses whether a contract is or contains a lease at the inception of the contract. A lease conveys the right to direct the use and obtain substantially all of the economic benefits of an identified asset for a period of time in exchange for consideration.

At lease commencement date, Halifax Water assess whether the recognition of a right-of-use asset and lease liability would have a material impact on the financial statements.

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# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

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### 2. Summary of significant accounting policies (continued)

#### (e) Leased assets (continued)

A right-of-use asset is initially measured at cost, which is comprised of the initial measurement of the lease liability, any initial direct costs incurred, an estimate of any costs to dismantle and remove the asset at the end of the lease, and any lease payments made in advance of the lease commencement date (net of any incentives received). A right-of-use asset is subsequently measured at cost less any accumulated depreciation or impairment losses and adjusted for certain re-measurements of the lease liability. A lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, Halifax Water's incremental borrowing rate.

Halifax Water has elected to apply the practical expedients available under IFRS 16 for short-term leases and leases for which the underlying asset is of low value. Short-term leases and low value leases are expensed in the period incurred.

Halifax Water maintains very few lease arrangements and management will assess future leases as they arise to determine whether the impact of the recognition of a right-of-use asset and lease liability on the statements of financial position, where Halifax Water is acting as a lessee, is material to the financial statements. All existing leases have been assessed and recognition in the financial statements has been deemed immaterial.

#### (f) Deferred contributed capital

Contributions for capital expenditures are treated as deferred contributed capital on the statement of financial position and amortized over the estimated useful lives of the assets (Note 12). Deferred contributed capital is initially measured at cost, being the value of contributions received by Halifax Water for the acquisition of utility plant in service. Contributions for capital expenditures are amortized over the estimated useful lives of the assets and show as a reduction in the amortization of utility plant in service.

#### (g) Cash and cash equivalents

Cash and cash equivalents consist of cash on hand and cash balances managed by HRM that are held within financial institutions.

#### (h) Depreciation of utility plant in service

Depreciation is calculated using the straight-line method over the estimated useful lives of the assets.

The estimated useful lives for the major classifications of utility plant in service are as follows:

Office equipment and furniture and transportation equipment	3 to 10 years
Supervisory control and data acquisition (SCADA) equipment	5 to 25 years
Meters	20 to 25 years
Pumping equipment	5 to 30 years
Tools and work equipment	5 to 30 years
Culverts	25 to 50 years
Purification and treatment equipment	20 to 50 years
Services and laterals	50 to 60 years
Hydrants	50 to 80 years
Structures and improvements	50 to 100 years
Water, Wastewater and Stormwater mains	50 to 100 years

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# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

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### 2. Summary of significant accounting policies (continued)

#### (h) Depreciation of utility plant in service (continued)

Depreciation commences in the year an asset is placed into service and ready for its intended use. In the year of acquisition, depreciation is calculated at 50% of the above rates unless a project is significant, in which case depreciation is prorated for the number of months the asset was in use. Halifax Water does not maintain a depreciation fund per regulatory reporting requirements. Halifax Water has received NSUARB approval for exemption from setting up a depreciation fund as long as net depreciable additions to utility plant in service exceed the depreciation charged.

#### (i) Inventory

Inventory is comprised of direct materials and supplies. Inventory is valued at the lower of cost and net realizable value with cost being determined on the weighted average cost method.

#### (j) Revenues and expenditures

Halifax Water recognizes revenue in a manner that depicts the transfer of goods or services to customers at an amount that reflects the consideration Halifax Water is expected to be entitled to in exchange for those goods or services rendered.

All revenues and expenditures are recorded on an accrual basis. Revenues relating to supplying water, Wastewater and Stormwater Services are recorded based on cyclical billings and include an accrual for estimated amounts not yet billed. Fire protection revenue is recorded based on approved rates. Other revenues are recorded at the time services are performed, the amount can be measured reliably, and collection is reasonably assured.

#### (k) Long term debt

Debt issue costs are deferred and amortized over the term of the debt to which they relate.

#### (l) Use of estimates and critical accounting judgments

In preparing Halifax Water's financial statements, management is required to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and reported amounts of revenue and expenditures during the period. Significant estimates and assumptions include the following:

- At year end, unbilled service revenues from water, Stormwater and Wastewater Services have been earned, but not yet billed due to the timing of the billing cycles. Management estimates the unbilled service revenues accrual based on historic billing trends.
- Management assumptions are used in the actuarial determination of employee benefit obligations, such as standard rates of inflation, mortality, discount rates, and anticipation of future salary increases.
- Useful lives of utility plant in service are reviewed at each reporting date based on expected patterns of usage and historical information.
- Recognition and measurement of provisions and contingencies.

Actual results could differ from these estimates.

#### (m) Financial instruments

##### *Recognition and derecognition*

Financial assets and financial liabilities are recognized when Halifax Water becomes a party to the contractual provisions of the financial instrument. Financial assets are derecognized when the contractual rights to the cash flows from the financial asset expire, or when the financial asset and substantially all the risks and rewards are transferred. A financial liability is derecognized when it is extinguished, discharged, cancelled or expired.

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# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

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### 2. Summary of significant accounting policies (continued)

#### (m) Financial instruments (continued)

##### *Classification and initial measurement of financial instruments*

All financial instruments are initially measured at fair value and adjusted for transaction costs, where applicable. Financial instruments are classified as: those measured at amortized cost, fair value through other comprehensive income (assets only), or fair value through profit and loss (FVTPL).

Halifax Water has classified its financial instruments as follows:

<u>Asset/Liability</u>	<u>Classification</u>
Cash and cash equivalents	Amortized cost
Receivables	Amortized cost
Payables and accruals	Amortized cost
Long term debt	Amortized cost
Contractor and customer deposits	Amortized cost

The classification is determined by both the Halifax Water business model for managing the financial instrument and the contractual cash flow characteristics of the financial instrument.

##### *Subsequent measurement of financial assets*

Financial assets are measured at amortized cost if the assets meet the following conditions, and are not designated as FVTPL:

- they are held within a business model whose objective is to hold the financial assets and collect its contractual cash flows; and
- the contractual terms of the financial assets give rise to cash flows that are solely payments of principal and interest on the principal amount outstanding.

After initial recognition, financial instruments are measured at amortized cost using the effective interest method. Discounting is omitted where the effect of discounting is immaterial.

##### *Impairment of financial assets*

Impairment requirements use more forward-looking information to recognize expected credit losses, the expected credit loss (ECL) model. Financial assets that are subject to the ECL model include cash and cash equivalents and receivables.

#### (n) Provisions

A provision is recognized in the statement of financial position when Halifax Water has a legal or constructive obligation as a result of a past event, and it is probable that an outflow of economic benefits will be required to settle the obligation. If the effect is material, provisions are determined by discounting the expected future cash flows at a rate that reflects current market assessment of the time value of money and, where appropriate, the risks specific to the obligation.

#### (o) Impairments

At the end of each reporting period, Halifax Water reviews the carrying amounts of its tangible and intangible assets to determine whether there is an indication of an impairment loss. If any such indication exists, the recoverable amount of the assets is estimated in order to determine the extent of impairment loss, if any. The recoverable amount of any asset is the higher of its fair value less costs to sell and its value in use. Where it is not possible to estimate the recoverable amount of an individual asset, the impairment test is carried out on the asset's cash-generating unit (CGU), which is the lowest group of assets to which the asset belongs for which there are separately identifiable cash inflows that are largely independent of the cash inflows from other assets. Halifax Water has three CGU's (water, Wastewater and Stormwater) for which impairment testing is performed.

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# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

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### 2. Summary of significant accounting policies (continued)

#### (o) Impairments (continued)

If the recoverable amount of the asset is estimated to be less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. An impairment loss is recognized immediately in earnings. When an impairment loss is subsequently reversed, the carrying amount of the assets is increased to the revised estimate of its recoverable amount, but so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognized for the asset in prior years.

#### (p) Intangible assets

Intangible assets include land rights, water removal rights, studies, and capital master plans. These are recorded at cost less accumulated amortization. Land rights include payment for easements and right of use over land and have an indefinite useful life. Intangibles with finite useful lives are amortized annually over the estimated useful lives. The expected useful lives are as follows:

Intangible assets	10 to 30 years
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#### (q) Employee benefit obligations

Halifax Water accrues annually, the estimated liabilities for pension and other employee benefits.

##### *Pension benefits*

Halifax Water provides employment, post-retirement and pre-retirement benefits through defined benefit plans and supplemental retirement plans.

The cost of pension benefits for the supplemental retirement plans are expensed at the time active employees are compensated.

The defined benefit plan sponsored by Halifax Water determines the amount of pension benefits employees will receive on retirement by reference to length of service and salary levels. Obligations associated with the defined benefit plan reside with Halifax Water, even if plan assets for funding the plan are set aside.

The liability recognized in the statement of financial position for the defined benefit plan sponsored by Halifax Water is the present value of the defined benefit obligation at the end of the reporting date less the fair value of plan assets.

Management estimates the defined benefit obligation annually with assistance from an independent actuary using the projected unit credit method. The defined benefit obligation uses estimates for inflation, medical cost trends, mortality, and anticipated salary levels. The discount factor used to present value estimated future cash flows is determined with reference to high quality corporate bonds that have terms to maturity approximating the terms of the related pension liability.

Gains and losses resulting from re-measurements of the net defined benefit liability are charged to other comprehensive income in the period in which they arise. Service costs are recognized immediately into earnings.

Net interest cost related to pension obligations and returns on plan assets are included in salary and benefits on the statement of earnings.

Halifax Water is responsible for funding the employer share of contributions to the HRM pension plan for certain employees that transferred from HRM as of August 1, 2007. HRM administers this defined benefit pension plan and Halifax Water reimburses HRM for the pension costs related to Halifax Water's proportionate share of the employees covered under the plan. Due to the nature of the plan, Halifax Water does not have sufficient information to account for the plan as a defined benefit pension plan; therefore, the multi-employer defined benefit plan is accounted for in the same manner as the supplemental retirement plans. An expense is recorded in the period when Halifax Water is obligated to make contributions for services rendered by the employee.

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## Halifax Regional Water Commission

### Notes to the financial statements

March 31, 2021 (in thousands)

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#### 2. Summary of significant accounting policies (continued)

##### (q) Employee benefit obligations (continued)

###### *Short-term employee benefits*

Short-term employee benefit obligations that are due to be settled wholly within twelve months after the end of the annual reporting period in which the employees rendered the related service are measured on an undiscounted basis and are expensed as the related service is provided.

##### (r) Regulatory deferral account

The regulatory deferral account is recognized and measured at historical cost less depreciation. Management continually assesses the likelihood of recovery of regulatory assets. If recovery through future rates is no longer considered probable, the amounts would be charged to the results of operations in the period that the assessment is made.

#### 3. Contingent liabilities

As a condition of sale in 2004 of a property, Halifax Water indemnified the purchaser from claims or actions resulting from migration of halocarbons. The environmental risk is assessed to be low and the likelihood of any related liability is not determinable.

Halifax Water is currently reviewing environmental risk factors at other owned properties to determine whether there is an obligation for reclamation. As of the date of issue of the financial statements the likelihood of any related liability is not determinable.

Halifax Water has been named in lawsuits that are ongoing and a liability has been accrued for legal fees and the insurance deductible.

There are other active claims against Halifax Water; however, the likelihood of actual liability is not determinable at this time. If Halifax Water's defence of active claims is unsuccessful, the potential exposure would be \$1,000 - \$2,000.

#### 4. Employee benefit obligations

##### **Retirement benefit plan – employees transferred from HRM**

For employees that transferred from HRM, Halifax Water records an expense for the employer share of the contributions to the HRM pension plan in the period when Halifax Water is obligated to make contributions for services rendered by the employee. During 2021, Halifax Water funded \$543 (2020 – \$555) in contributions to the plan. The number of employees included in this plan is 55 (2020 – 57) and this number is reducing over time. As former HRM employees retire, they are replaced with employees in the Halifax Water pension plan.

##### **Supplemental retirement plans sponsored by Halifax Water**

For employees who participate in the supplemental retirement plans, the cost of pension benefits are expensed at the time active employees are compensated. During 2020, Halifax Water funded \$23 (2020 – \$15) in contributions to the plans. The number of employees included in the plans is 7 (2020 – 5).

##### **Defined benefit plan sponsored by Halifax Water and other long term employment benefits**

For all other employees, Halifax Water maintains a defined benefit pension plan and offers post-retirement health and insurance benefits. The defined benefit pension plan provides pensions based upon length of service and best seven years' earnings. The defined benefit pension plan is funded by employer and employee contributions with employees contributing 10.34% of regular employee earnings, and Halifax Water matching employee contributions. The defined benefit pension plan assets are managed by the HRM Pension Committee.

# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

### 4. Employee benefit obligations (continued)

Employees, who retired prior to July 1, 1998, have extended health benefits coverage for life and drug coverage until age 65. Employees, who retired after July 1, 1998 and before December 31, 2008, have coverage for drug, extended health, dental and life insurance until age 65 on a 50/50 cost shared basis and a 100% basis for employees who retired after December 31, 2008. Extended health coverage for these retirees and their spouses after the age of 65 is available on an optional basis at 100% retiree cost and drug coverage is available through the provincially managed drug program.

Halifax Water has a non-funded pre-retirement benefit that is accrued annually, and is payable on retirement, termination or death of the employee. For individuals who elected to defer receipt of their benefit until the time which they leave employment, their individual benefit equates to approximately three days' pay for each year of completed service.

Completed service for unionized employees was frozen as at June 7, 2019 for the purposes of determining their pre-retirement benefit. Pre-retirement benefits accrue to a maximum of six months' salary and can be taken as a lump sum payment at the time of retirement in lieu of pre-retirement leave.

Information about Halifax Water's plans, based on an actuarial extrapolation of the defined benefit pension plan and pre-retirement benefits and based on actuarial valuation of the post-retirement benefits as at March 31, 2021, is as follows:

	Defined benefit pension plan		Post-retirement benefits		Pre-retirement benefits		Total	
	2021	2020	2021	2020	2021	2020	2021	2020
<b>Change in accrued benefit obligation</b>								
Balance, April 1	\$ 195,904	\$ 198,962	\$ 460	\$ 380	\$ 1,536	\$ 4,195	\$ 197,900	\$ 203,537
Current service cost	11,036	12,197	-	-	91	143	11,127	12,340
Interest cost	7,549	6,891	15	10	57	88	7,621	6,989
Benefit payments	(5,514)	(4,780)	(53)	(50)	(106)	(3,025)	(5,673)	(7,855)
Re-measurements – actuarial (gains)/ losses from changes in financial/experience assumptions	18,597	(17,366)	(27)	120	140	135	18,710	(17,111)
Balance, March 31	227,572	195,904	395	460	1,718	1,536	229,685	197,900
<b>Change in fair value of plan assets</b>								
Balance, April 1	134,535	131,207	-	-	-	-	134,535	131,207
Investment income	5,129	4,486	-	-	-	-	5,129	4,486
Administrative expenses	(69)	(112)	-	-	-	-	(69)	(112)
Actual return on plan assets	15,362	(2,611)	-	-	-	-	15,362	(2,611)
Benefit payments	(5,514)	(4,780)	(53)	(50)	(106)	(3,025)	(5,673)	(7,855)
Contributions: Employee	3,287	3,505	-	-	-	-	3,287	3,505
Employer	3,159	2,840	53	50	106	3,025	3,318	5,915
Balance, March 31	155,889	134,535	-	-	-	-	155,889	134,535
Accrued benefit liability, March 31	\$ 71,683	\$ 61,369	\$ 395	\$ 460	\$ 1,718	\$ 1,536	\$ 73,796	\$ 63,365

# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

### 4. Employee benefit obligations (continued)

Included in the statement of earnings and comprehensive earnings is pension expense of \$10,903 (2020 - \$11,940).

The significant actuarial assumptions adopted in measuring Halifax Water's accrued benefit obligations are as follows:

	<b>2021</b>	<b>2020</b>	<b>2021</b>	<b>2020</b>	<b>2021</b>	<b>2020</b>
	<b>Defined</b>	<b>Defined</b>	<b>Post-</b>	<b>Post-</b>	<b>Pre-</b>	<b>Pre-</b>
	<b>pension</b>	<b>benefit</b>	<b>retirement</b>	<b>retirement</b>	<b>retirement</b>	<b>retirement</b>
	<b>plan</b>	<b>plan</b>	<b>benefits</b>	<b>benefits</b>	<b>benefit</b>	<b>benefit</b>
Discount rate	<b>3.40%</b>	3.80%	<b>2.75%</b>	3.45%	<b>2.90%</b>	3.60%
Expected return on plan assets	<b>3.40%</b>	3.80%	<b>N/A</b>	N/A	<b>N/A</b>	N/A
Rate of compensation increase	<b>3.75%</b>	3.75%	<b>N/A</b>	N/A	<b>3.75%</b>	3.75%
Expenses for life benefits as a % of claims	<b>N/A</b>	N/A	<b>9.36%</b>	10.00%	<b>N/A</b>	N/A
Health benefit trending per year	<b>N/A</b>	N/A	<b>6.26%</b>	6.50%	<b>N/A</b>	N/A
Dental benefit trending per year	<b>N/A</b>	N/A	<b>4.00%</b>	4.00%	<b>N/A</b>	N/A

The measurement date used to determine the plan assets and the accrued benefit obligation was March 31, 2021. The most recent valuation was completed January 1, 2019. The next review is scheduled for January 1, 2022.

The estimated employer contributions expected to be paid to the pension plans for the next fiscal year are \$3,291.

### 5. Regulatory deferral account

In 2011, the NSUARB granted Halifax Water approval to defer depreciation charges on certain assets transferred in 2010 from HRM relating to the Halifax Harbour Solutions Project (HHSP). Depreciation of \$2,078 was deferred in each of fiscal 2011 and 2012. As a result, Halifax Water recognized a \$4,156 regulatory deferral account. In absence of rate regulation, this regulatory deferral account would have been expensed as depreciation in fiscal 2011 and 2012. In 2012, the NSUARB granted approval of the depreciation of this deferral account over the remaining useful lives of the underlying assets, beginning in 2014. The expense recognized in 2021 is \$192 (2020 - \$192).

	<b>2021</b>	<b>2020</b>
Balance, April 1	\$ <b>2,812</b>	\$ 3,004
Depreciation	<b>(192)</b>	(192)
Balance, March 31	<b>\$ 2,620</b>	\$ 2,812

### 6. Commitments

A new agreement with HRM for the dividend/grant in lieu of taxes (dividend) for fiscal years 2020/21 to 2022/23 was signed during the fiscal year. Dividend payments are approved as part of revenue requirements by the NSUARB. For the Water System, the dividend for fiscal years 2020/21 to 2022/23 is expected to be equal to 1.56% of Halifax Water's rate base assets allocated to the Water System at March 31 of the previous fiscal year. Starting September 1, 2020, for the Wastewater System and Stormwater System, the dividends for fiscal years 2020/21 to 2022/23 are expected to be equal to 0.25% of Halifax Water's rate base assets allocated to the Wastewater System at March 31 of the previous fiscal year, plus 0.25% of Halifax Water's rate base assets allocated to the Stormwater System at March 31 of the previous fiscal year.

For 2021/22, the dividends will be capped at 1% more than the dividend amounts for 2020/21 that would have been payable had the new Wastewater and Stormwater dividends commenced on April 1, 2020. The dividends payable for 2022/23 will be capped at 1% more than the dividends payable in the preceding fiscal year.



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## Halifax Regional Water Commission

### Notes to the financial statements

March 31, 2021 (in thousands)

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#### 7. Capital management

Halifax Water's objective when managing capital is to ensure sufficient liquidity to support its financial obligations and execute its operating and capital plans. Halifax Water monitors and adjusts its capital structure through additional borrowings of long term debt which are used to finance capital projects.

Halifax Water considers its total capitalization to include all long term debt and total equity. The calculation is set out as follows:

	<u>2021</u>	<u>2020</u>
Long term debt	\$ 224,665	\$ 219,146
Equity	<u>203,778</u>	<u>204,697</u>
Capital under management	<u>\$ 428,443</u>	<u>\$ 423,843</u>

Halifax Water has obtained regulatory approval for all borrowings during the fiscal year. Halifax Water is not subject to financial borrowing covenants other than as outlined in Note 9.

#### 8. Financial instruments and risk management

Halifax Water applies a three-tier hierarchy framework for disclosing fair value of financial instruments, based on whether the inputs into the various valuation techniques are observable or unobservable. Observable techniques reflect market data obtained from independent sources, while unobservable inputs reflect management assumptions. Changes in valuation techniques of financial instruments may result in transfers of assigned levels. The hierarchy of input is as follows:

Level I	Quoted prices in active markets for identical assets or liabilities;
Level II	Inputs other than quoted prices included in Level I that are observable, either directly or indirectly; and
Level III	Inputs that are not based on observable market data.

The carrying values of current assets and current liabilities approximate their fair value due to the relatively short period to maturity of these financial instruments. The fair value of fixed rate long-term debt is assumed to approximate its carrying value given the limitations where Halifax Water can obtain long-term debt.

There were no transfers between classes of the fair value hierarchy during the year.

Halifax Water is exposed to risks as a result of holding financial instruments. Management considers and evaluates those risks on an on-going basis to ensure that the risks are appropriately managed. These potential risks include credit risk, interest risk, market risk and liquidity risk.

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## Halifax Regional Water Commission

### Notes to the financial statements

March 31, 2021 (in thousands)

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#### 8. Financial instruments and risk management (continued)

##### *Credit risk*

Credit risk arises from the possibility that Halifax Water's customers may experience financial difficulty and be unable to fulfill their obligations. Halifax Water's maximum exposure to credit risk corresponds to customer charges and contractual receivables. However, Halifax Water's customers are numerous and diverse, which reduces the concentration of credit risk.

Halifax Water makes use of a simplified approach in accounting for receivables and records the loss allowance as lifetime ECL. These are the expected shortfalls in contractual cash flows, considering the potential for default at any point during the life of the financial instrument. In calculating, Halifax Water uses its historical experience, external indicators and forward-looking information to calculate the ECL using a provision matrix. Halifax Water includes 75% of the balance of closed accounts in the allowance and 1% of active accounts. Halifax Water assesses impairment of receivables on a collective basis. As receivables possess shared credit risk characteristics, receivables have been grouped based on the days past due.

An analysis of Halifax Water's receivables and continuity of Halifax Water's provision for impairment losses on receivables is as follows:

	<u>2021</u>	<u>2020</u>
Receivables		
Customer charges, contractual, and unbilled service revenues	\$ 38,654	\$ 38,464
Less: allowance for doubtful accounts	<u>(3,253)</u>	<u>(2,692)</u>
	<u>\$ 35,401</u>	<u>\$ 35,772</u>

The credit quality of financial assets that are neither past due nor impaired are assessed with reference to historical information and includes the following considerations; new customers, existing customers and payment pattern history.

##### *Interest risk*

Interest risk arises from the possibility that changes in interest rates will cause Halifax Water a potential loss. Halifax Water's long term debt has been acquired with a variety of fixed rates and has staggered maturity dates which mitigates the interest rate risk.

##### *Market risk*

Market risk arises from the possibility that the value of an investment will fluctuate as a result of changes in market prices. These changes could affect the market value of the investments in Halifax Water's employees' pension plan and consequently the plan's surplus. The risk is mitigated by the pension plan diversifying the types of investments in its portfolio.

##### *Liquidity risk*

Liquidity risk arises from the possibility of Halifax Water not being able to meet its cash requirements in a timely and cost-effective manner. Halifax Water manages this risk by closely monitoring the cash on hand in comparison to upcoming cash commitments.

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## Halifax Regional Water Commission

### Notes to the financial statements

March 31, 2021 (in thousands)

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#### 9. Related party transactions

The immediate parent and ultimate controlling party of Halifax Water is HRM.

Halifax Water is obligated to make payments on debt, held in the name of HRM, associated with Wastewater and Stormwater assets which were transferred to Halifax Water in 2007 and subsequent years.

Amounts receivable from HRM have normal credit terms.

Halifax Water had the following related party transactions with HRM:

- Halifax Water recorded revenue for provision of water, Wastewater and Stormwater Services in the amount of \$4,808 (2020 - \$4,943).
- Halifax Water recorded public fire protection revenue \$7,336 (2020 - \$7,074).
- Halifax Water paid a dividend of \$5,951 (2020 - \$5,078).
- Halifax Water paid operating expenses of \$1,694 (2020 - \$1,785).
- The debt issued by Halifax Water was covered by a blanket guarantee from HRM subject to Halifax Water maintaining a debt service ratio of less than 35%. The debt service ratio at March 31, 2021 is 20.29% (2020 – 18.91%).

#### Compensation of key management personnel

Members of the Board of Commissioners and Executive Management team are deemed to be key management personnel. It is the Board of Commissioners and Executive Management team who have the responsibility for planning, directing and controlling the activities of Halifax Water.

The following is compensation expense for key management personnel:

	<u>2021</u>	<u>2020</u>
Regular compensation and benefits	\$ 1,428	\$ 1,474
Post-employment benefits	<u>163</u>	<u>113</u>
Total compensation	<u>\$ 1,591</u>	<u>\$ 1,587</u>

# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

10. Intangible assets	2021	2020
Cost		
Balance, April 1	\$ 25,933	\$ 20,798
Additions	3,565	5,135
Balance, March 31	<u>29,498</u>	<u>25,933</u>
Accumulated amortization		
Balance, April 1	6,982	5,380
Amortization	1,928	1,602
Balance, March 31	<u>8,910</u>	<u>6,982</u>
Net book value, March 31	<u>\$ 20,588</u>	<u>\$ 18,951</u>

### 11. Utility plant in service

	Land	Structures and improvements	Treatment and network equipment	Distribution and collection network	Tools and work equipment	Total
Cost						
Balance, April 1, 2020	\$ 21,603	\$ 263,360	\$ 271,047	\$ 934,692	\$ 33,892	\$ 1,524,594
Additions	4,386	4,925	5,477	23,981	8,881	47,650
Disposals	-	(49)	(194)	-	(9,281)	(9,524)
Balance, March 31, 2021	<u>25,989</u>	<u>268,236</u>	<u>276,330</u>	<u>958,673</u>	<u>33,492</u>	<u>1,562,720</u>
Accumulated depreciation						
Balance, April 1, 2020	\$ -	\$ 62,646	\$ 71,773	\$ 94,691	\$ 14,474	\$ 243,584
Depreciation	-	10,120	15,104	17,792	5,266	48,282
Depreciation retired	-	(42)	(111)	-	(9,276)	(9,429)
Balance, March 31, 2021	<u>-</u>	<u>72,724</u>	<u>86,766</u>	<u>112,483</u>	<u>10,464</u>	<u>282,437</u>
Net book value, March 31, 2021	<u>\$ 25,989</u>	<u>\$ 195,512</u>	<u>\$ 189,564</u>	<u>\$ 846,190</u>	<u>\$ 23,028</u>	<u>\$ 1,280,283</u>

	Land	Structures and improvements	Treatment and network equipment	Distribution and collection network	Tools and work equipment	Total
Cost						
Balance, April 1, 2019	\$ 21,603	\$ 235,615	\$ 250,944	\$ 896,065	\$ 28,835	\$ 1,433,062
Additions	-	27,745	21,949	38,627	6,001	94,322
Disposals	-	-	(1,846)	-	(944)	(2,790)
Balance, March 31, 2020	<u>21,603</u>	<u>263,360</u>	<u>271,047</u>	<u>934,692</u>	<u>33,892</u>	<u>1,524,594</u>
Accumulated depreciation						
Balance, April 1, 2019	\$ -	\$ 52,737	\$ 58,807	\$ 77,046	\$ 11,032	\$ 199,622
Depreciation	-	9,909	14,474	17,645	4,386	46,414
Depreciation retired	-	-	(1,508)	-	(944)	(2,452)
Balance, March 31, 2020	<u>-</u>	<u>62,646</u>	<u>71,773</u>	<u>94,691</u>	<u>14,474</u>	<u>243,584</u>
Net book value, March 31, 2020	<u>\$ 21,603</u>	<u>\$ 200,714</u>	<u>\$ 199,274</u>	<u>\$ 840,001</u>	<u>\$ 19,418</u>	<u>\$ 1,281,010</u>

# Halifax Regional Water Commission

## Notes to the financial statements

March 31, 2021 (in thousands)

<b>12. Deferred contributed capital</b>	<b><u>2021</u></b>	<b><u>2020</u></b>
Balance, April 1	\$ 893,948	\$ 881,648
Assets contributed during the year	7,406	18,613
Contributions and interest	15,952	12,712
Amortization	<u>(18,810)</u>	<u>(19,025)</u>
Balance, March 31	898,496	893,948
Less: current portion	<u>(14,580)</u>	<u>(14,488)</u>
	<b><u>\$ 883,916</u></b>	<b><u>\$ 879,460</u></b>

Deferred contributed capital is comprised of contributions received by Halifax Water for the acquisition of utility plant in service. Contributions for capital expenditures are amortized over the estimated useful lives of the assets.

<b>13. Long-term debt</b>	<b><u>Interest rates</u></b>	<b><u>2021</u></b>	<b><u>2020</u></b>
Payable to Municipal Finance Corporation (MFC)			
Water	0.678% to 4.221%	\$ 74,648	\$ 67,586
HHSP	2.015% to 2.561%	5,850	6,500
Wastewater	0.678% to 3.614%	97,670	96,657
Stormwater	0.678% to 3.614%	<u>21,423</u>	<u>16,832</u>
		199,591	187,575
Payable to Halifax Regional Municipality			
Wastewater/Stormwater	1.200% to 5.940%	<u>26,000</u>	<u>32,500</u>
		225,591	220,075
Less: debt issue costs		<u>(926)</u>	<u>(929)</u>
		224,665	219,146
Less: amount payable within one year		<u>(20,559)</u>	<u>(21,184)</u>
		<b><u>\$ 204,106</u></b>	<b><u>\$ 197,962</u></b>

During the year Halifax Water acquired \$25,000 in new debt with a ten year term and twenty year amortization period. Additionally, \$1,700 of debt was refinanced for ten years.

The debentures are repayable in fixed annual principal instalments plus interest payable semi-annually. Interest paid during the year was \$7,118 (2020 - \$7,144). Principal instalments for the next five years are as follows:

2021/22	\$	20,559
2022/23	\$	45,272
2023/24	\$	41,951
2024/25	\$	32,065
2025/26	\$	22,417
Thereafter	\$	63,327

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## Halifax Regional Water Commission

### Notes to the financial statements

March 31, 2021 (in thousands)

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14. Operating expenditures by nature	<u>2021</u>	<u>2020</u>
Salaries and benefits	\$ 49,093	\$ 48,897
Training	325	644
Contract services	13,182	13,426
Electricity	6,868	6,535
Operating supplies	10,672	10,974
Professional services	5,650	4,806
Chemicals	5,973	5,742
Depreciation on assets allocated to departments	1,603	1,606
Depreciation and amortization	<u>48,607</u>	<u>46,410</u>
	<u>\$ 141,973</u>	<u>\$ 139,040</u>

#### 15. Impact of COVID-19

In response to the COVID-19 pandemic, Halifax Water did not charge interest on overdue accounts, fees for dishonored payments were waived, and disconnection for non-payment of service was suspended. These measures were in place until August 31, 2020. The impact of COVID-19 on Halifax Water's credit risk has been factored into the estimates for the allowance for doubtful accounts; however, it is not expected to be material to the financial statements. The duration of the COVID-19 pandemic remains unclear at this time.

# Halifax Regional Water Commission

## Schedule of utility plant in service

Year ended March 31, 2021 (in thousands)

# Schedule A

## Water

	Land	Structures and improvements	Pumping equipment	Purification equipment	SCADA equipment	Transmission and distribution mains	Services	Meters	Hydrants	Aerotech and small systems	Tools and work equipment	Total
<b>Cost</b>												
Balance, April 1, 2020	\$ 16,240	\$ 118,167	\$ 10,686	\$ 27,775	\$ 10,996	\$ 399,537	\$ 41,546	\$ 18,799	\$ 21,497	\$ 10,054	\$ 33,048	\$ 708,345
Cost												
Additions	2,193	3,546	59	474	375	11,996	1,612	542	493	-	5,712	27,002
Disposals	-	(149)	-	(17)	-	-	-	(194)	-	(6)	(6,598)	(6,964)
<b>Balance, March 31, 2021</b>	<b>18,433</b>	<b>121,564</b>	<b>10,745</b>	<b>28,232</b>	<b>11,371</b>	<b>411,533</b>	<b>43,158</b>	<b>19,147</b>	<b>21,990</b>	<b>10,048</b>	<b>32,162</b>	<b>728,383</b>
<b>Accumulated depreciation</b>												
Balance, April 1, 2020	-	31,504	7,869	18,699	4,405	94,804	8,347	5,082	4,860	3,627	20,393	199,590
Depreciation	-	2,082	298	1,166	526	5,198	734	895	356	337	2,856	14,448
Depreciation retired	-	(14)	-	(2)	-	-	-	(103)	-	(1)	(6,554)	(6,674)
Total accumulated depreciation, March 31, 2021	-	33,572	8,167	19,863	4,931	100,002	9,081	5,874	5,216	3,963	16,695	207,364
<b>Net book value, March 31, 2021</b>	<b>\$ 18,433</b>	<b>\$ 87,992</b>	<b>\$ 2,578</b>	<b>\$ 8,369</b>	<b>\$ 6,440</b>	<b>\$ 311,531</b>	<b>\$ 34,077</b>	<b>\$ 13,273</b>	<b>\$ 16,774</b>	<b>\$ 6,085</b>	<b>\$ 15,467</b>	<b>\$ 521,019</b>
<b>Cost</b>												
Balance, April 1, 2019	\$ 16,240	\$ 96,960	\$ 10,503	\$ 26,899	\$ 5,607	\$ 386,320	\$ 39,899	\$ 16,787	\$ 20,638	\$ 10,054	\$ 29,621	\$ 659,528
Cost												
Additions	-	21,207	183	876	5,389	13,217	1,647	3,409	859	-	4,339	51,126
Disposals	-	-	-	-	-	-	-	(1,397)	-	-	(912)	(2,309)
<b>Balance, March 31, 2020</b>	<b>16,240</b>	<b>118,167</b>	<b>10,686</b>	<b>27,775</b>	<b>10,996</b>	<b>399,537</b>	<b>41,546</b>	<b>18,799</b>	<b>21,497</b>	<b>10,054</b>	<b>33,048</b>	<b>708,345</b>
<b>Accumulated depreciation</b>												
Balance, April 1, 2019	-	29,662	7,576	17,571	4,053	89,784	7,646	5,087	4,524	3,288	19,014	188,205
Depreciation	-	1,842	293	1,128	352	5,020	701	847	336	339	2,291	13,149
Depreciation retired	-	-	-	-	-	-	-	(852)	-	-	(912)	(1,764)
Total accumulated depreciation, March 31, 2020	-	31,504	7,869	18,699	4,405	94,804	8,347	5,082	4,860	3,627	20,393	199,590
<b>Net book value, March 31, 2020</b>	<b>\$ 16,240</b>	<b>\$ 86,663</b>	<b>\$ 2,817</b>	<b>\$ 9,076</b>	<b>\$ 6,591</b>	<b>\$ 304,733</b>	<b>\$ 33,199</b>	<b>\$ 13,717</b>	<b>\$ 16,637</b>	<b>\$ 6,427</b>	<b>\$ 12,655</b>	<b>\$ 508,755</b>

Schedule A is presented in accordance with the NSUARB Water Utility Accounting and Reporting Handbook (NSUARB Handbook).

Utility plant in service under IFRS differs from the NSUARB Handbook due to exclusion of intangible assets, componentization of certain assets and differences in useful lives for depreciation.

# Halifax Regional Water Commission Schedule of utility plant in service

Year ended March 31, 2021 (in thousands)

## Schedule A

### Wastewater

	Land	Structures and improvements	Pumping equipment	Treatment equipment	SCADA equipment	Collection system	Laterals	Meters	Aerotech and small systems	Tools and work equipment	Total
<b>Cost</b>											
Balance, April 1, 2020	\$ 5,329	\$ 194,939	\$ 22,110	\$ 174,761	\$ 15,761	\$ 332,994	\$ 29,258	\$ 8,440	\$ 12,784	\$ 42,137	\$ 838,513
Cost	1,754	1,599	1,340	1,991	193	3,930	2,175	323	-	6,023	19,328
Additions	-	(130)	(177)	(113)	-	(410)	-	-	-	(2,511)	(3,341)
Disposals	-	-	-	-	-	-	-	-	-	-	-
<b>Balance, March 31, 2021</b>	<b>7,083</b>	<b>196,408</b>	<b>23,273</b>	<b>176,639</b>	<b>15,954</b>	<b>336,514</b>	<b>31,433</b>	<b>8,763</b>	<b>12,784</b>	<b>45,649</b>	<b>854,500</b>
<b>Accumulated depreciation</b>											
Balance, April 1, 2020	-	64,252	8,947	72,195	3,298	70,660	2,966	532	4,402	19,458	246,710
Depreciation	-	4,383	897	8,879	924	4,639	615	431	413	3,650	24,831
Depreciation retired	-	(61)	(30)	(31)	-	(17)	-	-	-	(2,504)	(2,643)
Total accumulated depreciation, March 31, 2021	-	68,574	9,814	81,043	4,222	75,282	3,581	963	4,815	20,604	268,898
<b>Net book value, March 31, 2021</b>	<b>7,083</b>	<b>127,834</b>	<b>13,459</b>	<b>95,596</b>	<b>11,732</b>	<b>261,232</b>	<b>27,852</b>	<b>7,800</b>	<b>7,969</b>	<b>25,045</b>	<b>585,602</b>
<b>Cost</b>											
Balance, April 1, 2019	\$ 5,329	\$ 190,847	\$ 21,467	\$ 172,769	\$ 10,565	\$ 326,334	\$ 26,535	\$ 5,031	\$ 12,784	\$ 36,377	\$ 808,038
Cost	-	4,092	643	2,441	5,196	6,660	2,723	3,409	-	5,792	30,956
Additions	-	-	-	(449)	-	-	-	-	-	(32)	(481)
Disposals	-	-	-	-	-	-	-	-	-	-	-
<b>Balance, March 31, 2020</b>	<b>5,329</b>	<b>194,939</b>	<b>22,110</b>	<b>174,761</b>	<b>15,761</b>	<b>332,994</b>	<b>29,258</b>	<b>8,440</b>	<b>12,784</b>	<b>42,137</b>	<b>838,513</b>
<b>Accumulated depreciation</b>											
Balance, April 1, 2019	-	59,838	8,104	63,702	2,488	66,089	2,400	201	3,973	16,406	223,201
Depreciation	-	4,414	843	8,707	810	4,571	566	331	429	3,084	23,755
Depreciation retired	-	-	-	(214)	-	-	-	-	-	(32)	(246)
Total accumulated depreciation, March 31, 2020	-	64,252	8,947	72,195	3,298	70,660	2,966	532	4,402	19,458	246,710
<b>Net book value, March 31, 2020</b>	<b>5,329</b>	<b>130,687</b>	<b>13,163</b>	<b>102,566</b>	<b>12,463</b>	<b>262,334</b>	<b>26,292</b>	<b>7,908</b>	<b>8,382</b>	<b>22,679</b>	<b>591,803</b>

Schedule A is presented in accordance with the NSUARB Handbook.

Utility plant in service under IFRS differs from the NSUARB Handbook due to exclusion of intangible assets, componentization of certain assets and differences in useful lives for depreciation.



# Halifax Regional Water Commission

## Schedule of utility plant in service

## Schedule A

Year ended March 31, 2021 (in thousands)

### Stormwater

	Land	Structures and improvements	Collection system	Laterals	Aerotech and small systems	Total
<b>Cost</b>						
Balance, April 1, 2020						
Cost	\$ 34	\$ 12,672	\$ 265,896	\$ 5,190	\$ 5,537	\$ 289,329
Additions	439	11	4,779	184	769	6,182
Disposals	-	-	(290)	-	(230)	(520)
<b>Balance, March 31, 2021</b>	<b>473</b>	<b>12,683</b>	<b>270,385</b>	<b>5,374</b>	<b>6,076</b>	<b>294,991</b>
<b>Accumulated depreciation</b>						
Balance, April 1, 2020	-	1,972	54,702	597	2,469	59,740
Depreciation	-	236	6,520	106	731	7,593
Depreciation retired	-	-	(10)	-	(230)	(240)
Total accumulated depreciation, March 31, 2021	-	2,208	61,212	703	2,970	67,093
<b>Net book value, March 31, 2021</b>	<b>\$ 473</b>	<b>\$ 10,475</b>	<b>\$ 209,173</b>	<b>\$ 4,671</b>	<b>\$ 3,106</b>	<b>\$ 227,898</b>
<b>Cost</b>						
Balance, April 1, 2019						
Cost	\$ 34	\$ 10,226	\$ 251,661	\$ 5,046	\$ 4,532	\$ 271,499
Additions	-	2,446	14,235	144	1,005	17,830
Disposals	-	-	-	-	-	-
<b>Balance, March 31, 2020</b>	<b>34</b>	<b>12,672</b>	<b>265,896</b>	<b>5,190</b>	<b>5,537</b>	<b>289,329</b>
<b>Accumulated depreciation</b>						
Balance, April 1, 2019	-	1,761	48,373	495	1,887	52,516
Depreciation	-	211	6,329	102	582	7,224
Depreciation retired	-	-	-	-	-	-
Total accumulated depreciation, March 31, 2020	-	1,972	54,702	597	2,469	59,740
<b>Net book value, March 31, 2020</b>	<b>\$ 34</b>	<b>\$ 10,700</b>	<b>\$ 211,194</b>	<b>\$ 4,593</b>	<b>\$ 3,068</b>	<b>\$ 229,589</b>

<b>Cumulative utility plant in service</b>	<b>Water</b>	<b>Wastewater</b>	<b>Stormwater</b>	<b>Total</b>
<b>Net book value, March 31, 2021</b>	<b>\$ 521,019</b>	<b>\$ 585,602</b>	<b>\$ 227,898</b>	<b>\$ 1,334,519</b>
<b>Net book value, March 31, 2020</b>	<b>\$ 508,755</b>	<b>\$ 591,803</b>	<b>\$ 229,589</b>	<b>\$ 1,330,147</b>

Schedule A is presented in accordance with the NSUARB Handbook.

Utility plant in service under IFRS differs from the NSUARB Handbook due to exclusion of intangible assets, componentization of certain assets and differences in useful lives for depreciation.

# Halifax Regional Water Commission

# Schedule B

## Schedule of long term debt

Year ended March 31, 2021 (in thousands)

	<u>Interest rate</u>	<u>Final Maturity</u>	<u>Balance Remaining</u>	
			<u>2021</u>	<u>2020</u>
Payable to Municipal Finance Corporation				
Water				
Debenture 30 A 1	1.330% to 2.979%	2020	\$ -	\$ 175
Debenture 31 A 1	1.630% to 4.221%	2021	150	300
Debenture 32 A 1	1.636% to 3.480%	2022	400	600
Debenture 32 C 1	1.510% to 3.160%	2022	6,440	6,977
Debenture 33 A 1	1.330% to 2.979%	2023	6,573	7,079
Debenture 33 B 1	1.285% to 3.614%	2023	4,818	5,189
Debenture 34 B 1	1.200% to 3.190%	2024	9,571	10,254
Debenture 35 A 1	1.040% to 2.894%	2025	10,100	10,774
Debenture 36 A 1	1.150% to 2.925%	2026	1,200	1,400
Debenture 36 B 1	1.150% to 2.506%	2026	3,471	3,688
Debenture 37 A 1	1.734% to 3.073%	2027	2,975	3,150
Debenture 38 A 1	2.060% to 3.295%	2028	1,100	1,300
Debenture 38 B 1	2.490% to 3.389%	2028	5,400	5,700
Debenture 39 A 1	2.015% to 2.561%	2029	10,450	11,000
Debenture 40 A 1	0.678% to 1.879%	2030	12,000	-
Wastewater				
Debenture 30 A 1	1.330% to 2.979%	2020	-	1,870
Debenture 32 A 1	1.636% to 3.480%	2022	1,438	1,558
Debenture 32 B 1	1.380% to 3.156%	2022	19,200	20,800
Debenture 32 C 1	1.510% to 3.160%	2022	2,757	2,987
Debenture 33 A 1	1.330% to 2.979%	2023	10,959	11,802
Debenture 33 B 1	1.285% to 3.614%	2023	7,080	7,625
Debenture 34 A 1	1.245% to 3.347%	2024	3,898	4,177
Debenture 34 B 1	1.200% to 3.190%	2024	6,010	6,439
Debenture 35 A 1	1.040% to 2.894%	2025	10,583	11,288
Debenture 36 B 1	1.150% to 2.506%	2026	1,450	1,541
Debenture 37 A 1	1.734% to 3.073%	2027	5,185	5,490
Debenture 38 B 1	2.490% to 3.389%	2028	5,760	6,080
Debenture 39 A 1	2.015% to 2.561%	2029	14,250	15,000
Debenture 40 A 1	0.678% to 1.879%	2030	9,100	-
HHSP				
Debenture 39 A 1	2.015% to 2.561%	2029	5,850	6,500
Stormwater				
Debenture 33 A 1	1.330% to 2.979%	2023	351	378
Debenture 33 B 1	1.285% to 3.614%	2023	1,715	1,847
Debenture 34 B 1	1.200% to 3.190%	2024	4,132	4,427
Debenture 35 A 1	1.040% to 2.894%	2025	2,423	2,584
Debenture 36 B 1	1.150% to 2.506%	2026	722	766
Debenture 37 A 1	1.734% to 3.073%	2027	340	360
Debenture 38 B 1	2.490% to 3.389%	2028	2,340	2,470
Debenture 39 A 1	2.015% to 2.561%	2029	3,800	4,000
Debenture 40 A 1	0.678% to 1.879%	2030	5,600	-
			<u>199,591</u>	<u>187,575</u>
Payable to Halifax Regional Municipality				
Wastewater/Stormwater				
Debenture 24 B 1	2.840% to 5.940%	2024	22,000	27,500
Debenture 34 B 1	1.200% to 3.190%	2024	4,000	5,000
			<u>26,000</u>	<u>32,500</u>
			225,591	220,075
Less: debt issue costs			(926)	(929)
			<u>224,665</u>	<u>219,146</u>
Less: amount payable within one year			(20,559)	(21,184)
			<u>\$ 204,106</u>	<u>\$ 197,962</u>

# Halifax Regional Water Commission

## Schedule of earnings

## Schedule C

Year ended March 31, 2021 (in thousands)

### Water

	<u>2021</u>	<u>2020</u>
Operating revenues		
Water	\$ 47,631	\$ 47,918
Public fire protection	7,336	7,074
Private fire protection	1,001	881
Other operating revenue		
Bulk water stations	318	300
Customer late payment fees	155	207
Miscellaneous	204	162
	<u>56,645</u>	<u>56,542</u>
Operating expenditures		
Water supply and treatment	9,987	9,573
Water transmission and distribution	12,031	10,843
Engineering and information services	3,654	3,230
Regulatory services	1,091	859
Customer services	2,614	2,520
Administration services	3,620	3,536
Depreciation and amortization	10,879	9,818
	<u>43,876</u>	<u>40,379</u>
Earnings from operations before financial and other revenues and expenditures	<u>12,769</u>	<u>16,163</u>
Financial and other revenues		
Interest	127	222
Other	572	544
	<u>699</u>	<u>766</u>
Financial and other expenditures		
Interest on long term debt	2,028	1,828
Repayment of long term debt	5,331	4,722
Amortization of debt discount	74	64
Dividend/grant in lieu of taxes	5,498	5,078
Other	43	32
	<u>12,974</u>	<u>11,724</u>
Earnings for the year	<u>\$ 494</u>	<u>\$ 5,205</u>

Schedule C is presented in accordance with the NSUARB Handbook.

**Halifax Regional Water Commission****Schedule C****Schedule of earnings**

Year ended March 31, 2021 (in thousands)

**Wastewater**

	<u>2021</u>	<u>2020</u>
Operating revenues		
Wastewater	\$ 69,605	\$ 70,494
Other operating revenue		
Leachate and other contract revenue	416	453
Septage tipping fees	486	514
Over strength surcharge	1	14
Airplane effluent	33	98
Customer late payment fees	118	123
Miscellaneous	163	141
	<u>70,822</u>	<u>71,837</u>
Operating expenditures		
Wastewater collection	14,467	13,963
Wastewater treatment	20,623	20,633
Engineering and information services	4,187	4,478
Regulatory services	1,385	1,432
Customer services	2,189	2,277
Administration services	2,965	3,024
Depreciation and amortization	15,019	14,038
	<u>60,835</u>	<u>59,845</u>
Earnings from operations before financial and other revenues and expenditures	<u>9,987</u>	<u>11,992</u>
Financial and other revenues		
Interest	55	191
Other	176	155
	<u>231</u>	<u>346</u>
Financial and other expenditures		
Interest on long term debt	4,405	4,706
Repayment of long term debt	13,242	12,522
Amortization of debt discount	117	110
Dividend/grant in lieu of taxes	386	-
Other	26	35
	<u>18,176</u>	<u>17,373</u>
Loss for the year	\$ <u>(7,958)</u>	\$ <u>(5,035)</u>

Schedule C is presented in accordance with the NSUARB Handbook.

# Halifax Regional Water Commission

## Schedule of earnings

## Schedule C

Year ended March 31, 2021 (in thousands)

### Stormwater

	<u>2021</u>	<u>2020</u>
Operating revenues		
Stormwater site generated service	\$ 5,127	\$ 5,361
Stormwater right-of-way service	3,835	3,835
Other operating revenue		
Customer late payment fees	38	81
Miscellaneous	102	94
	<u>9,102</u>	<u>9,371</u>
Operating expenditures		
Stormwater collection	4,762	4,808
Engineering and information services	440	728
Regulatory services	1,505	1,490
Customer services	278	370
Administration services	482	484
Depreciation and amortization	1,512	1,222
	<u>8,979</u>	<u>9,102</u>
Earnings from operations before financial and other revenue and expenditures	<u>123</u>	<u>269</u>
Financial and other revenues		
Interest	<u>33</u>	<u>99</u>
Financial and other expenditures		
Interest on long term debt	685	610
Repayment of long term debt	1,806	1,475
Amortization of debt discount	18	13
Dividend/grant in lieu of taxes	67	-
	<u>2,576</u>	<u>2,098</u>
Loss for the year	\$ <u>(2,420)</u>	\$ <u>(1,730)</u>

Schedule C is presented in accordance with the NSUARB Handbook.

# Halifax Regional Water Commission

## Schedule of earnings

## Schedule D

Year ended March 31, 2021 (in thousands)

### Regulated activities

	<u>2021</u>	<u>2020</u>
Operating revenues		
Water	\$ 47,631	\$ 47,918
Wastewater	69,605	70,494
Stormwater	8,962	9,196
Public fire protection	7,336	7,074
Private fire protection services	1,001	881
Other operating revenue	<u>1,061</u>	<u>1,085</u>
	<u>135,596</u>	<u>136,648</u>
Operating expenditures		
Water supply and treatment	9,970	9,541
Water transmission and distribution	12,031	10,843
Wastewater collection	14,421	13,939
Stormwater collection	4,762	4,808
Wastewater treatment	20,060	19,892
Engineering and information services	8,281	8,436
Regulatory services	3,981	3,781
Customer services	5,026	5,128
Administration services	7,029	7,007
Depreciation and amortization	<u>27,392</u>	<u>25,060</u>
	<u>112,953</u>	<u>108,435</u>
Earnings from operations before financial and other revenues and expenditures	<u>22,643</u>	<u>28,213</u>
Financial and other revenues		
Interest	215	512
Other	<u>88</u>	<u>143</u>
	<u>303</u>	<u>655</u>
Financial and other expenditures		
Interest on long term debt	7,118	7,144
Repayment of long term debt	20,379	18,719
Amortization of debt discount	209	187
Dividend/grant in lieu of taxes	<u>5,951</u>	<u>5,078</u>
	<u>33,657</u>	<u>31,128</u>
Loss for the year	<u>\$ (10,711)</u>	<u>\$ (2,260)</u>

Schedule D is presented in accordance with the NSUARB Handbook.

# Halifax Regional Water Commission

## Schedule of earnings

## Schedule D

Year ended March 31, 2021 (in thousands)

### Unregulated activities

	<u>2021</u>	<u>2020</u>
Operating revenues		
Septage tipping fees	\$ 486	\$ 514
Leachate treatment and contract revenue	416	453
Airplane effluent	33	98
Other operating revenue	<u>38</u>	<u>37</u>
	<u>973</u>	<u>1,102</u>
Operating expenditures		
Water supply and treatment	17	32
Wastewater treatment	563	741
Wastewater collection	46	24
Customer services	55	39
Administration services	38	37
Depreciation and amortization	<u>18</u>	<u>18</u>
	<u>737</u>	<u>891</u>
Earnings from operations before financial and other revenues and expenditures	<u>236</u>	<u>211</u>
Financial and other revenues		
Other	<u>660</u>	<u>556</u>
Financial and other expenditures		
Other	<u>69</u>	<u>67</u>
Earnings for the year	<u>\$ 827</u>	<u>\$ 700</u>

Schedule D is presented in accordance with the NSUARB Handbook.

# Halifax Regional Water Commission

## Nova Scotia Utility and Review Board information

## Schedule E

Year ended March 31, 2021 (in thousands)

Return on rate base	2021	2020
Rate of return on rate base for water Service	1.99%	3.15%
Rate of return on rate base for Wastewater Service	3.09%	3.87%
Rate of return on rate base for Stormwater Service	0.09%	0.50%

Return on rate base is calculated based on earnings from operations before financial and other revenues and expenditures divided by the net book value of funded utility plant in service.

### Special purpose reserves

	Wastewater and Stormwater Reserves	Regional Development Charge Water Reserve	Regional Development Charge Wastewater Reserve	Other Capital Reserves	2021 Total	2020 Total
Reserve, April 1	\$ 7,004	\$ 2,350	\$ 36,239	\$ 408	\$ 46,001	\$ 45,150
Contributions and interest	-	775	14,491	200	15,466	12,495
Expenditures	(5,040)	-	(2,371)	-	(7,411)	(11,644)
Reserve, March 31	\$ 1,964	\$ 3,125	\$ 48,359	\$ 608	\$ 54,056	\$ 46,001

### Summarized consolidated operating results

	2021	2020
Operating revenues	\$ 136,569	\$ 137,750
Operating expenditures	113,690	109,326
Earnings from operations before financial and other revenues and expenditures	22,879	28,424
Financial and other revenues	963	1,211
Financial and other expenditures	33,726	31,195
Loss for the year	\$ (9,884)	\$ (1,560)

The NSUARB approved a transfer of up to \$5,040 to cover the current year deficit within Wastewater Services. These funds were transferred from HRM in 2007 as part of the transfer of Wastewater and Stormwater Services.





**ITEM # 4.1**  
**Halifax Water Board**  
**January 27, 2022**

**TO:** Becky Kent, Chair, and Members of the Halifax Regional Water Commission Board

**SUBMITTED BY:** Louis de Montbrun  
 Digitally signed by Louis de Montbrun  
 Date: 2022.01.20 11:30:03 -04'00'

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Louis de Montbrun, CPA, CA  
 Director, Corporate Services/CFO

**APPROVED:** Cathie O'Toole  
 Digitally signed by Cathie O'Toole  
 Date: 2022.01.20 11:56:00 -04'00'

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Cathie O'Toole, MBA, FCPA, FCGA, ICD.D  
 General Manager

**DATE:** January 20, 2022

**SUBJECT:** Operating results for the 9 months ended December 31, 2021

**ORIGIN**

Financial Information Reporting.

**DISCUSSION**

Attached are the operating results for the nine (9) months ended December 31, 2021, with comparative figures for December 31, 2020.

The following discussion of the operating results reflect direct operating costs by department and allocations among water, wastewater and stormwater for common costs shared across all the services provided by Halifax Water.

**Statement of Financial Position (NSUARB)**

Key indicators and balances from the Statement of Financial Position are provided in the following tables.

**ITEM # 4.1**  
**Halifax Water Board**  
**January 27, 2022**

**Table 1: Assets**

December 31 (in thousands)	Notes	2021	2020	March 31 2021	From Prior Year	
					\$ Change	% Change
<b>Assets</b>						
<b>Current</b>						
Cash and cash equivalents	A	\$ 69,577	\$ 56,953	\$ 48,228	\$ 12,624	22.2%
Receivables						
Customer charges and contractual	B	15,513	17,287	17,155	(1,774)	(10.3%)
Unbilled service revenues	C	20,815	19,420	18,246	1,395	7.2%
Halifax Regional Municipality	D	0	0	2,711	0	0.0%
Inventory		2,202	2,185	2,003	17	0.8%
Prepays	E	2,039	829	1,570	1,210	146.0%
		110,146	96,674	89,913	13,472	13.9%
Capital work in progress	F	69,555	55,339	30,908	14,216	25.7%
Utility plant in service	G	1,298,142	1,295,439	1,334,519	2,703	0.2%
Total assets		1,477,843	1,447,452	1,455,340	30,391	2.1%
Regulatory deferral account		2,477	2,669	2,620	(192)	(7.2%)
<b>Total assets and regulatory deferral account</b>		<b>\$ 1,480,320</b>	<b>\$ 1,450,121</b>	<b>\$ 1,457,960</b>	<b>\$ 30,199</b>	<b>2.1%</b>

**Notes related to Table 1:**

- A) *Cash and cash equivalents* consist of cash on hand and balances held within financial institutions reduced by outstanding cheques. They have increased \$12.6 million from the prior year due to new debt of \$20 million in May 2021, reduced by repayments of \$21.6 million, net receipts of regional development charges of \$20.5 million, and spend on capital.
- B) *Customer charges and contractual receivables* have decreased \$1.8 million from the prior year. The change in receivables is driven by the timing of billing cycles, down \$4.1 million from prior year. This is offset by the accrual for funding on the Caledonia Road transmission project of \$1.0 million, an increase of the HST rebate of \$0.5 million due in part to capital project spend, and the decrease in the allowance for doubtful accounts.

<b>Customer charges and contractual</b>					
	2021	2020			
	'000	'000	\$ Change	% Change	
Trade receivables	\$ 14,710	\$ 18,795	\$ (4,085)	(21.7%)	
Other receivables	4,311	2,181	2,130	97.7%	
Allowance for doubtful accounts	(3,508)	(3,689)	181	(4.9%)	
	\$ 15,513	\$ 17,287	\$ (1,774)	(10.3%)	

<b>Aging of Trade Receivables (in thousands)</b>					
	<b>Current</b>	<b>31 to 60</b>	<b>61 to 120</b>	<b>120+</b>	<b>Grand Total</b>
2021	7,102	1,615	835	5,158	14,710
2020	8,329	2,083	1,313	7,070	18,795
\$ Change	(1,227)	(468)	(478)	(1,912)	(4,085)
% Change	(14.7%)	(22.5%)	(36.4%)	(27.0%)	(21.7%)
Number of customers with receivables in each category*					
2021	24,389	8,095	5,748	11,316	49,548
2020	32,048	7,392	6,122	10,784	56,346
Change	(7,659)	703	(374)	532	(6,798)

\* Customers may have receivable balances in multiple aging categories.

- C) *Unbilled service revenues* have increased \$1.4 million due to the timing of billing cycles and the increase in wastewater rates.
- D) *Halifax Regional Municipality (HRM) receivable* has decreased from the prior year by \$3.7 million and is in a payable balance this month. This relates to receipt of payment for holdbacks related to the Fall River Water servicing project, Lucasville Road and Wanda Lane cost sharing invoices offset by an increase in amounts accrued for the annual dividend/grant in lieu of taxes owing to HRM. The increase in the Regional Development Charge (RDC) is related to an increase of \$0.6 million in deferrals for charges greater than \$0.1 million, offset by a decrease in the monthly balance receivable of \$0.2 million due to lesser collections which is dependent on development activity.

<b>HRM Receivables and Payables</b>					
	<b>2021</b>	<b>2020</b>			
	<b>'000</b>	<b>'000</b>	<b>\$ Change</b>	<b>% Change</b>	
Receivables	\$ 344	\$ 3,919	\$ (3,575)	(91.2%)	
RDC	1,027	693	334	48.2%	
Payables	(5,730)	(5,257)	(473)	9.0%	
	\$ (4,359)	\$ (645)	\$ (3,714)	575.8%	

- E) The increase in *prepaids* of \$1.2 million is a result of the annual insurance premiums invoice, which in previous years was invoiced monthly, and new software licenses including the new payroll system. Also contributing to the increase were annual invoices for Microsoft and SAP licenses.
- F) The \$14.2 million increase in *capital work in progress* relates to expenditures during the year of \$39.9 million (\$37.8 million in prior year for the nine months ended December 31, 2020). The top five projects remaining in capital work in progress at December 31, 2021 are detailed below:

<b>Capital Work in Progress</b>	
	<b>Cumulative '000</b>
Bedford South Reservoir	\$ 5,726
ERP Replacement Project	3,803
Wastewater System Trenchless Rehabilitation	2,861
Romans and Federal Avenues Sewer Separation	2,708
Ellenvale Run Retaining Wall Phase 5	1,747
	<b>16,845</b>
<u>All other projects:</u>	
Water	21,907
Wastewater	25,235
Stormwater	5,568
	<b>52,710</b>
Capital work in progress	<b>\$ 69,555</b>

G) *Utility plant in service* assets total \$1.30 billion, an increase of \$2.7 million from the prior year. The increase is a result of additions at year end of \$52.5 million offset by net disposals and adjustments of \$2.0 million, less depreciation expense of \$47.8 million.

**Table 2: Liabilities and Equity**

<b>December 31 (in thousands)</b>	<b>Notes</b>	<b>2021</b>	<b>2020</b>	<b>March 31 2021</b>	<b>From Prior Year</b>	
					<b>\$ Change</b>	<b>% Change</b>
<b>Liabilities</b>						
<b>Current</b>						
Payables and accruals						
Trade	<b>A</b>	9,577	11,162	12,644	(1,585)	(14.2%)
Non-trade	<b>B</b>	4,870	4,614	6,192	256	5.5%
Interest on long term debt		1,427	1,508	2,065	(81)	(5.4%)
Halifax Regional Municipality	<b>C</b>	4,359	645	0	3,714	575.8%
Contractor and customer deposits		2,334	2,385	2,115	(51)	(2.1%)
Current portion of long term debt	<b>D</b>	48,908	20,559	20,559	28,349	137.9%
Unearned revenue		2,972	3,026	561	(54)	(1.8%)
		<b>74,447</b>	<b>43,899</b>	<b>44,136</b>	<b>30,548</b>	<b>69.6%</b>
Long term debt	<b>E</b>	175,219	204,054	204,106	(28,835)	(14.1%)
Deferred contributions	<b>F</b>	65,328	52,762	55,699	12,566	23.8%
<b>Total liabilities</b>		<b>314,994</b>	<b>300,715</b>	<b>303,941</b>	<b>14,279</b>	<b>4.7%</b>
<b>Equity</b>						
Accumulated capital surplus		1,114,485	1,097,530	1,103,616	16,955	1.5%
Accumulated operating surplus		38,000	42,622	47,906	(4,622)	(10.8%)
Operating surplus used to fund capital		12,380	12,380	12,380	0	0.0%
Deficiency of revenues over expenditures		461	(3,126)	(9,883)	3,587	(114.7%)
<b>Total equity</b>		<b>1,165,326</b>	<b>1,149,406</b>	<b>1,154,019</b>	<b>15,920</b>	<b>1.4%</b>
<b>Total liabilities and equity</b>		<b>\$ 1,480,320</b>	<b>\$ 1,450,121</b>	<b>\$ 1,457,960</b>	<b>\$ 30,199</b>	<b>2.1%</b>

**Notes related to Table 2:**

- A) *Trade payables and accruals* have decreased \$1.6 million from the prior year. Trade payables have increased \$0.7 million due to holdbacks for capital projects of \$1.0 million and invoicing for accrued payables resulting in a decrease of \$2.0 million in accruals. The accrued wastewater rebate has decreased \$0.3 million as those claiming rebates have been discharging more into the system, therefore claiming lower rebates in the current year.

<b>Payables and Accruals</b>					
	<b>2021</b>	<b>2020</b>			
	<b>'000</b>	<b>'000</b>	<b>\$ Change</b>	<b>% Change</b>	
Trade payable	\$ 5,190	\$ 4,497	\$ 693	15.4%	
Trade accrued payables	3,394	5,410	(2,016)	(37.3%)	
Accrued wastewater rebate	993	1,255	(262)	(20.9%)	
	<b>\$ 9,577</b>	<b>\$ 11,162</b>	<b>\$ (1,585)</b>	<b>(14.2%)</b>	

<b>Aging of Accounts Payable (in thousands)</b>					
	<b>Current</b>	<b>31 to 60</b>	<b>61 to 120</b>	<b>120+</b>	<b>Grand Total</b>
2021	3,482	634	544	530	5,190
2020	4,497	-	-	-	4,497
\$ Change	(1,015)	634	544	530	693
% Change	(22.6%)	0.0%	0.0%	0.0%	15.4%

Please see Attachment 2, Vendor Spend Report to December 31, 2021, for spend by vendor year to date, the top five are listed below:

<b>Top Vendor Payments</b>	
	<b>Cumulative YTD</b>
	<b>'000</b>
Halifax Regional Municipality	\$ 14,373
NS Power Inc.	6,484
The Northern Trust Company	5,126
Brycon Construction Ltd.	4,036
Dexter Construction Company	3,506
	33,525
All other vendors:	68,818
<b>Total vendor payments</b>	<b>\$ 102,343</b>

- B) *Non-trade payables and accruals* have decreased from the prior year by \$0.3 million due to timing of payroll remittances.
- C) *Halifax Regional Municipality (HRM) payable* has increased from the prior year by \$4.8 million. See explanation under the Notes related to Table 1, letter D.
- D) *Current portion of long term debt* has increased \$28.3 million due to balloon payments required for debt in May and November 2022 expected to be refinanced.

- E) *Long term debt* has decreased \$28.8 million as \$27.3 million has been reallocated to current. New debt of \$20.0 million was issued in May 2021. Long term debt repayments have been \$21.6 million.

Debt servicing ratio is a function of total interest and principal payments (including accrued amounts) plus the amortization of debt issue costs divided by total operating revenue per service. Debt servicing ratio by service as at December 31, 2021 is as follows:

<b>Debt Servicing Ratio by Service</b>		
	<b>2021/22</b>	<b>2020/21</b>
Water	<b>13.68%</b>	13.02%
Wastewater	<b>21.63%</b>	24.82%
Stormwater	<b>27.32%</b>	24.76%
Combined	<b>18.95%</b>	19.96%

The debt servicing ratio for each service, except wastewater, has increased from the prior year as a result of the issuance of new debt. The wastewater debt servicing ratio has decreased from the prior year due to higher revenues than the prior year as a result of an increase to the wastewater discharge rate.

The combined debt servicing ratio of 18.95% is below the maximum 35.0% ratio allowed under the blanket guarantee agreement with HRM.

### Statement of Earnings (NSUARB)

**Table 3: Summarized Statement of Earnings (NSUARB)**

<b>Summarized Statement of Earnings</b>									
	<b>Notes</b>	<b>Budget 2021/22 '000</b>	<b>Forecast 2021/22 '000</b>	<b>YTD Actual 2021/22 '000</b>	<b>PYTD Actual 2020/21 '000</b>	<b>From Prior Year</b>		<b>Budget to Forecast</b>	
						<b>\$ Change</b>	<b>% Change</b>	<b>\$ Change</b>	<b>% Change</b>
Operating revenues	\$	150,467	\$ 151,787	\$ 114,301	\$ 104,521	\$ 9,780	9.36%	\$ 1,320	0.87%
Operating expenditures		125,379	121,608	87,619	82,984	4,635	5.59%	(3,771)	(3.01%)
Earnings from operations before financial and other revenues and expenditures		25,088	30,179	26,682	21,537	5,145	23.89%	5,091	20.29%
Financial and other revenues		722	783	581	593	(12)	(2.02%)	61	8.45%
Financial and other expenditures		37,460	35,396	26,802	25,256	1,546	6.12%	(2,064)	(5.51%)
Earnings (loss) for the year	<b>A</b>	<b>\$ (11,650)</b>	<b>\$ (4,434)</b>	<b>\$ 461</b>	<b>\$ (3,126)</b>	<b>\$ 3,587</b>	<b>(114.75%)</b>	<b>\$ 7,216</b>	<b>(61.94%)</b>

### Notes related to Table 3:

- A) The *earnings* for the year to date are \$0.5 million, an increase of \$3.6 million over the prior year loss. The following is a discussion of factors influencing the change.

**Table 4: Operating Revenues:**

Operating Revenues									
	Notes	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
						\$ Change	% Change	\$ Change	% Change
Consumption revenue	B	\$ 96,525	\$ 96,831	\$ 73,557	\$ 65,019	\$ 8,538	13.13%	\$ 306	0.32%
Base charge revenue		34,003	34,180	25,356	25,266	90	0.36%	177	0.52%
Wastewater rebate	C	(1,487)	(1,108)	(803)	(821)	18	(2.19%)	379	(25.49%)
Metered sales total		129,041	129,903	98,110	89,464	8,646	9.66%	862	0.67%
Stormwater site generated charge	D	6,051	6,537	4,719	4,607	112	2.43%	486	8.03%
Stormwater right of way		3,835	3,835	2,876	2,876	-	0.00%	-	0.00%
Public fire protection	E	7,628	7,628	5,721	5,410	311	5.75%	-	0.00%
Private fire protection	E	1,312	1,335	940	670	270	40.30%	23	1.75%
Other operating revenue	F	2,600	2,549	1,935	1,494	441	29.52%	(51)	(1.96%)
Operating revenue total	A	\$ 150,467	\$ 151,787	\$ 114,301	\$ 104,521	\$ 9,780	9.36%	\$ 1,320	0.88%

**Notes related to Table 4:**

Operating revenues are presented below, broken down by type:

- A) *Operating revenues* have increased \$9.8 million as compared to the previous year.
- B) *Consumption* has increased 0.7% on a volumetric basis compared to the prior year. The other factor influencing the increase in *consumption revenue* of \$8.5 million over the prior year is the rate increase for wastewater discharge effective April 1, 2021 from \$1.753 per cubic meter to \$2.073 per cubic meter.

Consumption by Customer Class (m3)				
	2021/22	2020/21	m3 Change	% Change
Commercial	4,607,808	4,406,439	201,369	4.6%
Industrial	1,561,240	1,441,878	119,362	8.3%
Institutional	2,919,015	2,640,482	278,533	10.5%
Multi-residential	5,822,519	5,525,580	296,939	5.4%
Residential	9,843,126	10,564,116	(720,990)	(6.8%)
	24,753,708	24,578,495	175,213	0.7%

- C) *Wastewater rebate* forecast has decreased \$0.4 million compared to budget as annual requests have been processed for lesser volumes of wastewater discharged into our system due to the customers operational requirements.
- D) *Stormwater site generated charge revenue* has been forecast to be \$0.5 million more than budget due to the impervious area satellite imagery update.
- E) *Public and private fire protection revenues* have increased by a combined \$0.6 million from the prior year due to an approved rate increase effective October 1, 2020.
- F) *Other operating revenue* has increased \$0.4 million over the prior year due to late payment and interest charges being waived in the prior year as a COVID-19 relief measure, the introduction of a new meter reading charge to recoup the cost of manual meter reads for non-

AMI meters effective October 1, 2020, and an increase in drawing review fees which are dependent upon the level of development activity.

**Table 5: Operating expenditures:**

Operating Expenditures									
	Notes	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
						\$ Change	% Change	\$ Change	% Change
Water supply and treatment	B	\$ 10,778	\$ 10,575	\$ 8,045	\$ 7,377	\$ 668	9.06%	\$ (203)	(1.88%)
Water transmission and distribution	C	11,876	11,778	8,574	8,491	83	0.98%	(98)	(0.83%)
Wastewater collection	D	12,604	12,348	10,635	10,266	369	3.59%	(256)	(2.03%)
Stormwater collection	E	5,885	5,037	3,298	3,774	(476)	(12.61%)	(848)	(14.41%)
Wastewater treatment	F	22,071	21,378	15,870	15,035	835	5.55%	(693)	(3.14%)
Engineering and technology services	G	12,931	13,421	8,144	6,905	1,239	17.94%	490	3.79%
Regulatory services	H	4,472	4,315	3,198	2,918	280	9.60%	(157)	(3.51%)
Customer services	I	5,837	4,996	3,518	3,644	(126)	(3.46%)	(841)	(14.41%)
Corporate services	J	3,124	3,124	2,200	139	2,061	1482.73%	-	0.00%
Administration services	J	4,928	4,725	2,742	4,570	(1,828)	(40.00%)	(203)	(4.12%)
Depreciation and amortization	K	30,873	29,911	21,395	19,865	1,530	7.70%	(962)	(3.12%)
Total operating expenditures	A	\$ 125,379	\$ 121,608	\$ 87,619	\$ 82,984	\$ 4,635	5.59%	\$ (3,771)	(3.01%)

**Notes related to Table 5:**

- A) *Operating expenditures* of \$87.6 million are \$4.6 million higher than the prior year.
- B) *Water supply and treatment* has increased \$0.7 million from prior year due to increases in salaries and benefits (\$106k) relating to new positions and wage rate increases, and an increase in treatment chemicals (\$363k) mostly alum and phosphates with a decrease in lime relating to the increased dosage for the Lake Major clarifier project. Lead service line replacement costs also increased (\$273k) due to new program to pay for the private portion of service line replacements in the current year, and an increase in costs relating to JD Kline lagoon cleaning (\$65k) more than the prior year, offset by equipment repairs (\$134k) relating to a pump failure in prior year. Water supply and treatment forecast has decreased \$0.2 million due in part to reallocation of public portion of the lead service line replacement costs to capital.
- C) *Water transmission and distribution* has increased \$0.1 million from the prior year. Salaries and benefits have decreased (\$118k) offset by increases in traffic control costs (\$135k) due to an increase in activity over the prior year resulting from COVID-19 delays. Other categories with cost increases include hired equipment (\$107k) and road and street repairs (\$147k) offset by a decrease in vehicle and equipment costs (\$197k).
- D) *Wastewater collection* has increased \$0.4 million from prior year due to increases in salaries and benefits (\$50k) based on the allocation of time between wastewater and stormwater services, increase in vehicle cost allocation (\$198k) which is dependent upon usage, and an increase in traffic control costs (\$135k) due to an increase in activity as compared to the prior year. Prior year was lower as a result of COVID-19 delays. Wastewater collection is forecast to decrease \$0.3 million due mainly to vacancies during the year, particularly in the West region, which also resulted in lower costs associated with materials and supplies.
- E) *Stormwater collection* has decreased \$0.5 million from prior year due to decreases in salaries and benefits (\$218k) partially due to the allocation of time between wastewater and stormwater services, decrease in contract services (\$150k) relating mainly to emergency repairs for the Pier A combined sewer overflow (CSO) in the prior year, offset by an increase



in traffic control costs (\$30k) due to an increased focus on activities that reduce staff contact during COVID-19. Stormwater collection is forecasted to decrease \$0.8 million based on reduced costs being experienced in expenditure categories such as contract services and traffic control, and associated reduction in wages and overtime.

- F) *Wastewater treatment* has increased \$0.8 million from prior year due to increases in salaries and benefits (\$310k) relating to new positions and wage rate increases, increases in chemicals (\$436k) mostly polymer due to price increases and sodium hypochlorite due to a dry summer requiring more use of the chemical to reduce odors, increase in consulting costs (\$106k) for Dalhousie research project due to reduced activity in prior year due to COVID-19, and an increase in biosolids treatment and trucking costs (\$210k) due in part to higher volumes being processed. The cost increases are offset by a decrease in tools and equipment purchases mainly relating to UV light purchases in the prior year. Wastewater treatment is forecasted to decrease \$0.8 million partially due to lower flows being experienced at the treatment plants, resulting in lower treatment costs and usage costs for chemicals such as alum. Additionally, the treatment train was down at the Halifax wastewater treatment facility longer than expected, resulting in lower biosolid treatment cost.
- G) *Engineering and technology services* have increased \$1.2 million from prior year due to increases in salaries and benefits (\$138k) relating to new positions and wage rate increases along with training costs (\$21k) due to the availability of courses. Other increases include website hosting (\$50k), new Microsoft Azure licenses (\$331k) which have been included in the revised forecast, software licenses for the new VIP payroll system (\$192k), and customer portal (\$116k). Engineering and technology services are forecasted to increase \$0.5 million due to the need for Microsoft Azure licenses, a higher subscription rate by customers for the customer portal than budgeted, and a net new hire in the information services department.
- H) *Regulatory Services* have increased \$0.3 million mainly due to increases in salaries and benefits (\$232k) relating to wage rate increases and new staff. Expenditures have been forecast \$0.2 million lower due to lower than expected consulting costs, and a reduction in training and development costs. As well, there has been a reallocation of legal services forecast to other departments.
- I) *Customer services* have decreased \$0.1 million from the prior year mainly due to decreases in salaries and benefits (\$40k) relating to vacant positions. Customer services are forecasted to decrease by \$0.8 million. This is attributed to deferring implementation of the monthly customer billing project resulting in savings of approximately \$0.7 million as well as cost savings of \$0.1 million relating to salaries due to vacant positions. The decrease has been offset by an increase in subscription costs, which are forecasted to increase \$0.1 million and not previously budgeted.
- J) *Corporate services and administration services* have increased \$0.2 million from the prior year mainly due to increases in salaries and benefits (\$243k) relating to new positions and wage rate increases. Other increases include insurance policy premiums (\$224k), and an increase in legal services (\$55k). These increases are offset by decreases in regulatory costs (\$295k) mainly due to the RDC and water and wastewater rate applications in the prior year. Corporate services are forecasted to remain the same, with offsetting changes between departments. Administration services are forecast to decrease \$0.2 million due to awards banquet cancellation, fewer arbitrations, and low number of investigations, as well as a decrease in consulting costs for rate and utility consulting.

K) *Depreciation and amortization* have increased \$1.5 million as a result of additions to utility plant in service and intangibles. Depreciation and amortization are forecasted to decrease \$1.0 million due to fewer additions in prior and current year than budgeted.

**Table 6: Operating Expenditures by Nature:**

Operating Expenditures by Nature					
	Notes	2021/22 '000	2020/21 '000	\$ Change	% Change
Salaries and benefits	A	\$ 31,171	\$ 30,391	\$ 779	2.50%
Training		296	238	58	19.53%
Contract services	B	10,126	9,035	1,091	10.77%
Electricity		5,098	5,004	94	1.84%
Operating supplies	C	9,163	8,758	406	4.43%
Professional services		4,123	4,137	(14)	(0.33%)
Chemicals	D	5,162	4,364	798	15.45%
Depreciation on assets allocated to departments	E	1,085	1,191	(106)	(9.77%)
Depreciation and amortization	E	21,395	19,865	1,530	7.15%
		<b>\$ 87,619</b>	<b>\$ 82,984</b>	<b>\$ 4,635</b>	<b>5.29%</b>

**Notes related to Table 6:**

Operating expenditures of \$87.6 million are \$4.6 million higher than the prior year.

Compared to the prior year, expenditure types with the largest changes in costs are:

- A) Salaries and benefits increase of \$0.8 million is due to wage rate increases and new positions, offset by several retirements.
- B) Contract services increase of \$1.1 million is due to an increase in traffic control services and hired equipment relating to an increase in activity post COVID-19 along with an increase in biosolids treatment due to higher volume being sent for processing at third-party facility.
- C) Operating supplies increase of \$0.4 million is due mainly to engineering and technology services cost increases relating to software licenses, network costs, and equipment purchases.
- D) Chemicals increase of \$0.8 million is due mainly to price increases and greater usage of certain chemicals.
- E) Depreciation increase of \$1.4 million is due to additions to utility plant in service.

**Table 7: Operating Results by Service:**

Operating Results by Service								
	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
					\$ Change	% Change	\$ Change	% Change
Water	\$ (5,221)	\$ (2,355)	\$ (148)	\$ 1,835	\$ (1,983)	(108.07%)	\$ 2,866	(54.89%)
Wastewater	(1,517)	1,499	1,702	(3,779)	5,481	(145.04%)	3,016	(198.81%)
Stormwater	(4,912)	(3,578)	(1,093)	(1,182)	89	(7.53%)	1,334	(27.16%)
Earnings (loss)	\$ (11,650)	\$ (4,434)	\$ 461	\$ (3,126)	\$ 3,587	(114.75%)	\$ 7,216	(61.94%)

The results in Table 7 are explained in more detail in Tables 8 to 10.

**Table 8: Operating Results by Service – Water:**

Operating Results by Service - Water									
	Notes	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
						\$ Change	% Change	\$ Change	% Change
Operating revenues	A	\$ 58,213	\$ 58,556	\$ 44,005	\$ 42,960	\$ 1,045	2.43%	\$ 343	0.59%
Operating expenditures	B	48,638	47,592	34,150	31,806	2,344	7.37%	(1,046)	(2.15%)
Earnings from operations		9,575	10,964	9,855	11,154	(1,299)	(11.65%)	1,389	14.51%
Financial and other revenues		495	578	456	414	42	10.14%	83	16.77%
Financial and other expenditures	C	15,291	13,897	10,459	9,733	726	7.46%	(1,394)	(9.12%)
(Loss) earnings for the year		\$ (5,221)	\$ (2,355)	\$ (148)	\$ 1,835	(1,983)	(108.07%)	2,866	(54.89%)

*Water services earnings* has decreased from the prior year by \$2.0 million due to the following factors:

- A) *Operating revenues* increase of \$1.0 million is attributable to the following:
  - i. Increase in base charges and consumption as a result of new customers.
  - ii. Increase in fire protection revenues of \$0.6 million as a result of a rate increase effective October 1, 2020.
  - iii. Increase in late payment fees of \$0.1 million as prior year fees were waived for part of the year as a result of COVID-19 relief measures.
  - iv. Increase in miscellaneous revenues of \$0.1 million mainly due to new meter reading fee allocated between water and wastewater services.
- B) Increase in *operating expenditures* of \$2.3 million as discussed previously including increases in salaries from wage rate increases and depreciation.
- C) Increase in *financial and other expenditures* of \$0.7 million due to higher debt servicing costs and the dividend/grant in lieu of taxes.

**Table 9: Operating Results by Service – Wastewater:**

Operating Results by Service - Wastewater									
	Notes	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
						\$ Change	% Change	\$ Change	% Change
Operating revenues	A	\$ 82,167	\$ 82,682	\$ 62,548	\$ 53,999	\$ 8,549	15.83%	\$ 515	0.63%
Operating expenditures	B	64,837	62,735	46,833	44,312	2,521	5.69%	(2,102)	(3.24%)
Earnings (loss) from operations		17,330	19,947	15,715	9,687	6,028	62.23%	2,617	15.10%
Financial and other revenues		196	187	111	151	(40)	(26.49%)	(9)	(4.59%)
Financial and other expenditures	C	19,043	18,635	14,124	13,617	507	3.72%	(408)	(2.14%)
Earnings (loss) for the year		\$ (1,517)	\$ 1,499	\$ 1,702	\$ (3,779)	5,481	(145.04%)	3,016	(198.81%)

*Wastewater services earnings* of \$1.7 million have increased from the prior year by \$5.5 million due to the following factors:

- A) *Operating revenues* increase of \$8.5 million is attributable to the following:
  - i. Increase in the wastewater discharge rate from \$1.753 to \$2.073 effective April 1, 2021.
  - ii. Increase in late payment fees of \$70k as prior year fees were waived for part of the year as a result of COVID-19 relief measures.
  - iii. Increase in miscellaneous revenues of \$70k mainly due to new meter reading fee allocated between water and wastewater services.
- B) Increase in *operating expenditures* of \$2.5 million as discussed previously including increases in salaries from wage rate increases and depreciation.
- C) Increase in *financial and other expenditures* of \$0.5 million due to higher debt servicing costs and the new dividend/grant in lieu of taxes on wastewater assets.

**Table 10: Operating Results by Service – Stormwater:**

Operating Results by Service - Stormwater									
	Notes	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
						\$ Change	% Change	\$ Change	% Change
Operating revenues	A	\$ 10,087	\$ 10,549	\$ 7,748	\$ 7,562	\$ 186	2.46%	\$ 462	4.58%
Operating expenditures	B	11,904	11,281	6,636	6,866	(230)	(3.35%)	(623)	(5.23%)
Earnings (loss) from operations		(1,817)	(732)	1,112	696	416	59.77%	1,085	(59.71%)
Financial and other revenues		31	18	14	28	(14)	(50.00%)	(13)	(41.94%)
Financial and other expenditures	C	3,126	2,864	2,219	1,906	313	16.42%	(262)	(8.38%)
Loss for the year		\$ (4,912)	\$ (3,578)	\$ (1,093)	\$ (1,182)	89	(7.53%)	1,334	(27.16%)

*Stormwater services loss* of \$1.1 million has decreased from the prior year by \$0.1 million due to the following factors:

- A) Increase of \$0.2 million in site generated revenue due to satellite imagery update and an increase in late payment fees of \$52k as prior year fees were waived for part of the year as a result of COVID-19 relief measures.
- B) Decrease in *operating expenditures* of \$0.2 million mainly due to decreases in salaries and benefits as resources are allocated between wastewater and stormwater collection offset by an increase in depreciation.

- C) Increase in *financial and other expenditures* of \$0.3 million due to higher debt servicing costs and the new dividend/grant in lieu of taxes on stormwater assets.

**Table 11: Financial and other revenues:**

Financial and other revenues									
	Notes	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
						\$ Change	% Change	\$ Change	% Change
Interest	A	\$ 173	\$ 163	\$ 129	\$ 178	\$ (49)	(27.53%)	\$ (10)	(6.13%)
Other	B	\$ 549	\$ 620	\$ 452	\$ 415	\$ 37	8.92%	\$ 71	12.93%
Total financial and other revenue		\$ 722	\$ 783	\$ 581	\$ 593	\$ (12)	(2.02%)	\$ 61	8.45%

**Notes related to Table 11:**

- A) *Interest* is lower than the prior year due to a decrease in interest rates.
- B) *Other revenues* include various un-regulated activities such as tower lease revenues, energy generation revenues, consulting activities and contracted service revenues. The increase in the forecast is mainly related to new source of revenue for the sale of wood.

**Table 12: Financial and other expenditures:**

Financial and other expenditures									
	Notes	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
						\$ Change	% Change	\$ Change	% Change
Interest on long term debt	B	\$ 7,603	\$ 6,822	\$ 5,334	\$ 5,400	\$ (66)	(1.22%)	\$ (781)	(11.45%)
Repayment on long term debt	B	\$ 22,716	\$ 21,559	\$ 16,160	\$ 15,309	\$ 851	5.56%	\$ (1,157)	(5.09%)
Amortization of debt discount	B	\$ 258	\$ 229	\$ 171	\$ 158	\$ 13	8.23%	\$ (29)	(11.24%)
Dividend/grant in lieu of taxes	C	\$ 6,837	\$ 6,626	\$ 4,970	\$ 4,350	\$ 620	14.25%	\$ (211)	(3.09%)
Other		\$ 46	\$ 160	\$ 167	\$ 39	\$ 128	328.21%	\$ 114	247.83%
Total financial and other expenditures	A	\$ 37,460	\$ 35,396	\$ 26,802	\$ 25,256	\$ 1,546	6.12%	\$ (2,064)	(5.51%)

**Notes related to Table 12:**

- A) *Financial and other expenditures* have increased \$1.5 million over the prior year mainly due to an increase in *long term debt payments* due to the acquisition of new debt and an increase in the *dividend/grant in lieu of taxes* due to additions to utility plant in service and a dividend of 0.25% on wastewater and stormwater rate based assets, effective October 1, 2020.
- B) *Long term debt appropriation expenditures (interest, repayment, and amortization)* are forecast to decrease \$2.0 million due to the budgeted debt issuance for this fiscal year being higher than actual debt acquired.
- C) *Dividend/grant in lieu of taxes* has been forecast to decrease \$0.2 million due to lower capital additions as at March 31, 2021 which drives the basis for the dividend.

**Table 13: Debt Servicing by Service:**

<b>Debt Servicing by Service</b>					
	Notes	2021/22 '000	2020/21 '000	\$ Change	% Change
<b>Water Services</b>					
Interest on long term debt		\$ 1,594	\$ 1,525	\$ 69	4.5%
Repayment on long term debt		4,365	4,012	353	8.8%
Amortization of debt discount		61	55	6	10.9%
<b>Total debt servicing cost - water services</b>	<b>A</b>	<b>\$ 6,020</b>	<b>\$ 5,592</b>	<b>\$ 428</b>	<b>7.7%</b>
<b>Wastewater Services</b>					
Interest on long term debt		\$ 3,186	\$ 3,359	\$ (173)	(5.2%)
Repayment on long term debt		10,248	9,954	294	3.0%
Amortization of debt discount		94	90	4	4.4%
<b>Total debt servicing cost - wastewater services</b>	<b>B</b>	<b>\$ 13,528</b>	<b>\$ 13,403</b>	<b>\$ 125</b>	<b>0.9%</b>
<b>Stormwater Services</b>					
Interest on long term debt		\$ 554	\$ 516	\$ 38	7.4%
Repayment on long term debt		1,547	1,343	204	15.2%
Amortization of debt discount		16	13	3	23.1%
<b>Total debt servicing cost - stormwater services</b>	<b>C</b>	<b>\$ 2,117</b>	<b>\$ 1,872</b>	<b>\$ 245</b>	<b>13.1%</b>

**Notes related to Table 13:**

- A) *Water debt servicing costs* of \$6.0 million have increased \$0.4 million from the prior year as a result of \$22.0 million in new debt.
- B) *Wastewater debt servicing costs* of \$13.5 million have increased \$0.1 million from the prior year as a result of \$13.4 million in new debt.
- C) *Stormwater debt servicing costs* of \$2.1 million have increased \$0.2 million from the prior year as a result of \$9.6 million in new debt.

**Table 14: Operating Results by Activity:**

<b>Operating Results by Activity</b>									
	Notes	Budget 2021/22 '000	Forecast 2021/22 '000	YTD 2021/22 '000	PYTD 2020/21 '000	From Prior Year		Budget to Forecast	
						\$ Change	% Change	\$ Change	% Change
Regulated activities	A	\$ (12,175)	\$ (4,779)	\$ 106	\$ (3,749)	\$ 3,855	(102.83%)	\$ 7,396	(60.75%)
Unregulated activities	B	525	345	355	623	(268)	(43.02%)	(180)	(34.29%)
Earnings (loss)		\$ (11,650)	\$ (4,434)	\$ 461	\$ (3,126)	\$ 3,587	(114.75%)	\$ 7,216	(61.94%)

**Notes related to Table 14:**

- A) *Regulated activities* earnings have increased from the prior year loss by \$3.9 million due to the factors as previously explained.
- B) *Unregulated activities* earnings of \$0.4 million have decreased \$0.3 million from the prior year due to an increase in operating costs for the leachate and dewatering facilities and allocation of administrative costs.

**Results under International Financial Reporting Standards (IFRS) as compared to NSUARB Handbook**

As a rate regulated utility, the Accounting Standards Board (AcSB) requires Halifax Water, to report financial results using IFRS. The NSUARB requires Halifax Water to report in accordance with the NSUARB Handbook. Table 15 below reconciles the results between IFRS and the NSUARB Handbook:

**Table 15: Reconciliation IFRS to NSUARB:**

<b>Reconcile IFRS to NSUARB</b>			
	<b>Notes</b>	<b>2021/22 '000</b>	<b>2020/21 '000</b>
IFRS comprehensive earnings		\$ 6,821	\$ 3,160
Add non-cash pension expense	<b>A</b>	8,678	7,653
Subtract debt principal payments	<b>B</b>	(16,160)	(15,309)
Add depreciation expense on contributed assets	<b>C</b>	13,901	14,096
Subtract amortization of contributed capital	<b>C</b>	(13,901)	(14,096)
Add various depreciation adjustments	<b>D</b>	1,122	1,370
NSUARB earnings (loss)		\$ 461	\$ (3,126)

**Notes related to Table 15:**

Operating revenues are the same under both IFRS and the NSUARB Handbook.

The main differences relate to reporting requirements surrounding the recognition of various expenditures as follows:

- A) *Non-cash pension expense* represents the accrual of unpaid contributions to the pension plan and is not considered an expense for NSUARB Handbook reporting purposes.
- B) The *principal payments* on long term debt are recognized as an expense for NSUARB Handbook reporting purposes but are not an expense under IFRS.
- C) *Depreciation expense on contributed assets* is not an expense for NSUARB Handbook purposes, however, it is offset by the removal of the amortization of contributed capital. IFRS requires *contributed capital* to be treated as a long term liability and amortized, resulting in higher long term liabilities and lower equity on the statement of financial position.
- D) The *various depreciation adjustments* include the add back of gains on the disposal of utility plant in service and IFRS requires componentization of assets and shorter useful lives resulting in higher depreciation than under NSUARB Handbook reporting.

**Table 16: Statement of Earnings and Comprehensive Earnings (IFRS):**

<b>Summarized Comprehensive Earnings</b>					
	<b>Notes</b>	<b>2021/22 '000</b>	<b>2020/21 '000</b>	<b>\$ Change</b>	<b>% Change</b>
Operating revenues	<b>A</b>	<b>\$ 114,301</b>	<b>\$ 104,521</b>	<b>\$ 9,780</b>	<b>9.4%</b>
Operating expenditures	<b>B</b>	<b>111,371</b>	<b>106,217</b>	<b>5,154</b>	<b>4.9%</b>
Earnings (loss) from operations before financial and other revenues and expenditures		<b>2,930</b>	<b>(1,696)</b>	<b>4,626</b>	<b>(272.8%)</b>
Financial and other revenues	<b>C</b>	<b>14,482</b>	<b>14,688</b>	<b>(206)</b>	<b>(1.4%)</b>
Financial and other expenditures	<b>D</b>	<b>10,399</b>	<b>9,640</b>	<b>759</b>	<b>7.9%</b>
Total comprehensive earnings for the year		<b>\$ 6,821</b>	<b>\$ 3,160</b>	<b>\$ 3,661</b>	<b>115.9%</b>

**Notes related to Table 16:**

Key indicators and balances from the Statement of Earnings and Comprehensive Earnings are as follows:

- A) *Operating revenues* of \$114.3 million are \$9.8 million higher than the prior year. Details have been discussed in preceding pages.
- B) *Operating expenditures* of \$111.4 million are \$5.2 million higher than the prior year. This is primarily the result of the following factors:
  - a. Increase in depreciation and amortization expense of \$1.0 million as a result of additions to utility plant in service.
  - b. Increase in accrued pension expense of \$1.0 million as a result of the actuarial extrapolation at year end, resulting in a higher estimate for this current fiscal year.
- C) *Financial and other revenues* have decreased \$0.2 million from the prior year relating to lower amortization of contributed capital.
- D) *Financial and other expenditures* have decreased \$0.8 million from the prior year. This is a result of gains on sale of vehicles offset by losses on disposal of other assets.

**Attachments**

Attachment 1: Operating Results for December 31, 2021

Attachment 2: Vendor Spend Report to December 31, 2021

Report prepared by:

**Alicia  
Scallion**

Alicia Scallion, CPA, CA  
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HALIFAX WATER  
UNAUDITED STATEMENT OF FINANCIAL POSITION - IFRS  
DECEMBER 31, 2021 (in thousands)

December 31 (in thousands)	2021	2020	March 31 2021	From Prior Year \$ Change	% Change
<b>Assets</b>					
Current					
Cash and cash equivalents	\$ 69,577	\$ 56,953	\$ 48,228	\$ 12,624	22.2%
Receivables					
Customers charges and contractual	15,513	17,287	17,155	(1,774)	(10.3%)
Unbilled service revenues	20,815	19,420	18,246	1,395	7.2%
Halifax Regional Municipality	0	0	2,711	0	0.0%
Inventory	2,202	2,185	2,003	17	0.8%
Prepays	2,039	829	1,570	1,210	146.0%
	110,146	96,674	89,913	13,472	13.9%
Intangible assets					
Capital work in progress	19,003	17,633	20,588	1,370	7.8%
Utility plant in service	69,555	55,339	30,908	14,216	25.7%
Total assets	1,243,730	1,245,029	1,280,283	(1,299)	(0.1%)
	1,442,434	1,414,675	1,421,692	27,759	2.0%
Regulatory deferral account	2,477	2,669	2,620	(192)	(7.2%)
<b>Total assets and regulatory deferral account</b>	<b>\$ 1,444,911</b>	<b>\$ 1,417,344</b>	<b>\$ 1,424,312</b>	<b>\$ 27,567</b>	<b>1.9%</b>
<b>Liabilities</b>					
Current					
Payables and accruals					
Trade	9,577	11,162	12,644	(1,585)	(14.2%)
Non-trade	4,870	4,614	6,192	256	5.5%
Interest on long term debt	1,427	1,508	2,065	(81)	(5.4%)
Halifax Regional Municipality	4,359	645	0	3,714	575.8%
Contractor and customer deposits	2,334	2,385	2,115	(51)	(2.1%)
Current portion of deferred contributed capital	14,580	14,488	14,580	92	0.6%
Current portion of long term debt	48,908	20,559	20,559	28,349	137.9%
Unearned revenue	2,972	3,026	561	(54)	(1.8%)
	89,027	58,387	58,716	30,640	52.5%
Deferred contributed capital	887,753	876,187	883,916	11,566	1.3%
Long term debt	175,219	204,054	204,106	(28,835)	(14.1%)
Employee benefit obligation	82,464	71,007	73,796	11,457	16.1%
Total liabilities	1,234,463	1,209,635	1,220,534	24,828	2.1%
Equity					
Accumulated other comprehensive loss	(29,682)	(26,452)	(29,682)	(3,230)	12.2%
Accumulated surplus	240,130	234,161	233,460	5,969	2.5%
Total equity	210,448	207,709	203,778	2,739	1.3%
<b>Total liabilities and equity</b>	<b>\$ 1,444,911</b>	<b>\$ 1,417,344</b>	<b>\$ 1,424,312</b>	<b>\$ 27,567</b>	<b>1.9%</b>

**UNAUDITED STATEMENT OF EARNINGS AND COMPREHENSIVE EARNINGS - ALL SERVICES - IFRS**

APRIL 1, 2021 - DECEMBER 31, 2021 (9 MONTHS)

**ACTUAL YEAR TO DATE COMPLETE: 75.00%**

	ACTUAL YEAR TO DATE		APR 1/21 MAR 31/22		APR 1/21 MAR 31/22		ACTUAL YEAR TO DATE	
	THIS YEAR	LAST YEAR	BUDGET	FORECAST	as % of BUDGET	as % of BUDGET	From Prior Year \$ Change	% Change
	'000	'000	'000	'000				
<b>Operating revenues</b>								
Water	\$ 36,636	\$ 36,378	\$ 48,423	\$ 48,654	75.66%	\$	258	0.71%
Wastewater	61,474	53,086	80,618	81,249	76.25%		8,388	15.80%
Stormwater	7,595	7,483	9,886	10,372	76.83%		112	1.50%
Public fire protection	5,721	5,410	7,628	7,628	75.00%		311	5.75%
Private fire protection	940	670	1,312	1,335	71.65%		270	40.30%
Other operating revenue	1,935	1,494	2,600	2,549	74.42%		441	29.52%
	<b>114,301</b>	<b>104,521</b>	<b>150,467</b>	<b>151,787</b>	<b>75.96%</b>		<b>9,780</b>	<b>9.36%</b>
<b>Operating expenditures</b>								
Water supply and treatment	8,045	7,377	10,778	10,575	74.64%		668	9.06%
Water transmission and distribution	8,574	8,491	11,876	11,778	72.20%		83	0.98%
Wastewater collection	10,635	10,266	12,604	12,348	84.38%		369	3.59%
Stormwater collection	3,298	3,774	5,885	5,037	56.04%		(476)	(12.61%)
Wastewater treatment	15,870	15,035	22,071	21,378	71.90%		835	5.55%
Engineering and technology services	8,144	6,905	12,931	13,421	62.98%		1,239	17.94%
Regulatory services	3,198	2,918	4,472	4,315	71.51%		280	9.60%
Customer services	3,518	3,644	5,837	4,996	60.27%		(126)	(3.46%)
Corporate services	2,200	139	3,124	3,124	70.42%		2,061	1482.73%
Administration services	2,742	4,570	4,928	4,725	55.64%		(1,828)	(40.00%)
Pension services	8,678	7,653	0	8,837	0.00%		1,025	13.39%
Depreciation and amortization	36,661	35,637	44,837	43,875	81.77%		1,024	2.87%
	<b>111,563</b>	<b>106,409</b>	<b>139,343</b>	<b>144,409</b>	<b>80.06%</b>		<b>5,154</b>	<b>4.84%</b>
<b>Earnings (loss) from operations before financial and other revenues and expenditures</b>	<b>2,738</b>	<b>(1,888)</b>	<b>11,124</b>	<b>7,378</b>	<b>24.61%</b>		<b>4,626</b>	<b>(245.02%)</b>
<b>Financial and other revenues</b>								
Interest	129	178	173	163	74.57%		(49)	(27.53%)
Amortization of contributed capital	13,901	14,096	13,964	13,964	99.55%		(195)	(1.38%)
Other	452	414	549	620	82.33%		38	9.18%
	<b>14,482</b>	<b>14,688</b>	<b>14,686</b>	<b>14,747</b>	<b>98.61%</b>		<b>(206)</b>	<b>(1.40%)</b>
<b>Financial and other expenditures</b>								
Interest on long term debt	5,334	5,400	7,603	6,822	70.16%		(66)	(1.22%)
Amortization of debt discount	171	158	258	229	66.28%		13	8.23%
Dividend/grant in lieu of taxes	4,970	4,350	6,837	6,626	72.69%		620	14.25%
Other	(76)	(268)	46	160	(165.22%)		192	(71.64%)
	<b>10,399</b>	<b>9,640</b>	<b>14,744</b>	<b>13,837</b>	<b>70.53%</b>		<b>759</b>	<b>7.87%</b>
<b>Total comprehensive earnings for the year</b>	<b>\$ 6,821</b>	<b>\$ 3,160</b>	<b>\$ 11,066</b>	<b>\$ 8,288</b>	<b>61.64%</b>		<b>\$ 3,661</b>	<b>115.85%</b>

**HALIFAX WATER**  
**UNAUDITED STATEMENT OF FINANCIAL POSITION - NSUARB**  
**DECEMBER 31, 2021 (in thousands)**

December 31 (in thousands)	2021	2020	March 31 2021	From Prior Year \$ Change	% Change
<b>Assets</b>					
Current					
Cash and cash equivalents	\$ 69,577	\$ 56,953	\$ 48,228	\$ 12,624	22.2%
Receivables					
Customer charges and contractual	15,513	17,287	17,155	(1,774)	(10.3%)
Unbilled service revenues	20,815	19,420	18,246	1,395	7.2%
Halifax Regional Municipality	0	0	2,711	0	0.0%
Inventory	2,202	2,185	2,003	17	0.8%
Prepays	2,039	829	1,570	1,210	146.0%
	110,146	96,674	89,913	13,472	13.9%
Capital work in progress	69,555	55,339	30,908	14,216	25.7%
Utility plant in service	1,298,142	1,295,439	1,334,519	2,703	0.2%
Total assets	1,477,843	1,447,452	1,455,340	30,391	2.1%
Regulatory deferral account	2,477	2,669	2,620	(192)	(7.2%)
<b>Total assets and regulatory deferral account</b>	<b>\$ 1,480,320</b>	<b>\$ 1,450,121</b>	<b>\$ 1,457,960</b>	<b>\$ 30,199</b>	<b>2.1%</b>
<b>Liabilities</b>					
Current					
Payables and accruals					
Trade	9,577	11,162	12,644	(1,585)	(14.2%)
Non-trade	4,870	4,614	6,192	256	5.5%
Interest on long term debt	1,427	1,508	2,065	(81)	(5.4%)
Halifax Regional Municipality	4,359	645	0	3,714	575.8%
Contractor and customer deposits	2,334	2,385	2,115	(51)	(2.1%)
Current portion of long term debt	48,908	20,559	20,559	28,349	137.9%
Unearned revenue	2,972	3,026	561	(54)	(1.8%)
	74,447	43,899	44,136	30,548	69.6%
Long term debt	175,219	204,054	204,106	(28,835)	(14.1%)
Deferred contributions	65,328	52,762	55,699	12,566	23.8%
Total liabilities	314,994	300,715	303,941	14,279	4.7%
<b>Equity</b>					
Accumulated capital surplus	1,114,485	1,097,530	1,103,616	16,955	1.5%
Accumulated operating surplus	38,000	42,622	47,906	(4,622)	(10.8%)
Operating surplus used to fund capital	12,380	12,380	12,380	0	0.0%
Deficiency of revenues over expenditures	461	(3,126)	(9,883)	3,587	(114.7%)
Total equity	1,165,326	1,149,406	1,154,019	15,920	1.4%
<b>Total liabilities and equity</b>	<b>\$ 1,480,320</b>	<b>\$ 1,450,121</b>	<b>\$ 1,457,960</b>	<b>\$ 30,199</b>	<b>2.1%</b>

HALIFAX WATER  
UNAUDITED STATEMENT OF EARNINGS - ALL SERVICES - NSUARB  
APRIL 1, 2021 - DECEMBER 31, 2021 (9 MONTHS)  
ACTUAL YEAR TO DATE COMPLETE: 75.00%

	ACTUAL YEAR TO DATE THIS YEAR '000	LAST YEAR '000	APR 1/21 MAR 31/22 BUDGET '000	APR 1/21 MAR 31/22 FORECAST '000	ACTUAL as % of BUDGET	ACTUAL YEAR TO DATE as % of FORECAST	From Prior Year \$ Change % Change	Actual to Forecast \$ Remaining % Remaining	Budget to Forecast \$ Change % Change
<b>Operating revenues</b>									
Water	\$ 36,636	\$ 36,378	\$ 48,423	\$ 48,654	75.66%	75.30%	\$ 258	\$ (12,018)	\$ 231
Wastewater	61,474	53,086	80,618	81,249	76.25%	75.66%	8,388	(19,775)	631
Stormwater site generated service	4,719	4,607	6,051	6,537	77.99%	72.19%	112	(1,818)	488
Stormwater right of way service	2,876	2,876	3,835	3,835	74.99%	74.99%	0	(959)	0
Fire protection (public and private)	6,661	6,080	8,940	8,963	74.51%	74.32%	581	(2,302)	23
Other services and fees	1,033	1,009	1,417	1,322	72.90%	78.14%	24	(289)	(95)
Late payment and other connection fees	382	162	563	550	72.90%	69.45%	220	(168)	(13)
Miscellaneous	520	323	620	677	83.87%	76.81%	197	(157)	57
	<b>114,301</b>	<b>104,521</b>	<b>150,467</b>	<b>151,787</b>	<b>75.96%</b>	<b>75.30%</b>	<b>9,780</b>	<b>(37,486)</b>	<b>1,320</b>
<b>Operating expenditures</b>									
Water supply and treatment	8,045	7,377	10,778	10,575	74.84%	76.08%	668	(2,530)	(203)
Water transmission and distribution	8,574	8,491	11,876	11,778	72.20%	72.80%	83	(3,204)	(98)
Wastewater collection	10,635	10,266	12,604	12,348	84.38%	86.13%	369	(1,713)	(256)
Stormwater collection	3,298	3,774	5,885	5,037	56.04%	65.48%	(476)	(1,739)	(848)
Wastewater treatment	15,870	15,035	22,071	21,378	71.90%	74.24%	835	(5,508)	(693)
Engineering and technology services	8,144	6,905	12,931	13,421	62.98%	60.68%	1,239	(5,277)	(490)
Regulatory services	3,198	2,918	4,472	4,315	71.51%	74.11%	280	(1,177)	(157)
Customer services	3,518	3,644	5,837	4,996	60.27%	70.42%	(126)	(1,478)	(841)
Corporate services	2,200	139	3,124	3,124	70.42%	70.42%	2,061	(924)	0
Administration services	2,742	4,570	4,928	4,725	55.64%	58.03%	(1,828)	(1,983)	(203)
Depreciation and amortization	21,395	19,865	30,873	29,911	69.30%	71.53%	1,530	(8,516)	(962)
	<b>87,619</b>	<b>82,984</b>	<b>125,379</b>	<b>121,608</b>	<b>69.88%</b>	<b>72.05%</b>	<b>4,635</b>	<b>(33,989)</b>	<b>(3,771)</b>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<b>26,682</b>	<b>21,537</b>	<b>25,088</b>	<b>30,179</b>	<b>106.35%</b>	<b>88.41%</b>	<b>5,145</b>	<b>(3,497)</b>	<b>5,091</b>
<b>Financial and other revenues</b>									
Interest	129	178	173	163	74.57%	79.14%	(49)	(34)	(10)
Other	452	415	549	620	82.33%	72.90%	37	(168)	71
	<b>581</b>	<b>593</b>	<b>722</b>	<b>783</b>	<b>80.47%</b>	<b>74.20%</b>	<b>(12)</b>	<b>(202)</b>	<b>61</b>
<b>Financial and other expenditures</b>									
Interest on long term debt	5,334	5,400	7,603	6,822	70.16%	78.19%	(66)	(1,488)	(781)
Repayment on long term debt	16,160	15,309	22,716	21,559	71.14%	74.96%	851	(5,399)	(1,157)
Amortization of debt discount	171	188	258	229	66.28%	74.67%	13	(56)	(29)
Dividend/grant in lieu of taxes	4,970	4,350	6,837	6,626	72.69%	75.01%	620	(1,656)	(211)
Other	167	39	46	160	363.04%	104.38%	128	7	114
	<b>26,802</b>	<b>25,256</b>	<b>37,460</b>	<b>35,396</b>	<b>71.55%</b>	<b>75.72%</b>	<b>1,546</b>	<b>(8,594)</b>	<b>(2,064)</b>
<b>Earnings (loss) for the year</b>	<b>\$ 461</b>	<b>\$ (3,126)</b>	<b>\$ (11,650)</b>	<b>\$ (4,434)</b>	<b>(3.96%)</b>	<b>(10.40%)</b>	<b>\$ 3,587</b>	<b>\$ 4,895</b>	<b>\$ 7,216</b>



HALIFAX WATER  
UNAUDITED STATEMENT OF EARNINGS - WASTEWATER - NSUARB  
APRIL 1, 2021 - DECEMBER 31, 2021 (9 MONTHS)  
ACTUAL YEAR TO DATE COMPLETE: 75.00%

	THIS YEAR '000	ACTUAL YEAR TO DATE LAST YEAR '000	APR 31/21 BUDGET '000	MAR 31/21 FORECAST '000	APR 1/20 BUDGET '000	MAR 31/21 FORECAST '000	ACTUAL YEAR TO DATE as % of BUDGET	ACTUAL YEAR TO DATE as % of FORECAST	From Prior Year \$ Change	% Change	Actual to Forecast \$ Remaining	% Remaining	Budget to Forecast \$ Change	% Change
<b>Operating revenues</b>														
Wastewater	\$ 61,474	\$ 53,086	\$ 80,618	\$ 81,249			76.25%	75.66%	\$ 8,388	15.80%	\$ (19,775)	(24.34%)	\$ 631	0.78%
Leachate and other contract revenue	346	303	484	482			71.49%	71.78%	43	14.19%	(136)	(28.22%)	(2)	(0.41%)
Septage tipping fees	397	393	505	465			78.61%	85.38%	4	1.02%	(68)	(14.62%)	(40)	(7.92%)
Overstrength surcharge	0	0	15	10			0.00%	0.00%	0	0.00%	(10)	(100.00%)	(5)	(33.33%)
Airplane effluent	3	28	76	35			3.95%	8.57%	(25)	(89.29%)	(32)	(91.43%)	(41)	(53.95%)
Late payment and other connection fees	143	69	222	202			64.41%	70.79%	74	107.25%	(59)	(29.21%)	(20)	(9.01%)
Miscellaneous	185	120	247	239			74.90%	77.41%	65	54.17%	(54)	(22.53%)	(8)	(3.24%)
	<b>62,548</b>	<b>53,999</b>	<b>82,167</b>	<b>82,682</b>			<b>76.12%</b>	<b>75.65%</b>	<b>8,549</b>	<b>15.83%</b>	<b>(20,134)</b>	<b>(24.35%)</b>	<b>515</b>	<b>0.83%</b>
<b>Operating expenditures</b>														
Wastewater collection	10,635	10,266	12,604	12,348			84.38%	86.13%	369	3.59%	(1,713)	(13.87%)	(256)	(2.03%)
Wastewater treatment	15,870	15,035	22,071	21,378			71.90%	74.24%	835	5.55%	(5,508)	(25.76%)	(693)	(3.14%)
Engineering and technology services	3,880	3,414	5,881	6,102			65.98%	63.59%	466	13.65%	(2,222)	(36.41%)	221	3.76%
Regulatory services	1,173	1,018	1,587	1,533			73.91%	76.52%	155	15.23%	(360)	(23.48%)	(54)	(3.40%)
Customer services	1,477	1,561	2,522	2,154			58.56%	68.57%	(84)	(5.38%)	(677)	(31.43%)	(368)	(14.59%)
Corporate services	934	0	1,318	1,318			70.86%	70.86%	934	0.00%	(384)	(29.14%)	0	0.00%
Administration services	1,160	2,149	2,079	1,993			55.80%	58.20%	(989)	(46.02%)	(833)	(41.80%)	(86)	(4.14%)
Depreciation and amortization	11,704	10,869	16,775	15,909			69.77%	73.57%	835	7.68%	(4,205)	(26.43%)	(866)	(5.16%)
	<b>46,833</b>	<b>44,312</b>	<b>64,837</b>	<b>62,735</b>			<b>72.23%</b>	<b>74.65%</b>	<b>2,521</b>	<b>5.69%</b>	<b>(15,902)</b>	<b>(25.35%)</b>	<b>(2,102)</b>	<b>(3.24%)</b>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<b>15,715</b>	<b>9,687</b>	<b>17,330</b>	<b>19,947</b>			<b>90.68%</b>	<b>78.78%</b>	<b>6,028</b>	<b>62.23%</b>	<b>(4,232)</b>	<b>(21.22%)</b>	<b>2,617</b>	<b>15.10%</b>
<b>Financial and other revenues</b>														
Interest	26	45	46	33			56.52%	78.79%	(19)	(42.22%)	(7)	(21.21%)	(13)	(28.26%)
Other	85	106	150	154			56.67%	55.19%	(21)	(19.81%)	(69)	(44.81%)	4	2.67%
	<b>111</b>	<b>151</b>	<b>196</b>	<b>187</b>			<b>56.63%</b>	<b>59.36%</b>	<b>(40)</b>	<b>(28.49%)</b>	<b>(76)</b>	<b>(40.64%)</b>	<b>(9)</b>	<b>(4.59%)</b>
<b>Financial and other expenditures</b>														
Interest on long term debt	3,186	3,359	4,196	3,999			75.93%	79.67%	(173)	(5.15%)	(813)	(20.33%)	(197)	(4.69%)
Repayment on long term debt	10,248	9,954	13,864	13,711			73.92%	74.74%	294	2.95%	(3,463)	(25.26%)	(153)	(1.10%)
Amortization of debt discount	94	90	133	126			70.68%	74.60%	4	4.44%	(32)	(25.40%)	(7)	(5.26%)
Dividend/grant in lieu of taxes	563	193	820	777			71.10%	75.03%	390	202.07%	(194)	(24.97%)	(43)	(5.24%)
Other	13	21	30	22			43.33%	59.09%	(8)	(38.10%)	(9)	(40.91%)	(8)	(26.67%)
	<b>14,124</b>	<b>13,617</b>	<b>19,043</b>	<b>18,635</b>			<b>74.17%</b>	<b>75.79%</b>	<b>507</b>	<b>3.72%</b>	<b>(4,511)</b>	<b>(24.21%)</b>	<b>(408)</b>	<b>(2.14%)</b>
<b>Earnings (loss) for the year</b>	<b>\$ 1,702</b>	<b>\$ (3,779)</b>	<b>\$ (1,517)</b>	<b>\$ 1,499</b>			<b>(112.20%)</b>	<b>113.54%</b>	<b>\$ 5,481</b>	<b>(145.04%)</b>	<b>\$ 203</b>	<b>13.54%</b>	<b>\$ 3,016</b>	<b>(198.81%)</b>

HALIFAX WATER											
UNAUDITED STATEMENT OF EARNINGS - STORMWATER - NSUARB											
APRIL 1, 2021 - DECEMBER 31, 2021 (9 MONTHS)											
ACTUAL YEAR TO DATE COMPLETE: 75.00%											
	ACTUAL YEAR TO DATE THIS YEAR		APR 1/20 MAR 31/21		APR 1/20 MAR 31/21		ACTUAL YEAR TO DATE as % of BUDGET		ACTUAL YEAR TO DATE as % of FORECAST		
	'000	'000	'000	'000	'000	'000					
<b>Operating revenues</b>											
Stormwater site generated service	\$ 4,719	\$ 4,607	\$ 6,051	\$ 6,537			77.99%	72.19%			
Stormwater right of way service	2,876	2,876	3,835	3,835			74.99%	74.99%			
Late payment and other connection fees	55	3	104	89			52.88%	61.80%			
Miscellaneous	98	76	97	88			101.03%	111.36%			
	<b>7,748</b>	<b>7,562</b>	<b>10,087</b>	<b>10,549</b>			<b>76.81%</b>	<b>73.45%</b>			
<b>Operating expenditures</b>											
Stormwater collection	3,298	3,774	5,885	5,037			56.04%	65.48%			
Engineering and technology services	468	381	1,396	1,438			33.52%	32.55%			
Regulatory services	1,128	1,111	1,684	1,603			66.98%	70.37%			
Customer services	201	196	341	297			58.94%	67.68%			
Corporate services	152	0	214	214			71.03%	71.03%			
Administration services	189	349	338	324			55.92%	58.33%			
Depreciation and amortization	1,200	1,055	2,046	2,368			58.65%	50.88%			
	<b>6,636</b>	<b>6,866</b>	<b>11,904</b>	<b>11,281</b>			<b>55.75%</b>	<b>58.82%</b>			
<b>Earnings from operations before financial and other revenues and expenditures</b>	<b>1,112</b>	<b>696</b>	<b>(1,817)</b>	<b>(732)</b>			<b>(61.20%)</b>	<b>(151.91%)</b>			
<b>Financial and other revenues</b>											
Interest	14	28	31	18			45.16%	77.78%			
	<b>14</b>	<b>28</b>	<b>31</b>	<b>18</b>			<b>45.16%</b>	<b>77.78%</b>			
<b>Financial and other expenditures</b>											
Interest on long term debt	554	516	791	720			70.04%	76.94%			
Repayment on long term debt	1,547	1,343	2,156	1,986			71.75%	77.90%			
Amortization of debt discount	16	13	25	22			64.00%	72.73%			
Dividend/grant in lieu of taxes	102	34	154	136			66.23%	75.00%			
	<b>2,219</b>	<b>1,906</b>	<b>3,126</b>	<b>2,864</b>			<b>70.99%</b>	<b>77.48%</b>			
<b>Loss for the year</b>	<b>\$ (1,093)</b>	<b>\$ (1,182)</b>	<b>\$ (4,912)</b>	<b>\$ (3,578)</b>			<b>22.25%</b>	<b>30.55%</b>			

## UNAUDITED STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB

ACTUAL YEAR TO DATE COMPLETE: 75.00%

## REGULATED ACTIVITIES



HALIFAX WATER  
UNAUDITED STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB  
APRIL 1, 2021 - DECEMBER 31, 2021 (9 MONTHS)  
ACTUAL YEAR TO DATE COMPLETE: 75.00%

	ACTUAL YEAR TO DATE		APR 1/20 MAR 31/21		APR 1/20 MAR 31/21		ACTUAL as % of BUDGET		ACTUAL as % of FORECAST		From Prior Year		Actual to Forecast		Budget to Forecast	
	'000	'000	'000	'000	'000	'000	'000	'000	'000	'000	\$ Change	% Change	\$ Remaining	% Remaining	\$ Change	% Change
<b>UNREGULATED ACTIVITIES</b>																
<b>Operating revenues</b>																
Seepage tipping fees	\$ 397	\$ 393	\$ 505	\$ 465			78.61%		85.38%		\$ 4	1.02%	\$ (68)	(14.62%)	\$ (40)	(7.92%)
Leachate and other contract revenue	346	303	484	482			71.49%		71.78%		43	14.19%	(136)	(28.22%)	(2)	(0.41%)
Airplane effluent	3	28	76	35			3.95%		8.57%		(25)	(89.29%)	(32)	(91.43%)	(41)	(53.95%)
Miscellaneous	29	24	38	38			76.32%		76.32%		5	20.83%	(9)	(23.68%)	0	0.00%
	<b>775</b>	<b>748</b>	<b>1,103</b>	<b>1,020</b>			<b>70.26%</b>		<b>75.98%</b>		<b>27</b>	<b>3.61%</b>	<b>(245)</b>	<b>(24.02%)</b>	<b>(83)</b>	<b>(7.32%)</b>
<b>Operating expenditures</b>																
Water supply and treatment	30	10	32	32			93.75%		93.75%		20	200.00%	(2)	(6.25%)	0	0.00%
Wastewater treatment	527	377	759	759			69.43%		69.43%		150	39.79%	(232)	(30.57%)	0	0.00%
Wastewater collection	15	35	88	88			17.05%		17.05%		(20)	(57.14%)	(73)	(82.95%)	0	0.00%
Sponsorships and donations	5	56	0	0			0.00%		0.00%		(51)	(91.07%)	5	0.00%	0	0.00%
Corporate services	13	0	13	13			100.00%		100.00%		13	0.00%	0	0.00%	0	0.00%
Administration services	84	0	97	97			86.60%		86.60%		84	0.00%	(13)	(13.40%)	0	0.00%
Depreciation and amortization	13	13	18	18			72.22%		72.22%		0	0.00%	(5)	(27.78%)	0	0.00%
	<b>687</b>	<b>491</b>	<b>1,007</b>	<b>1,007</b>			<b>68.22%</b>		<b>68.22%</b>		<b>196</b>	<b>39.92%</b>	<b>(320)</b>	<b>(31.78%)</b>	<b>0</b>	<b>0.00%</b>
<b>Earnings from operations before financial and other revenues and expenditures</b>	<b>88</b>	<b>257</b>	<b>96</b>	<b>13</b>			<b>91.67%</b>		<b>676.92%</b>		<b>(169)</b>	<b>(65.76%)</b>	<b>75</b>	<b>576.92%</b>	<b>(83)</b>	<b>(86.46%)</b>
<b>Financial and other revenues</b>																
Other - leases and rentals	301	242	321	338			93.77%		89.05%		59	24.38%	(37)	(10.95%)	17	5.30%
Other - energy projects	133	163	189	189			70.37%		70.37%		(30)	(18.40%)	(56)	(29.63%)	0	0.00%
	<b>434</b>	<b>405</b>	<b>510</b>	<b>527</b>			<b>85.10%</b>		<b>82.35%</b>		<b>29</b>	<b>7.16%</b>	<b>(93)</b>	<b>(17.65%)</b>	<b>17</b>	<b>3.33%</b>
<b>Financial and other expenditures</b>																
Other	167	39	81	195			206.17%		85.64%		128	328.21%	(28)	(14.36%)	114	140.74%
	<b>167</b>	<b>39</b>	<b>81</b>	<b>195</b>			<b>206.17%</b>		<b>85.64%</b>		<b>128</b>	<b>328.21%</b>	<b>(28)</b>	<b>(14.36%)</b>	<b>114</b>	<b>140.74%</b>
	<b>\$ 355</b>	<b>\$ 623</b>	<b>\$ 525</b>	<b>\$ 345</b>			<b>67.62%</b>		<b>102.90%</b>		<b>\$</b>	<b>(43.02%)</b>	<b>\$ 10</b>	<b>2.90%</b>	<b>\$ (180)</b>	<b>(34.29%)</b>
<b>Earnings for the year - Unregulated</b>																
<b>Total earnings (loss) for the year (Regulated and Unregulated)</b>	<b>\$ 461</b>	<b>\$ (3,126)</b>	<b>\$ (11,650)</b>	<b>\$ (4,434)</b>			<b>(3.96%)</b>		<b>(10.40%)</b>		<b>\$ 3,587</b>	<b>(114.75%)</b>	<b>\$ 4,895</b>	<b>(110.40%)</b>	<b>\$ 7,216</b>	<b>(61.94%)</b>

**ITEM # 4.1**  
**ATTACHMENT 2**

HALIFAX REGIONAL WATER COMMISSION  
Reporting Periods - April to Dec 31, 2021

CoCd	Recon acct	Vendor	Name 1	Country	PostalCode	City	Street	Rg	Crcy	Purchasing
HRWC	2110	54	HALIFAX REGIONAL MUNICIPALITY	CA	B3J 3A5	HALIFAX		NS	CAD	14,373,480.09
HRWC	2020	146	NS POWER INC.	CA	B3J 2W5	HALIFAX	P.O. BOX 910	NS	CAD	6,484,497.52
HRWC	2020	1215	THE NORTHERN TRUST COMPANY	CA	M5H 1J8	TORONTO	145 KING STREET WEST, SUITE 1910	ON	CAD	5,125,503.83
HRWC	2020	559	BRYCON CONSTRUCTION LTD.	CA	B2Y 4P4	DARTMOUTH	67 ATLANTIC ST	NS	CAD	4,035,968.65
HRWC	2020	109	DEXTER CONSTRUCTION COMPANY LI	CA	B4A 3Z2	BEDFORD		NS	CAD	3,505,504.91
HRWC	2020	1151	N-VIRO SYSTEMS CANADA LP	CA	B2T 1K3	GOFFS	350 AEROTECH PARK DR	NS	CAD	3,044,156.02
HRWC	2020	1689	LANDMARK STRUCTURES CO.	CA	L7R 3X4	BURLINGTON	3091 HARRISON COURT	ON	CAD	2,762,274.98
HRWC	2020	133	CHEMTRADE	CA	M5W 1P8	TORONTO		ON	CAD	2,197,379.19
HRWC	2020	2732	N HARRIS COMPUTER CORPORATION	CA	K2E 8C4	OTTAWA	1 ANLARES DRIVE, SUITE 400	ON	CAD	2,056,887.09
HRWC	2020	2251	ATLANTIC ROAD CONSTRUCTION & P	CA	B3G 1M7	EASTERN PASSAGE		NS	CAD	1,818,519.73
HRWC	2020	447	HARBOUR CONSTRUCTION COMPANY L	CA	B3B 1L3	DARTMOUTH	40 ISLEY AVE	NS	CAD	1,727,253.24
HRWC	2020	1715	INSITUFORM TECHNOLOGIES LIMITE	CA	T6P 1N9	EDMONTON	7605 18TH STREET	AB	CAD	1,724,852.41
HRWC	2020	277	SACKVILLE TRENCHING LTD	CA	B4C 3G4	LOWER SACKVILLE		NS	CAD	1,700,055.77
HRWC	2020	2180	EASTERN TRAFFIC SERVICES LIMIT	CA	B4A 3Z2	BEDFORD	927 ROCKY LAKE DRIVE	NS	CAD	1,582,935.28
HRWC	2020	111	G & R KELLY ENTERPRISES LTD.	CA	B4B 1B1	BEDFORD	738 HAMMONDS PLAINS ROAD	NS	CAD	1,489,327.47
HRWC	2020	403	CBCL LIMITED	CA	B3J 2R7	HALIFAX		NS	CAD	1,473,585.03
HRWC	2020	2	BLACK & MCDONALD LTD.	CA	B3B 1Z6	DARTMOUTH	10 PAYZANT AVENUE	NS	CAD	1,323,446.87
HRWC	2020	2797	AMG ENVIRONMENTAL INC	CA	L4N 9J5	BARRIE	494 VETERANS DR, UNIT 12	ON	CAD	1,312,064.90
HRWC	2020	3342	EASTERN TRENCHLESS LTD.	CA	E3B 5N8	FREDERICTON	711 WOODSTOCK RD	NB	CAD	1,265,004.63
HRWC	2020	340	MEDAVIE BLUE CROSS	CA	E1C 8L3	MONCTON		NB	CAD	1,031,484.82
HRWC	2020	2476	CGI INFORMATION SYSTEMS AND MG	CA	E3C 2R2	FREDERICTON	30 KNOWLEDGE PARK DRIVE - SUITE #30	NB	CAD	824,032.53
HRWC	2020	283	W. ERIC WHEBBY LTD.	CA	B3B 1W2	DARTMOUTH	201 BROWNLOW AVE., UNIT 57	NS	CAD	804,814.25
HRWC	2020	1216	THE NORTHERN TRUST COMPANY	CA	M5H 1J8	TORONTO	145 KING STREET WEST, SUITE 1910	ON	CAD	781,394.57
HRWC	2020	147	BRENNTAG CANADA INC.	CA	M8Z 2G6	TORONTO	43 JUTLAND ROAD	ON	CAD	770,629.99
HRWC	2020	1249	SNF CANADA LIMITED	CA	L4L 3Z5	VAUGHAN	4 DIRECTOR COURT, SUITE 101	ON	CAD	756,464.25
HRWC	2020	3101	MEDAVIE INC. (LTD & LIFE)	CA	E1C 8L3	MONCTON	644 MAIN STREET	NB	CAD	746,021.25
HRWC	2020	262	OCEAN CONTRACTORS LIMITED	CA	B2Y 3Y9	DARTMOUTH		NS	CAD	684,126.53
HRWC	2020	696	MINISTER OF FINANCE FOR NS	CA	B3J 2V2	HALIFAX	HALIFAX CENTRAL	NS	CAD	676,895.19
HRWC	2020	18	ATLANTIC PURIFICATION SYSTEM	CA	B2Y 3Z5	DARTMOUTH		NS	CAD	641,771.32
HRWC	2020	99	IMP GROUP LIMITED	CA	B3L 4T1	HALIFAX	2651 JOSEPH HOWE DRIVE, STE 400	NS	CAD	636,219.91
HRWC	2020	1821	WEST BEDFORD HOLDINGS LIMITED	CA	B3M 4G2	HALIFAX	255 LACEWOOD DRIVE, SUITE 100C	NS	CAD	629,909.03
HRWC	2020	1824	BULLETPROOF SOLUTIONS INC.	CA	E3C 2N5	FREDERICTON	25 ALISON BLVD	NB	CAD	615,218.47
HRWC	2020	1	ONE TIME VENDOR	CA					CAD	606,852.94
HRWC	2020	2299	VEOLIA WATER SOLUTIONS & TECHN	CA	H4S 2B3	SAINT-LAURENT	4105 RUE SARTELON	QC	CAD	602,554.22
HRWC	2020	3069	FOAM & COATING PROS LIMITED	CA	B0N 2T0	WINDSOR	6536 HWY #14, RR #1	NS	CAD	600,633.47
HRWC	2020	3124	PIVOT CONSULTING INC.	CA	B3J 1P3	HALIFAX	5251 DUKE ST, SUITE 1210, DUKE TOWE	NS	CAD	573,355.82
HRWC	2020	620	BARRINGTON CONSULTING GROUP IN	CA	B3J 3R7	HALIFAX	1696 UPPER WATER STREET, TWR 2, STE	NS	CAD	567,420.52
HRWC	2020	953	MCCARTHY'S ROOFING LTD.	CA	B2W 3V1	DARTMOUTH	850 MAIN STREET	NS	CAD	545,839.02
HRWC	2020	2454	BOURQUE SECURITY SERVICES	CA	B3S 1B5	HALIFAX	55 CRANE LAKE DR	NS	CAD	543,669.20
HRWC	2020	1940	MICROSOFT LICENSING, GP	US	89511	RENO	6100 NEIL RD STE 210	NV	CAD	526,271.33
HRWC	2020	246	ALPHA CHEMICAL LTD	CA	B3B 1K2	DARTMOUTH	40 PETTIPAS DRIVE	NS	CAD	481,194.02
HRWC	2020	2828	ONX ENTERPRISE SOLUTIONS LTD	CA	L3T 7V8	THORNHILL	165 COMMERCE VALLEY DR W. #300	ON	CAD	451,126.29
HRWC	2020	754	ELMSDALE LANDSCAPING LTD.	CA	B2S 1K7	ELMSDALE	113 ELMSDALE ROAD	NS	CAD	443,151.40
HRWC	2020	370	MCLENNAN SALES (EMCO)	CA	N5W 3A7	LONDON	1108 DUNDAS STREET	ON	CAD	441,525.35
HRWC	2020	1976	WSP CANADA INC.	CA	H3C 5Z8	MONTREAL	SUCCURSALE CENTRE-VILLE	QC	CAD	440,907.26
HRWC	2020	2421	TELUS CORPORATION	CA	L7R 458	BURLINGTON		ON	CAD	426,705.42
HRWC	2020	1447	OLSEN'S MECHANICAL LIMITED	CA	B0N 2T0	WINDSOR	88 SANFORD DRIVE	NS	CAD	422,479.28
HRWC	2020	77	ESRI CANADA LIMITED	CA	M3C 3R8	TORONTO	12 CONCORDE PLACE	ON	CAD	415,340.99
HRWC	2020	649	ENVIROSYSTEMS (TERRAPURE)	CA	B3B 1Z7	DARTMOUTH	11 BROWN AVENUE	NS	CAD	393,394.79
HRWC	2020	41	BUREAU VERITAS CANADA (2019) I	CA	M5W 5V2	TORONTO	P O BOX 4269, POSTAL STN A	ON	CAD	379,076.47
HRWC	2020	349	NS UTILITY & REVIEW BOARD	CA	B3J 353	HALIFAX	PO BOX 1692 UNIT M	NS	CAD	377,744.88
HRWC	2020	2215	CORNELL VIDEO INSPECTIONS	CA	B3B 1H5	DARTMOUTH	9 RALSTON AVENUE	NS	CAD	369,412.48
HRWC	2020	297	C.R. FALKENHAM	CA	B4A 1N4	BEDFORD	8 LINDSAY HILL	NS	CAD	364,288.27
HRWC	2020	1245	AIR LIQUIDE CANADA INC	CA	B2Y 3Z7	DARTMOUTH	180 AKERLEY BLVD	NS	CAD	354,559.25
HRWC	2020	394	DALHOUSIE UNIVERSITY	CA	B3H 4H6	HALIFAX	FINANCIAL SERVICES	NS	CAD	345,282.07
HRWC	2020	505	WOLSELEY CANADA - MECHANICAL G	CA	L7N 3V6	BURLINGTON	880 LAURENTIAN DR	ON	CAD	331,211.77
HRWC	2020	645	CANADA POST CORPORATION	CA	K1A 1L7	OTTAWA	2701 RIVERSIDE DRIVE	ON	CAD	320,728.10
HRWC	2020	2095	EASTPOINT ENGINEERING LIMITED	CA	B3J 3N4	HALIFAX	1801 HOLLIS ST - SUITE #1500	NS	CAD	314,190.36
HRWC	2020	98	GRAYMONT (NB) INC.	CA	M5W 5V2	TORONTO		ON	CAD	314,017.26
HRWC	2020	2690	DESIGNPOINT ENGINEERING & SURV	CA	B4A 4J4	BEDFORD	200 WATERFRONT DR	NS	CAD	310,672.96
HRWC	2020	1287	STANTEC CONSULTING LTD.	CA	T2P 2J2	CALGARY	C/O LOCKBOX 310260, BOX 578 STN M	AB	CAD	306,531.18
HRWC	2020	3521	R.V. ANDERSON ASSOCIATES LTD	CA	M2J 4Z8	TORONTO	2001 SHEPPARD AVENUE EAST SUITE 300	ON	CAD	302,984.57
HRWC	2020	264	XYLEM WATER SOLUTIONS	CA	H9R 4V5	POINT-CLAIRE	300 LABROSSE AVE	QC	CAD	302,321.01
HRWC	2020	2926	ITRON CANADA INC	US	99019	LIBERTY LAKE	2111 N MOLTER RD	WA	CAD	292,838.67
HRWC	2020	47	CN NON FREIGHT	CA	M5W 5S5	TORONTO		ON	CAD	292,238.12
HRWC	2020	352	CARUS CORPORATION	US	60693	CHICAGO	1555 COLLECTIONS CENTER DR	IL	CAD	283,746.46
HRWC	2020	1565	LAURENTIDE CONTROLS	CA	H9J 4A1	KIRKLAND	18000 RTE TRANSCANADIENNE	QC	CAD	262,174.56
HRWC	2020	2371	BELL CANADA	CA	L4W 5R1	MISSISSAUGA	5115 CREEKBANK RD, E3-M2	ON	CAD	259,159.23
HRWC	2020	816	J.W. LINDSAY ENTERPRISES LTD.	CA	B3B 1E2	DARTMOUTH	22 FIELDING AVENUE	NS	CAD	254,345.23
HRWC	2020	1000	WESTERN PLUMBING & HEATING LTD	CA	B2Y 3Z3	DARTMOUTH		NS	CAD	251,959.05
HRWC	2020	2886	SNT SOLUTIONS INC	CA	B4B 1P7	HAMMONDS PLAINS	1411 LUCASVILLE RD	NS	CAD	250,990.72
HRWC	2020	1551	MACHPHEE FORD SALES	CA	B2W 3M3	DARTMOUTH	580 PORTLAND ST	NS	CAD	250,483.80
HRWC	2020	68	SOURCE ATLANTIC	CA	E2L 4E4	SAINT JOHN		NB	CAD	240,740.89
HRWC	2020	3577	MINDWIRE SYSTEMS LTD	CA	K1Z 8P9	OTTAWA	1545 CARLING AVENUE - SUITE 308	ON	CAD	240,083.20
HRWC	2020	1421	ATLANTICA MECHANICAL CONTRACTO	CA	B3B 1H5	DARTMOUTH	9 RALSTON AVENUE	NS	CAD	234,361.74
HRWC	2020	95	MUNICIPAL ENTERPRISES LIMITED	CA	B4A 3Z2	BEDFORD		NS	CAD	218,597.84
HRWC	2020	1392	L & R CONSTRUCTION LIMITED	CA	B0N 2J0	STEWIACKE	75 RIVER PARK RD., RR#2	NS	CAD	216,976.36
HRWC	2020	2892	Suez Treatment Solutions Inc	US	23255	Richmond		VA	CAD	213,835.33
HRWC	2020	127	SANSOM EQUIPMENT LTD	CA	B2N 6W8	TRURO	100 UPHAM DRIVE	NS	CAD	212,289.12
HRWC	2020	3184	MUSIAL'S COMPUTER CONSULTING I	CA	B1T 1N9	BEAVER COVE	5192 GRAND NARROWS HWY	NS	CAD	207,055.45
HRWC	2020	1989	RASMUSSEN'S WELDING LTD.	CA	B2X 3G8	DARTMOUTH	16 CAPRI COURT	NS	CAD	205,735.64
HRWC	2020	959	WATCHDOG SECURITY SYSTEMS	CA	B3M 4H4	HALIFAX		NS	CAD	200,663.85
HRWC	2020	829	JOE JOHNSON EQUIPMENT INC.	CA	L9S 3V6	INNISFIL	2521 BOWMAN STREET	ON	CAD	197,304.35
HRWC	2020	51	LINDE	CA	H3B 3L2	MONTREAL		QC	CAD	194,587.76
HRWC	2020	263	MCINNES COOPER	CA	B3J 3R7	HALIFAX	1969 UPPER WATER ST	NS	CAD	191,608.61
HRWC	2020	3558	PSD CITYWIDE INC	CA	N6A 5P3	LONDON	148 FULLARTON ST, 9TH FLOOR	ON	CAD	189,980.00

HALIFAX REGIONAL WATER COMMISSION  
Reporting Periods - April to Dec 31, 2021

CoCd	Recon acct	Vendor	Name 1	Country	PostalCode	City	Street	Rg	Crcy	Purchasing
HRWC	2020	3480	ENVIROGEM INC	CA	L5M 5L5	MISSISSUAGA	2529 RAGLAN COURT	ON	CAD	189,819.48
HRWC	2020	860	UNIVAR CANADA LTD.	CA	M5W 0B8	TORONTO	PO BOX 4910, STATION A	ON	CAD	189,262.43
HRWC	2020	92	BATTLEFIELD EQUIPMENT RENTALS	CA	B3B 2B1	DARTMOUTH	185 AKERLEY BLVD	NS	CAD	188,229.45
HRWC	2020	2463	MARINER PARTNERS INC	CA	E2L 5G5	SAINT JOHN	12 SMYTHE STREET, 3RD FLOOR	NB	CAD	188,177.95
HRWC	2020	2289	DALE FABRICATION INC.	CA	B4E 3C1	UPPER SACKVILLE	43 CARIBOU ROAD	NS	CAD	184,928.74
HRWC	2020	2367	GIL-SON CONSTRUCTION LTD.	CA	B3T 1P3	GOODWOOD	1 MILLS DRIVE	NS	CAD	184,599.37
HRWC	2020	549	ROBINSON CONSULTANTS	CA	K2V 1A8	KANATA	350 PALLADIUM DRIVE	ON	CAD	183,719.03
HRWC	2020	320	IRVING ENERGY DISTRIBUTION & M	CA	E2L 4C3	SAINT JOHN		NB	CAD	182,773.80
HRWC	2020	2199	DITCH DOCTOR ATLANTIC LIMITED	CA	B0M 1G0	GLENHOLME	2896 HIGHWAY #4	NS	CAD	179,687.50
HRWC	2020	1126	EVOQUA WATER TECHNOLOGIES LLC	US	30022	ALPHARETTA	4800 NORTHPOINT PARKWAY - SUITE #25	GA	CAD	164,068.83
HRWC	2020	2298	FILTRUM CONSTRUCTION	CA	G1M 1B3	QUEBEC	430 RUE DES ENTREPRENEURS	QC	CAD	154,241.23
HRWC	2020	3517	CUPE NATIONAL (LOCAL 227)	CA	K1G 0Z7	OTTAWA	1375 ST.LAURENT BLVD	ON	CAD	151,565.93
HRWC	2020	2940	LABATT BREWING COMPANY LIMITED	CA	M5J 1A7	TORONTO	207 QUEEN'S QUAY WEST, SUITE 299	ON	CAD	151,433.07
HRWC	2020	867	MITCHELMORE ENGINEERING	CA	B3S 1S8	DARTMOUTH	109 ILSLEY AVE, UNIT 14	NS	CAD	150,190.65
HRWC	2020	3202	NOVA SPATIAL	CA	B4A 3R4	BEDFORD	130 BEDFORD HILLS ROAD	NS	CAD	148,631.20
HRWC	2020	332	SUEZ WATER TECHNOLOGIES & SOLU	CA	H3C 5H1	MONTREAL		QC	CAD	145,579.87
HRWC	2020	3652	KLIR INC	US	89501	RENO	1 E LIBERTY ST #600	NV	CAD	144,900.00
HRWC	2020	128	BELL ALIANT MOBILITY INC	CA	L7R 4R7	BURLINGTON		ON	CAD	144,236.98
HRWC	2020	1272	ROYAL ENVIRONMENTAL INC	CA	B3M 2T2	HALIFAX	209 KEARNEY LAKE DRIVE	NS	CAD	142,315.87
HRWC	2020	3640	ADS ENVIRONMENTAL TECHNOLOGIES	US	35806	HUNTVILLE	340 BRIDGE STREET - SUITE 204	AL	CAD	140,587.50
HRWC	2020	305	TOROMONT CAT	CA	B2Y 3Z6	DARTMOUTH	P.O. BOX 953	NS	CAD	137,463.18
HRWC	2020	934	L & B ELECTRIC LTD.	CA	B4V 3V4	BRIDGEWATER	94 WENTZELL DRIVE	NS	CAD	137,274.60
HRWC	2020	3136	GARTNER CANADA CO.	CA	M2N 7E9	TORONTO	5000 YONGE ST, 14TH FLOOR, SUITE 14	ON	CAD	137,195.00
HRWC	2020	3565	AVERTRA CORP	US	20170	HERNDON	580 HERNDON PARKWAY	VA	CAD	135,752.64
HRWC	2020	1347	NATIONAL PROCESS EQUIPMENT INC	CA	B3B 1L5	DARTMOUTH	95 IISLEY AVENUE UNIT C	NS	CAD	133,329.66
HRWC	2020	2883	VALMET LTD	CA	H4R 2B2	ST LAURENT	4900 BOULTHIMENS	QC	CAD	131,206.26
HRWC	2020	3260	ENGLOBE CORP.	CA	B3R 2A7	DARTMOUTH	97 TROOP AVE	NS	CAD	131,074.53
HRWC	2020	364	ACKLANDS GRAINGER INC.	CA	R3C 4B5	WINNIPEG		MB	CAD	131,052.78
HRWC	2020	3458	CHERWELL SOFTWARE LLC	US	80908	COLORADO SPRINGS	10125 FEDERAL DRIVE SUITE 100	CO	CAD	127,717.12
HRWC	2020	153	NORTHEAST EQUIPMENT LIMITED	CA	B3B 1W1	DARTMOUTH	135 JOSEPH ZATZMAN DRIVE	NS	CAD	126,668.39
HRWC	2020	367	CONRAD BROTHERS LTD	CA	B2W 3Y2	DARTMOUTH	PO BOX 2129 DARTMOUTH EAST	NS	CAD	125,901.35
HRWC	2020	2839	ROGERS ELECTRIC & MACHINE	CA	E2A 4W7	BATHURST	1990 CONNOLLY AVE	NB	CAD	125,151.89
HRWC	2020	2488	BLUEROCK CONSTRUCTION	CA	B3E 1C6	LAKE ECHO	3416 HIGHWAY #7	NS	CAD	124,535.57
HRWC	2020	2649	C & C SAFETY & COMPLIANCE SERV	CA	B3M 4X2	HALIFAX	64 BEDROS LANE, APT 603	NS	CAD	117,113.22
HRWC	2020	1468	MEGA-LAB MANUFACTURING CO.LTD	CA	L4K 5R2	CONCORD	361 CONNIE CRESCENT, UNIT B	ON	CAD	109,504.63
HRWC	2020	548	IMPERIAL CLEANERS LTD.	CA	B2W 6B2	DARTMOUTH	PO BOX 21057	NS	CAD	106,938.50
HRWC	2020	159	P.S.C. EMPLOYEES' CREDIT UNION	CA	B3K 5M1	HALIFAX		NS	CAD	101,014.48
HRWC	2020	420	NEPTUNE TECHNOLOGY GROUP	CA	M5W 2N7	TORONTO		ON	CAD	100,591.65
HRWC	2020	121	MACFARLANDS RENTIT	CA	B3B 0J6	DARTMOUTH	34 CUTLER AVENUE	NS	CAD	100,577.55
HRWC	2020	666	CAPS PLUS	CA	B4C 2K3	LWR. SACKVILLE	732 OLD SACKVILLE ROAD	NS	CAD	100,432.21
HRWC	2020	3564	BLUECONDUIT	US	48103	ANN ARBOR	315 2nd ST APT 205	MI	CAD	99,574.50
HRWC	2020	905	EASTLINK	CA	B3K 5M2	HALIFAX		NS	CAD	96,637.95
HRWC	2020	1665	MARITIME PRESSURE WORKS LTD	CA	B2Y 4K3	DARTMOUTH	41 ESTATES ROAD	NS	CAD	93,620.36
HRWC	2020	1624	NORTHERN BUSINESS INTELLIGENCE	CA	B3B 0K4	DARTMOUTH	201-26 AKERLEY BLVD	NS	CAD	91,910.31
HRWC	2020	94	BELL ALIANT	CA	E2L 4K2	SAINT JOHN		NB	CAD	90,726.67
HRWC	2020	541	HACH SALES & SERVICE CANADA LP	CA	N5V 4T7	LONDON	3020 GORE RD	ON	CAD	90,202.44
HRWC	2020	2326	HR ATLANTIC	CA	C1A 4J6	CHARLOTTETOWN	20 GREAT GEORGE ST UNIT 201	PE	CAD	89,394.15
HRWC	2020	3570	RAFTELIS	US	28202	Charlotte	227 W Trade St	NC	CAD	88,543.50
HRWC	2020	399	ECKLER PARTNERS LTD.	CA	B3J 3R7	HALIFAX	1969 UPPER WATER STREET, STE 1306	NS	CAD	87,559.98
HRWC	2020	160	CANADIAN UNION OF PUBLIC EMPLO	CA	K1G 0Z7	Ottawa	1375 St. Laurent Blvd	ON	CAD	87,135.36
HRWC	2020	3653	NOXON (WIRES)	SE	43903	Fjaras	Fjaras Industrivag 19		CAD	86,685.00
HRWC	2020	965	ADVANCED ENERGY MANAGEMENT LTD	CA	B3B 0B1	DARTMOUTH	60 DOREY AVE, SUITE 103	NS	CAD	85,888.55
HRWC	2020	537	CANSEL WADE	CA	B3B 1J3	DARTMOUTH	100 ISLEY AVE - UNIT C AND D	NS	CAD	81,931.64
HRWC	2020	239	OMNITECH INCORPORATED	CA	B3B 1J4	DARTMOUTH	10 AKERLEY BLVD., STE 1	NS	CAD	81,533.29
HRWC	2020	3532	CLOUD MANAGED NETWORKS	CA	L4S 0B8	RICHMOND HILL	30 VIA RENZO DRIVE #200	ON	CAD	79,822.47
HRWC	2020	424	FRED M. DUNPHY EXCAVATING	CA	B2Z 1B3	WESTPHAL	237 LAKE MAJOR ROAD	NS	CAD	79,731.89
HRWC	2020	818	ST. JOSEPH PRINT GROUP INC	CA	K1G 651	OTTAWA	1165 KENASTON RD	ON	CAD	79,157.14
HRWC	2020	385	SNC LAVALIN OPERATIONS AND MAI	CA	B3J 3R4	HALIFAX	5657 SPRING GARDEN ROAD, STE 200	NS	CAD	78,169.84
HRWC	2020	902	TOTAL FALL PROTECTION	CA	B2W 3C8	DARTMOUTH		NS	CAD	78,091.80
HRWC	2020	3052	BLUEJACK CONSULTING INC.	CA	B3J 0G7	UPPER TANTALLON	152 FALCOURT RUN	NS	CAD	77,435.25
HRWC	2020	1267	WAJAX INDUSTRIAL COMPONENTS	CA	H8T 2Y3	LACHINA	2200 52nd AVENUE	QC	CAD	77,354.57
HRWC	2020	223	REXEL CANADA ELECTRICAL INC.-A	CA	B3B 1X2	BURNSIDE		NS	CAD	76,243.47
HRWC	2020	1610	RECEIVER GENERAL FOR CANADA	CA	K1A 0K2	OTTAWA	101 COLONEL BY DR	ON	CAD	75,242.88
HRWC	2020	2802	SFC ENERGY LTD	CA	T2C 5C2	CALGARY	10509 46 STREET SE	AB	CAD	75,119.17
HRWC	2020	2701	FRONTLINE TRAFFIC	CA	B3G 1M7	EASTERN PASSAGE		NS	CAD	74,791.27
HRWC	2020	3120	OPIN SOFTWARE INC.	CA	K1R 5T5	OTTAWA	320 CATHERINE ST, SUITE 2	ON	CAD	74,750.00
HRWC	2020	1268	FOURNIER INDUSTRIES INC	CA	G6H 2B5	THETFORD MINES	3787 BOULEVARD FRONTENAC OUEST	QC	CAD	69,936.10
HRWC	2020	1344	BROOKFIELD CONCRETE PRODUCTS L	CA	B0N 1C0	BROOKFIELD		NS	CAD	69,535.60
HRWC	2020	3439	STRONGCO CORPORATION	CA	L4W 4Z4	MISSISSAUGA	1640 ENTERPRISE RD	ON	CAD	68,136.04
HRWC	2020	414	BEVLO PRODUCTS INC.	CA	B3E 1H4	PORTERS LAKE	2 THIS STREET	NS	CAD	64,839.45
HRWC	2020	183	K & D PRATT LIMITED	CA	A1N 4S9	MOUNT PEARL	126 GLENCOE DRIVE	NL	CAD	62,964.42
HRWC	2020	3017	KULVINDER DHILLON	CA	B3S 1K4	HALIFAX	22 PARKMOUNT CLOSE	NS	CAD	62,761.01
HRWC	2020	1273	POOLCORP / SCP DISTRIBUTORS IN	CA	B4B 1J3	BEDFORD	380 BLUEWATER ROAD	NS	CAD	62,274.40
HRWC	2020	1929	BEDFORD READY MIX LTD	CA	E2K 516	SAINT JOHN	400 CHESLEY DRIVE	NB	CAD	60,487.08
HRWC	2020	3042	CLEANEARTH INDUSTRIAL	CA	B3B 1C5	DARTMOUTH	20 MACDONALD AVENUE	NS	CAD	58,322.75
HRWC	2020	371	XEROX CANADA LTD.	CA	M4W 3H1	TORONTO	33 BLOOR STREET EAST	ON	CAD	57,723.38
HRWC	2020	1351	GCR TIRE CENTRES	CA	L5R 3G5	MISSISSAUGA	5770 HURONTARIO STREET, SUITE 400	ON	CAD	57,440.36
HRWC	2020	1303	EASTERN ALTERNATIVE POWER SYST	CA	B3B 1S4	DARTMOUTH	N-21 IISLEY AVE	NS	CAD	57,069.99
HRWC	2020	184	WORK AUTHORITY	CA	M5W 1P8	TORONTO		ON	CAD	55,912.10
HRWC	2020	2485	PRIORITY WATER LTD	CA	B4E 3G1	MIDDLE SACKVILLE	1272 SACKVILLE DR	NS	CAD	55,660.00
HRWC	2020	3571	ARCADIS	US					CAD	55,495.28
HRWC	2020	497	MERCER HUMAN RESOURCE	CA	B3J 3N4	HALIFAX	1801 HOLLIS ST., STE 1300	NS	CAD	54,638.13
HRWC	2020	1281	HERCULES SLR INC	CA	B3B 1B3	DARTMOUTH	520 WINDMILL ROAD	NS	CAD	54,320.55
HRWC	2020	1348	TRIHEDRAL ENGINEERING LTD	CA	B4A 1C1	BEDFORD	1160 BEDFORD HWY., SUITE 400	NS	CAD	54,180.60
HRWC	2020	2205	SOFTCHOICE LP	CA	L6M 2W1	OAKVILLE	105-1175 NORTH SERVICE RD WEST	ON	CAD	51,893.75
HRWC	2020	3216	ADESSO PROJECT MANAGEMENT	CA	B3J 2A4	HALIFAX	1725 BARRINGTON ST, SUITE 300	NS	CAD	50,955.72

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CoCd	Recon acct	Vendor	Name 1	Country	PostalCode	City	Street	Rg	Crcy	Purchasing
HRWC	2020	1258	TEAK TREE ENTERPRISES	CA	B4C 4C9	LAKEVIEW	229 THIRD AVENUE	NS	CAD	50,784.00
HRWC	2020	144	MINISTER OF FINANCE	CA	B3J 2T9	HALIFAX	PO BOX 698	NS	CAD	50,595.01
HRWC	2020	1767	CTS CONTAINER & TRAILER SERVIC	CA	B3B 1C6	DARTMOUTH	33 MACDONALD AVENUE	NS	CAD	49,701.85
HRWC	2020	2912	MAPDEV TECHNOLOGY SOLUTIONS IN	CA	B4C 4A2	LOWER SACKVILLE	100 STONE MOUNT DR	NS	CAD	49,288.34
HRWC	2020	2598	GM BLUEPLAN ENGINEERING LIMITE	CA	N1K 1B8	GUELPH	650 WOODLAWN ROAD WEST, BLOCK C, UN	ON	CAD	49,253.06
HRWC	2020	522	GRANT THORNTON	CA	B3J 0E9	HALIFAX	1675 GRAFTON ST, SUITE 1001	NS	CAD	49,195.51
HRWC	2020	2272	WALLACE CONSTRUCTION SPECIALTI	CA	S7K 1T6	SASKATOON	825 MACKAY ST	SK	CAD	49,099.26
HRWC	2020	612	ADM SYSTEMS ENGINEERING LTD.	CA	E2M 3X8	ST. JOHN	1465 MANAWAGONISH ROAD	NB	CAD	48,719.54
HRWC	2020	348	EASTERN FENCE ERECTORS LTD.	CA	B3B 0I5	DARTMOUTH	145 CUTLER AVENUE	NS	CAD	48,561.51
HRWC	2020	1261	WAJAX POWER SYSTEMS	CA	G1X 3W1	QUEBEC	2997 RUE WATT	QC	CAD	48,394.81
HRWC	2020	1135	FADER AGENCIES	CA	B3B 1L6	DARTMOUTH	30 TOPPLE DR	NS	CAD	47,620.20
HRWC	2020	1211	CUMMINS CANADA ULC	CA	H9R 1C2	POINT CLAIRE	7200 TRANS CANADA HWY	QC	CAD	47,604.44
HRWC	2020	2045	KEMTAG ENTERPRISES LTD	CA	E1B 4T9	RIVERVIEW		NB	CAD	47,593.90
HRWC	2020	569	COASTAL CONTROLS & INSTRUMENT	CA	B4A 225	BEDFORD	20 DUKE STREET, UNIT 107	NS	CAD	47,345.68
HRWC	2020	158	OVERHEAD DOOR OF NS LTD.	CA	B3A 1H6	DARTMOUTH	328 WINDMILL ROAD	NS	CAD	46,575.00
HRWC	2020	2033	WESTECH ENGINEERING INC	US	84165-0068	SALT LAKE CITY		UT	CAD	44,194.97
HRWC	2020	1683	STRUM ENVIRONMENTAL	CA	B4A 1C5	BEDFORD	1355 BEDFORD HIGHWAY	NS	CAD	44,111.22
HRWC	2020	443	LIVINGSTON INTERNATIONAL	CA	H4T 2B5	St. Laurent,Bureau 300	6700 chemin de la Coste-de-Liesse	QC	CAD	44,099.22
HRWC	2020	162	STRUM ENGINEERING ASSOC LTD	CA	B3B 1Y6	DARTMOUTH	80 EILEEN STUBBS AVE.	NS	CAD	43,785.81
HRWC	2020	341	ANIXTER CANADA INC	CA	H2Y 3E9	MONTREAL	PO BOX 144 SUCCESALE PLACE	QC	CAD	42,657.37
HRWC	2020	833	CME-CANADIAN MARITIME ENGINEER	CA	B3B 1S3	DARTMOUTH	90 THORNHILL DRIVE	NS	CAD	42,200.49
HRWC	2020	3553	DIRECT EQUIPMENT LTD	CA	L6J 7T5	OAKVILLE	1363 CORNWALL RD	ON	CAD	41,866.50
HRWC	2020	97	GRAYBAR CANADA LTD	CA	B3K 5M7	HALIFAX		NS	CAD	41,670.57
HRWC	2020	500	SGS CANADA INC.	CA	M5W 4W2	TORONTO	PO BOX 4580, DEPT 5, STN A	ON	CAD	41,565.38
HRWC	2020	455	AECOM CANADA LIMITED	CA	L3T 7W3	MARKHAM	105 COMMERCE VALLEY DRIVE WEST	ON	CAD	41,132.91
HRWC	2020	1367	FLOWSTAR INDUSTRIAL INC	CA	B2N 5Z5	TRURO		NS	CAD	40,577.71
HRWC	2020	3079	CANADIAN WATER NETWORK	CA	N2L 3G1	WATERLOO	200 UNIVERSITY AVE WEST	ON	CAD	40,000.00
HRWC	2020	1762	STONHARD DIVISION, RPM CANANDA	CA	L1N 9C9	WHITBY	95 SUNRAY STREET	ON	CAD	39,810.70
HRWC	2020	284	NOVA COMMUNICATIONS	CA	B3B 0I5	DARTMOUTH	89 CUTLER AVE, UNIT 104	NS	CAD	38,595.87
HRWC	2020	93	THE HALIFAX HERALD LTD.	CA	B3J 2T2	HALIFAX		NS	CAD	38,594.84
HRWC	2020	2292	SEPEX.COM	US	44193	CLEVELAND	PO BOX 951454	OH	CAD	38,245.75
HRWC	2020	1666	KROWN RUST CONTROL SYSTEMS	CA	B3K 4P3	HALIFAX	2823 ROBIE STREET	NS	CAD	38,219.13
HRWC	2020	1469	MICHELIN NORTH AMERICA(CANADA)	CA	H3C 6P4	MONTREAL	P O BOX 11725, SUCCURSAL CENTRE-VI	QC	CAD	37,546.15
HRWC	2020	2876	Nintex	US	98004	Bellevue	10800 NE 8th Street Suite 400	WA	CAD	36,939.00
HRWC	2020	3401	HOMEWOOD HEALTH INC	CA	V6E 3S7	VANCOUVER	1050 WEST PENDER ST, SUITE 500	BC	CAD	36,883.39
HRWC	2020	3413	C3 WATER INC	CA	N0B 1M0	BRESLAU	350 WOOLWICH STREET SOUTH	ON	CAD	36,804.60
HRWC	2020	2608	CDW CANADA INC	CA	M5W 5M5	TORONTO	POSTAL STATION A	ON	CAD	36,715.66
HRWC	2020	3551	ICINFRASTRUCTURE CORPORATION	CA	V4T 2E9	WEST KELOWNA	2475 DOBBIN ROAD UNIT 22-517	BC	CAD	36,645.00
HRWC	2020	2848	JOHN BROOKS	CA	L5N 7K5	MISSISSAUGA	2625 MEADOWPINE BLVD	ON	CAD	36,098.35
HRWC	2020	3148	CITY CENTRE PROPERTY MANAGEMEN	CA	B3M 0J9	HALIFAX	300-50 BEDFORD HIGHWAY	NS	CAD	35,997.78
HRWC	2020	3262	GEMTEC CONSULTING ENGINEERS &	CA	E3C 2E6	FREDERICTON	191 DOAK RD	NB	CAD	35,945.56
HRWC	2020	1172	BDI A DIVISION OF BELL MOBILIT	CA	M9C 0A8	ETOBICOKE	PO A	ON	CAD	35,596.06
HRWC	2020	245	SACKVILLE CONCRETE LTD.	CA	B4C 322	LR. SACKVILLE	17 ESTATE DRIVE	NS	CAD	34,923.85
HRWC	2020	102	MARSH ADJUSTMENT BUREAU LTD.	CA	B4A 1E6	BEDFORD	1550 BEDFORD HWY., STE 711	NS	CAD	34,488.43
HRWC	2020	3252	INFO-EXCAVATION	CA	H3M 3E2	MONTREAL	1600 BOUL-HENRI-BOURASSA O	QC	CAD	34,350.31
HRWC	2020	3435	EXCALIBUR DATA SYSTEMS CORP	CA	E2M 558	LANCASTER	PO BOX 27068	NB	CAD	34,284.71
HRWC	2020	2933	C & D CLEANING & SECURITY SERV	CA	B3S 1A8	HALIFAX	106 CHAIN LAKE DR, UNIT 2A	NS	CAD	34,271.15
HRWC	2020	335	RECEIVER GENERAL FOR CANADA	CA	K1P 6K1	OTTAWA		ON	CAD	33,943.26
HRWC	2020	2733	EC ARMITAGE HARDWARE	CA	B3K 2E9	HALIFAX	5655 STANLY ST	NS	CAD	33,502.63
HRWC	2020	1169	IMAGINIT CANADA	CA	L5W 1Y5	MISSISSAUGA	151 COURTNEY PARK DR. WEST STE. 201	ON	CAD	33,445.68
HRWC	2020	1585	WHITE CAP SUPPLY/BRAFASCO	CA	L4L 0B9	VAUGHAN	100 GALT CAT DR	ON	CAD	32,902.58
HRWC	2020	1185	EATON INDUSTRIES (CANADA) COMP	CA	K1B 5N2	OTTAWA	2615 LANCASTER ROAD, UNIT 6	ON	CAD	32,545.00
HRWC	2020	2302	A-PLUS ROOFING & MASONRY LTD	CA	B4C 1R9	LOWER SACKVILLE	186 SKYRIDGE AVE	NS	CAD	32,315.00
HRWC	2020	1428	KENTAIN PRODUCTS LTD	CA	N2K 2Z4	KITCHENER	55 HOWARD PLACE	ON	CAD	32,194.25
HRWC	2020	3559	SURVIVAL SYSTEMS TRAINING LTD	CA	B2Y 4R9	DARTMOUTH	40 MOUNT HOPE AVE	NS	CAD	32,085.00
HRWC	2020	181	PARTS FOR TRUCKS INC.	CA	B3B 1C6	DARTMOUTH	15 MACDONALD AVE.	NS	CAD	31,959.09
HRWC	2020	1629	HAYWARD GORDON LTD.	CA	L7G 0A3	HALTON HILLS	5 BRIDGEN GATE	ON	CAD	31,895.24
HRWC	2020	586	BIRD STAIRS	CA	B3B 0C9	DARTMOUTH	102 JOHN SAVAGE AVENUE	NS	CAD	31,664.83
HRWC	2020	3050	Innovyze	US	91016	Monrovia	605 East Huntington Dr., Suite 205	CA	CAD	31,438.07
HRWC	2020	3464	G6N CONSULTING GROUP INC	CA	B4B 2B7	HAMMONDS PLAINS	19 REINING WAY	NS	CAD	31,384.49
HRWC	2020	173	QUALITY CONCRETE	CA	B3B 1C5	DARTMOUTH	20 MACDONALD AVENUE	NS	CAD	30,986.16
HRWC	2020	1402	WURTH CANADA LTD	CA	N1C 0A1	GUELPH	345 HANLON CREEK BOULEVARD	ON	CAD	30,230.51
HRWC	2020	3560	PROGRESS	US	1730	BEDFORD	14 OAK PARK DR	MA	CAD	30,086.79
HRWC	2020	292	VVR INTERNATIONAL, CO	CA	L5N 5Z7	MISSISSAUGA	2360 ARGENTIA RD	ON	CAD	30,019.22
HRWC	2020	2202	PMC INC	US	21204	TOWSON	110 WEST RD, SUITE 213	MD	CAD	29,349.35
HRWC	2020	3192	KORN FERRY HAY GROUP LTD.	CA	M5J 2T3	TORONTO	181 BAY ST, SUITE 3810	ON	CAD	28,980.00
HRWC	2020	1630	CANADIAN BEARINGS LTD	CA	L5S 155	MISSISSAUGA	1600 DREW RD	ON	CAD	28,865.67
HRWC	2020	654	LONGSTAFF-PARKER-WAMBOLDT SURV	CA	B2W 3Y6	DARTMOUTH	73 TACOMA DRIVE - SUITE 807	NS	CAD	28,750.00
HRWC	2020	2624	EFP TECHNICAL SOLUTIONS INC.	CA	B3B 1N7	DARTMOUTH	97 SIMMONDS DR, BURNSIDE IND PRK	NS	CAD	28,462.44
HRWC	2020	2906	CORRPRO CANADA INC.	CA	H9P 1G9	DORVAL	1985 55TH AVENUE	QC	CAD	28,177.88
HRWC	2020	1263	ROMA WELDING & MAINTENANCE LTD	CA	B3E 1K5	PORTERS LAKE	442 WEST PORTERS LAKE ROAD	NS	CAD	27,914.66
HRWC	2110	451	HALIFAX REGIONAL MUNICIPALITY	CA	B3J 3Y8	HALIFAX	1841 ARGYLE ST.,CITY HALL, 4TH FLO	NS	CAD	27,879.33
HRWC	2020	3387	FLOTTWEG SEPARATION TECHNOLOGY	US	41051	INDEPENDENCE	10700 TOEBBEN DRIVE	KY	CAD	27,835.19
HRWC	2020	3612	GARLAND CANADA INC	CA	M9W 5Y8	ETOBICOKE	209 CARRIER DRIVE	ON	CAD	27,536.75
HRWC	2020	3614	GW ASPHALT PAVING LIMITED	CA	B2Z 2T6	COLE HARBOUR	1729 COLE HARBOUR RD	NS	CAD	26,243.00
HRWC	2020	1862	ULINE	CA	L6Y 0N3	BRAMPTON	60 HEREFORD STREET	ON	CAD	26,224.49
HRWC	2020	2983	ERGOCENTRIC SEATING SYSTEMS IN	CA	L5T 2L6	MISSISSAUGA	275 SUPERIOR BLVD UNIT 2	ON	CAD	26,150.14
HRWC	2020	3203	NOVATE SYSTEMS INC.	CA	B3B 1P7	DARTMOUTH	900 WINDMILL RD, UNIT 107B	NS	CAD	26,116.50
HRWC	2020	3498	COOPER EQUIPMENT RENTALS LTD	CA	L5W 0G7	MISSISSAUGA	255 LONGSIDE DR UNIT 103	ON	CAD	26,047.59
HRWC	2020	3620	EXCELITR	CA	K1P 5N4	OTTAWA	102 BANK STREET, SUITE 300	ON	CAD	26,001.50
HRWC	2020	1908	KGP CO. (FORMERLY HUTTON COMM	CA	L4W 2R4	MISSISSAUGA	5228 EVEREST DR	ON	CAD	25,959.78
HRWC	2020	2098	WILL-KARE PAVING & CONTRACTING	CA	B2N 5E5	TRURO	95 LOWER TRURO RD, BOX 651	NS	CAD	25,538.28
HRWC	2020	1306	STRESCON LIMITED	CA	E2K 5L6	SAINT JOHN	400 CHESLEY DRIVE	NB	CAD	25,374.75
HRWC	2020	3409	SHORELINE LUBE DISTRIBUTION IN	CA	E4P 7M7	GRAND BARACHOIS	55 RAYMEL ROAD	NB	CAD	24,715.16
HRWC	2020	2939	KS B PUMPS INC.	CA	L4W 8G2	MISSISSAUGA	5205 TOMKEN ROAD	ON	CAD	24,494.60
HRWC	2020	1450	COX & PALMER	CA	B3J 3E5	HALIFAX	1959 UPPER WATER STREET	NS	CAD	24,378.62

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CoCd	Recon acct	Vendor	Name 1	Country	PostalCode	City	Street	Rg	Crcy	Purchasing
HRWC	2020	2203	GALVANIC APPLIED SCIENCES USA	US	1851	LOWELL	41 WELLMAN STREET	MA	CAD	24,347.04
HRWC	2020	2884	KENT HOMES	CA	E2L 4M3	SAINT JOHN		NB	CAD	24,207.50
HRWC	2020	2493	INDEPENDENT SECURITY SERVICES	CA	B3M 3Y7	HALIFAX	287 LACEWOOD DR, UNIT 103, SUITE 14	NS	CAD	24,094.19
HRWC	2020	2361	PREDICTIVE SUCCESS CORPORATION	CA	L1N 1X3	WHITBY	316 COLBORNE ST WEST	ON	CAD	24,029.25
HRWC	2020	1196	PORT OF HALIFAX	CA	B3J 2P6	HALIFAX		NS	CAD	23,916.18
HRWC	2020	1827	EAST COAST INTERNATIONAL TRUCK	CA	E1H 2R5	MONCTON	100 URQUHART AVE	NB	CAD	23,870.15
HRWC	2020	3627	SALTWIRE NETWORK	CA	A1B 3T7	ST. JOHNS	36 AUSTIN ST	NL	CAD	23,774.80
HRWC	2020	886	WAJAX EQUIPMENT	CA	T7X 5A3	ACHESON	#30 26313 TWP 531A	AB	CAD	23,292.62
HRWC	2020	2597	ATLANTEK COMPUTER POWER SOLUTI	CA	B3B 1R3	DARTMOUTH	14-24 SIMMONDS DR	NS	CAD	23,248.98
HRWC	2020	1505	DUERDEN&KEANE ENVIRONMENTAL IN	CA	B3A 2M3	DARTMOUTH	26 FOREST ROAD	NS	CAD	22,770.00
HRWC	2020	2920	LUMEN DIVISION OF SONEPAR CANA	CA	H2Y 1L6	MONTREAL	119 SAINT-JACQUES ST	QC	CAD	22,507.67
HRWC	2020	281	J & M MURPHY LTD.	CA	B3L 4H7	HALIFAX	3514 JOSEPH HOWE DRIVE	NS	CAD	22,349.60
HRWC	2020	1482	HERITAGE GAS LIMITED	CA	B2Y 4W3	DARTMOUTH		NS	CAD	22,189.06
HRWC	2020	1238	PITNEY WORKS	CA	L9W 2Z7	ORANGEVILLE		ON	CAD	21,854.38
HRWC	2020	2662	ENVIROSPHERE CONSULTANTS LTD.	CA		NEWPORT		NS	CAD	21,851.45
HRWC	2020	3606	NEXOM INC	CA		NAVIN	5 BURKS WAY	MB	CAD	21,620.00
HRWC	2020	659	XL ELECTRIC LIMITED	CA	B3B 1K3	DARTMOUTH	4 WADDELL AVENUE	NS	CAD	21,577.24
HRWC	2020	3054	CORPORATE EXPRESS CANADA INC	CA	B3B 2E5	DARTMOUTH	2 ROYLES AVENUE	NS	CAD	20,758.54
HRWC	2020	3119	ILLER DOOR SYSTEMS LTD.	CA	B6L 1X2	TRURO	159 TRURO HEIGHTS RD	NS	CAD	20,215.63
HRWC	2020	3130	HATCH CORPORATION	CA	B3J 3K8	HALIFAX	1809 BARRINGTON ST, SUITE 1009	NS	CAD	20,041.07
HRWC	2020	977	UNDERGROUND CONSULTING SERVICE	CA	B3A 3H7	DARTMOUTH	12 GRAHAM STREET	NS	CAD	19,959.86
HRWC	2020	1754	JAVELIN CONSTRUCTION LTD	CA	B3A 1H3	DARTMOUTH	311 WINDMILL ROAD	NS	CAD	19,785.75
HRWC	2020	728	MMP OFFICE INTERIORS INC.	CA	B3B 1B8	DARTMOUTH	656 WINDMILL ROAD	NS	CAD	19,577.75
HRWC	2020	3602	HIGHLAND GEOMATICS & ENGINEERI	CA	B4C 2R3	LOWER SACKVILLE	153 SACKVILLE DR, SUITE 1	NS	CAD	19,550.00
HRWC	2020	3641	METRO ROOFING	CA	B3B 1R7	DARTMOUTH	95 AKERLEY BLVD - UNIT 110	NS	CAD	19,406.25
HRWC	2020	1467	ADVOCATE PRINTING & PUBL. CO. L	CA	B0K 1H0	PICTOU	181 BROWNS POINT RD	NS	CAD	19,360.63
HRWC	2020	3527	MITACS INC	CA	V6T 1Z3	VANCOUVER	6190 AGRONOMY RD, SUITE 301	BC	CAD	19,166.67
HRWC	2020	1410	HSE INTEGRATED LTD	CA	B3B 1L5	DARTMOUTH	95 LISLEY AVENUE	NS	CAD	18,474.75
HRWC	2020	2506	LOFTY PERCH INC	CA	L3R 5V6	MARKHAM	15-505 HOOD RD	ON	CAD	18,112.50
HRWC	2020	3146	NETWRIX	US	43017	DUBLIN	565 METRO PLACE	OH	CAD	18,028.79
HRWC	2020	486	ATLANTIC BACKFLOW SPECIALISTS	CA	B2W 3K6	DARTMOUTH	65 MT. EDWARD ROAD	NS	CAD	18,026.30
HRWC	2020	2288	VAN HOUTTE COFFEE SERVICES INC	CA	H1Z 4J9	MONTREAL	8215 17TH AVENUE	QC	CAD	17,513.97
HRWC	2020	1321	BLUEWAVE ENERGY INC (ULTRAMAR)	CA	B3J 0A5	DARTMOUTH	P O BOX 728, STN CENTRAL	NS	CAD	17,267.60
HRWC	2020	3546	XPLORNET COMMUNICATIONS	CA	E7M 6B5	WOODSTOCK	300 LOCKHART MILL RD, PO BOX 9060	NB	CAD	17,181.00
HRWC	2020	3655	STINGRAY RADIO INC	CA	B3B 1W8	DARTMOUTH	208-3 SPECTACLE LAKE DR	NS	CAD	17,077.50
HRWC	2020	630	ATLANTIC CRANE & MAT. HANDLING	CA	B3B 1V6	DARTMOUTH	49 TRIDER CRES	NS	CAD	17,051.41
HRWC	2020	1596	WESTECH INDUSTRIAL LTD	CA	T2H 1Z6	CALGARY	5636 BURBANK CRESCENT SE	AB	CAD	16,954.45
HRWC	2020	3070	FRANKLIN COVEY	US	84119	SALT LAKE CITY	2200 W PARKWAY BLVD	UT	CAD	16,905.00
HRWC	2020	2971	INDUSTRIAL ALLIANCE	CA	B2B 1Y2	DARTMOUTH	238 BROWNLOW AVE, SUITE 320	NS	CAD	16,747.14
HRWC	2020	334	HETEK SOLUTIONS INC.	CA	T5J 3P4	EDMONTON	10250 101 STREET NW	AB	CAD	16,632.28
HRWC	2020	2846	MAXWELL PROMOTIONAL PRODUCTS	CA	B3M 3Y7	HALIFAX	287 LACEWOOD DRIVE UNIT 103-273	NS	CAD	16,489.85
HRWC	2020	849	BRANDT TRACTOR LTD.	CA	S4P 3R8	REGINA	HWY1 EAST BOX 3856	SK	CAD	16,007.57
HRWC	2020	2182	DAN-X RECYCLING LIMITED	CA	B3B 1R6	DARTMOUTH	64 TRIDER CRES	NS	CAD	15,998.67
HRWC	2020	772	CORROSION SERVICE CO. LTD.	CA	L6C 3A1	MARKHAM	280 HILLMOUNT ROAD, UNIT 9	ON	CAD	15,977.70
HRWC	2020	617	SPRING WATER INC.	CA	B4C 4G3	LOWER SACKVILLE	17 MURDOCK MACKAY CRT, SUITE 101	NS	CAD	15,936.87
HRWC	2020	3611	SMITH + ANDERSEN CONSULTING EN	CA	B3J 3R7	HALIFAX	1969 UPPER WATER STREET - SUITE 190	NS	CAD	15,752.70
HRWC	2020	2120	JAMES LEGGATE FORESTRY	CA	B0N 2L0	UPPER KENNETCOOK	6079 HIGHWAY 236 - RR #1	NS	CAD	15,686.00
HRWC	2020	882	HEATHER BOUDREAU	CA	B4B 2B2	HAMMONDS PLAINS	28 HARNESS TRAIL	NS	CAD	15,524.98
HRWC	2020	1365	MARITIME HOSE SPECIALTIES	CA	L5T 1V1	MISSISSAUGA	7245 PACIFIC CIRCLE	ON	CAD	15,419.90
HRWC	2020	185	SERVANT, DUNBRACK, MCKENZIE &	CA	B3S 1C6	HALIFAX	36 OLAND CRESCENT	NS	CAD	15,052.35
HRWC	2020	2351	WESTOWER COMMUNICATIONS LTD.	CA	N3B 2Z2	ELMIRA	60 SOUTH FIELD DRIVE	ON	CAD	14,795.90
HRWC	2020	1934	BRUNSWICK NEWS INC	CA	E1C 8P3	MONCTON	PO BOX 1001	NB	CAD	14,705.34
HRWC	2020	494	NGUYEN TECHNOLOGIES & ELECTRIC	CA	B3A 1H8	DARTMOUTH	339 WINDMILL ROAD	NS	CAD	14,565.11
HRWC	2020	3601	PRAXES EMERGENCY SPECIALISTS I	CA	B3K 1Z7	HALIFAX	5539B YOUNG STREET	NS	CAD	14,490.00
HRWC	2020	3291	TTX CANADA INC	CA	N1T 1N6	CAMBRIDGE	150 WERLICH DR UNIT 5 & 6	ON	CAD	14,304.85
HRWC	2020	2592	SEASCAPE BUILDING MAINTENANCE	CA		MIDDLE SACKVILLE	515 LUCASVILLE ROAD UNIT 101	NS	CAD	14,283.00
HRWC	2020	2339	UNIFORM WORKS LIMITED	CA	B3B 0J5	DARTMOUTH	89 CUTLER AVENUE, SUITE 104	NS	CAD	14,250.80
HRWC	2020	199	TERRA NOVA LANDSCAPING LTD	CA	B4B 1G7	BEDFORD	130 BLUEWATER ROAD	NS	CAD	14,247.95
HRWC	2020	2566	JC AUTOWORKS INCORPORATED	CA	B3V 1A3	HARRIETSFIELD	801 OLD SAMBRO ROAD	NS	CAD	14,206.09
HRWC	2020	835	PACE PLUMBING & HEATING	CA	B3P 2C8	HALIFAX	34 WINCHESTER AVENUE	NS	CAD	14,196.68
HRWC	2020	1996	WOOD WYANT	CA	B3B 1C9	DARTMOUTH	27 FIELDING AVENUE	NS	CAD	14,134.20
HRWC	2020	1009	COMMISSIONAIRES NOVA SCOTIA	CA	B3J 2Z1	HALIFAX		NS	CAD	14,105.90
HRWC	2020	2600	JOHNSON CONTROLS	CA	B4A 2T3	BEDFORD	275 ROCKY LAKE DRIVE, SUITE 20	NS	CAD	13,951.40
HRWC	2020	429	SSQ INSURANCE COMPANY INC	CA	H3A 2A5	MONTREAL	2020 UNIVERSITY AVE, SUITE 1800	QC	CAD	13,821.11
HRWC	2020	3557	THE PROCUREMENT LAW OFFICE	CA	M5V 3L5	TORONTO	781 KING ST WEST, SUITE 406	ON	CAD	13,800.00
HRWC	2020	2593	INTEGRATED PNEUMATICS LIMITED	CA	E2K 4B5	SAINT JOHN	22 ROCKY TERRACE	NB	CAD	13,638.37
HRWC	2020	3097	PINCHIN LTD.	CA	LSN 7W5	MISSISSAUGA	2470 MILLTOWER COURT	ON	CAD	13,595.62
HRWC	2020	3575	VOLCANO CONSTRUCTION SERVICES	CA	B3B 1E4	DARTMOUTH	36 FIELDING AVENUE	NS	CAD	13,455.00
HRWC	2020	376	RAE INDUSTRIAL ELECTRONICS LTD	CA	B3B 1M2	DARTMOUTH	11 MORRIS DR., SUITE 103	NS	CAD	13,315.36
HRWC	2020	2691	CONTRIO VALVE	CA	J4Y 2R4	BROSSARD	9610B IGNACE	QC	CAD	13,269.85
HRWC	2020	1301	TRAILWALK HOLDINGS LTD	CA	B0N 2T0	WINDSOR	RR #1 391 WENTWORTH RD	NS	CAD	13,142.20
HRWC	2020	1915	HAZMASTERS INC.	CA	B3B 1S1	DARTMOUTH	60 THORNHILL DRIVE, UNIT 5	NS	CAD	13,137.31
HRWC	2020	3534	E SOURCE	US	80301	Boulder	1745 38th Street	CO	CAD	13,007.81
HRWC	2020	149	KENT BUILDING SUPPLIES	CA	E2L 4G7	SAINT JOHN		NB	CAD	12,843.56
HRWC	2020	9	AWWA RESEARCH FOUNDATION	US	80235-3098	DENVER	6666 WEST QUINCY AVENUE	CO	CAD	12,688.71
HRWC	2020	1503	DRIVE PRODUCTS / OCEAN TRUCK E	CA	B3B 1M7	DARTMOUTH	141A JOSEPH ZATZMAN DRIVE	NS	CAD	12,664.44
HRWC	2020	2142	KILDOON INTELLIGENCE INC	CA	B3P 2H5	HALIFAX	9 MELVIN RD	NS	CAD	12,655.75
HRWC	2020	1103	RORY MACNEIL	CA	B3K 5M1	HALIFAX		NS	CAD	12,603.90
HRWC	2020	3181	ROCKWELL AUTOMATION CANADA LTD	CA	M5W 1P8	TORONTO		ON	CAD	12,581.00
HRWC	2020	2590	ROSS VALVE MANUFACTURING CO	US	12181	TROY	79 102 ND STREET	NY	CAD	12,550.85
HRWC	2020	3658	WOOD ENVIRONMENT & INFRASTRUCT	CA	T2E 7T8	CALGARY	401-1925 18TH AVENUE NE	AB	CAD	12,296.81
HRWC	2020	1669	AINSWORTH INC	CA	M4A 1X4	TORONTO	131 BERMONDSEY ROAD	ON	CAD	12,160.40
HRWC	2020	2280	DIESEL AND AUTO ELECTRIC LIMIT	CA	B3B 1N7	DARTMOUTH	105 SIMMONDS DRIVE BURNSIDE PARK	NS	CAD	12,115.51
HRWC	2020	1330	STELLAR INDUSTRIAL SALES LTD	CA	B3B 1B3	DARTMOUTH	520 WINDMILL RD	NS	CAD	12,081.17
HRWC	2020	3572	PHYTOXIGENE INC	US	44311	AKRON	526 SOUTH MAIN STREET	OH	CAD	11,976.47
HRWC	2020	2191	WIRE ROPE INDUSTRIES (ATLANTIC	CA	B3B 1S3	DARTMOUTH	84 THORNHILL DRIVE	NS	CAD	11,746.75

HALIFAX REGIONAL WATER COMMISSION  
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CoCd	Recon acct	Vendor	Name 1	Country	PostalCode	City	Street	Rg	Crcy	Purchasing
HRWC	2020	2164	EASYKLEEN PRESSURE SYSTEMS LTD	CA	E4E 2N8	SUSSEX	26 EVELEIGH ST	NB	CAD	11,721.66
HRWC	2020	3513	NATURAL FORCES SOLAR INC	CA	B3T 3N4	HALIFAX	1205-1801 HOLLIS ST	NS	CAD	11,720.23
HRWC	2020	3463	REFINED ROOFING	CA	B3K 3P8	HALIFAX	3675 ACADIA ST	NS	CAD	11,557.50
HRWC	2020	2397	LINKEDIN IRELAND	CA	M5E 0E9	TORONTO		ON	CAD	11,520.00
HRWC	2020	3619	RLS CONTRACTING LIMITED	CA	B4B 1E9	HAMMONDS PLAINS	34 CRESTFIELD DRIVE	NS	CAD	11,518.40
HRWC	2020	3568	JAMES HANNAM INC	CA	B3M 3B1	HALIFAX	12 KINGFISHER CRESCENT	NS	CAD	11,509.03
HRWC	2020	3287	3325398 NOVA SCOTIA LTD.	CA	B3K 4X8	HALIFAX	3770 KEMPT RD, SUITE 110	NS	CAD	11,500.00
HRWC	2020	3449	HALIFAX PARTNERSHIP	CA	B3J 0E9	HALIFAX	1675 GRAFTON ST - SUITE 701	NS	CAD	11,500.00
HRWC	2020	2829	CENTRIFUGES UNLIMITED INC.	CA	T2C 1P4	CALGARY	3504-64 AVENUE SE	AB	CAD	11,425.94
HRWC	2020	588	OSISOFT, INC.	CA	H3B 3K9	MONTREAL		QC	CAD	11,374.07
HRWC	2020	446	ALL GLASS & UPHOLSTERY	CA	B3S 1C4	HALIFAX	55 MCQUADE LAKE CR	NS	CAD	11,320.60
HRWC	2020	2764	WINCAN	US	15205	PITTSBURGH	300 CEDAR RIDGE DRIVE SUITE 308	PA	CAD	11,319.25
HRWC	2020	1542	FOWLER BAULD & MITCHELL	CA	B3J 1V7	HALIFAX	H51-1600 HOLLIS ST	NS	CAD	11,235.22
HRWC	2020	35	DON BRENTON'S	CA	B3T 1L7	LAKESIDE	2 LAKESIDE PARK DRIVE, UNIT 12	NS	CAD	11,201.96
HRWC	2020	732	COASTAL RESTORATION & MASONRY	CA	B3T 1P3	GOODWOOD	8 MILLS DRIVE	NS	CAD	10,991.70
HRWC	2020	3639	WILLSCOT	CA	M5W 0E9	TORONTO	C/O 911630 PO BOX 4090 STN A	ON	CAD	10,976.13
HRWC	2020	2504	FIRST RATE MACHINING LTD	CA	B3B 1L4	DARTMOUTH	31 RADDALL AVE - UNIT #3	NS	CAD	10,916.95
HRWC	2020	1984	MINISTER OF FINANCE	CA	B3B 1T3	DARTMOUTH	780 WINDMILL RD - 3RD FLOOR	NS	CAD	10,893.39
HRWC	2020	2676	BLUE WATER AGENCIES LIMITED	CA	B3B 1L6	DARTMOUTH	40 TOPPLE DR	NS	CAD	10,829.63
HRWC	2020	1352	PARKWAY AUTOMOTIVE SERVICES LT	CA	B2W 3T7	DARTMOUTH	676 MAIN STREET	NS	CAD	10,783.58
HRWC	2020	1863	E.B.M. TRUCK & TRAILER LIMITED	CA	B4C 322	LOWER SACKVILLE	9 ESTATES ROAD	NS	CAD	10,761.78
HRWC	2020	3292	EAST COAST MOBILE MEDICAL	CA	B3B 1S8	DARTMOUTH	101 ILSLEY AVE, SUITE 1	NS	CAD	10,746.75
HRWC	2020	3167	ATLAS COPCO COMPRESSORS CANADA	CA	H4R 2P1	SAINT LAURENT	5060 LEVY	QC	CAD	10,739.66
HRWC	2020	2954	THAUMAS ENVIRONMENTAL CONSULTA	CA	B2Y 4C8	DARTMOUTH	30 BECKFOOT DR	NS	CAD	10,698.46
HRWC	2020	3593	PALADIN SECURITY GROUP LTD	CA	V5G 4W3	BURNABY	201-3001 WAYBURN DRIVE	BC	CAD	10,687.81
HRWC	2020	511	STANHOPE SIMPSON INSURANCE LTD	CA	B3K 5M6	HALIFAX		NS	CAD	10,600.00
HRWC	2020	641	UNITED RENTALS OF CANADA LTD.	CA	N2B 3G1	KITCHENER	36 CENTENNIAL ROAD	ON	CAD	10,506.89
HRWC	2020	1288	THE SHAW GROUP LIMITED	CA	B2S 1M9	LANTZ	1101 HIGHWAY #2	NS	CAD	10,496.05
HRWC	2020	2377	DAC INDUSTRIAL ENGINES	CA	B3B 126	DARTMOUTH	10 PAYZANT AVE	NS	CAD	10,465.93
HRWC	2020	1773	STEEL 'N MOTION INC	CA	B3V 1B9	HALIFAX	1922 OLD SAMBRO ROAD	NS	CAD	10,334.33
HRWC	2020	3549	VACUTRUX LTD	CA	N3B 2A1	ELMIRA	20 MARTINS LANE	ON	CAD	10,319.30
HRWC	2020	1623	DOUG CLARKE AUTO BODY LTD	CA	B2R 1R9	WAVERLEY	2578 ROCKY LAKE DR	NS	CAD	10,183.91
HRWC	2020	398	SHIRLEY SAMPSON	CA	B2W 1H1	DARTMOUTH	63 EVERETTE STREET	NS	CAD	10,153.10
HRWC	2020	1380	CANADAWIDE SCIENTIFIC LTD	CA	K1G 6B1	OTTAWA	2300 WALKLEY ROAD	ON	CAD	10,070.79
HRWC	2020	678	HURRICANE INDUSTRIAL EQUIPMENT	CA	B3B 1N4	DARTMOUTH	188 JOSEPH ZATZMAN DRIVE	NS	CAD	10,044.75
HRWC	2020	3451	PROAX TECHNOLOGIES LTD	CA	H7P 0C9	LAVAL	3505 JOHN PRATT STREET	QC	CAD	10,010.50
HRWC	2020	440	ANSWER 365	CA	B3K 4E5	HALIFAX	2829 AGRICOLA STREET	NS	CAD	10,006.08
HRWC	2020	876	DISCOVERY CENTRE	CA	B3J 3S8	HALIFAX	1215 LOWER WATER ST	NS	CAD	10,000.00
HRWC	2020	44	TRANS WORLD DISTRIBUTING LTD.	CA	B3B 1K4	DARTMOUTH	9 WADDELL AVENUE	NS	CAD	9,736.65
HRWC	2020	2661	PROPERTY VALUATION SERVICE COR	CA	B3B 2B4	DARTMOUTH	238A BROWNLOW AVE, SUITE 200	NS	CAD	9,417.12
HRWC	2020	1164	NATIONAL LIFE SUPPORT	CA	B3M 4H4	HALIFAX		NS	CAD	9,387.00
HRWC	2020	2710	PRINT 101 LTD	CA	B3K 5A8	HALIFAX	3667 STRAWBERRY HILL ST, UNIT 200	NS	CAD	9,341.19
HRWC	2020	2494	CROMER INDUSTRIES (1988) CORP.	CA	P2S 2W8	SEGUIN	160A HIGHWAY 141	ON	CAD	9,312.33
HRWC	2020	3631	FINISHCOAT PAINTING LTD	CA	B3R 1X3	HALIFAX	531 HERRING COVE RD	NS	CAD	9,188.50
HRWC	2020	2760	BRAND SAFAWAY ACCESS INC	CA	N6M 1A1	LONDON	318 NEPTUNE CRESCENT UNIT 5	ON	CAD	9,061.25
HRWC	2020	1746	BDI CANADA INC	CA	L5T 1K2	MISSISSAUGA	6235 TOMKEN ROAD	ON	CAD	8,913.34
HRWC	2020	2844	SHAREGATE	CA	H3K 1G6	MONTREAL	1751 RICHARDSON ST, SUITE 5400	QC	CAD	8,883.24
HRWC	2020	1944	GALARDI ROTHSTEIN GROUP	US	60605	CHICAGO	740 S FEDERAL ST #1101	IL	CAD	8,625.07
HRWC	2020	1559	DOMINION DIVING	CA	B2Y 2W1	DARTMOUTH	7 CANAL STREET	NS	CAD	8,611.20
HRWC	2020	3490	SCOTIA TIRE - ANDY'S TIRE - A1	CA	B3T 1A1	LAKESIDE	12 DOMINION CRES	NS	CAD	8,583.07
HRWC	2020	2313	E.D. TECHNICAL SERVICES	CA	B0J 1J0	CHESTER	85 GRANITE ST	NS	CAD	8,325.43
HRWC	2020	2309	APPLIED INDUSTRIAL TECHNOLOGIE	CA	S7P 0A4	SASKATOON	143 WHEELER STREET	SK	CAD	8,306.53
HRWC	2020	1705	CUSTOM PROTECT EAR INC.	CA	V3S 9E9	SURREY	#681-7789 134TH STREET	BC	CAD	8,210.84
HRWC	2020	3491	QUEST SOFTWARE CANADA INCORPOR	CA	M5A 4L5	TORONTO	260 KING STREET EAST	ON	CAD	8,182.87
HRWC	2020	1928	KNIGHTSBRIDGE ROBERTSON SURRET	CA	B3J 3T2	HALIFAX	5475 SPRING GARDEN ROAD, 6TH FLOOR	NS	CAD	8,050.00
HRWC	2020	1847	VERONICS INSTRUMENTS INC	CA	L8E 0C5	STONEY CREEK	1100 SOUTH SERVICE RD, SUITE #114	ON	CAD	7,990.20
HRWC	2020	328	CTH INSTRUMENTS LTD.	CA	B3B 1J4	DARTMOUTH	10 AKERLEY BLVD., SUITE 36	NS	CAD	7,900.50
HRWC	2020	3576	COMPUGEN INC	CA	L4S 0B8	RICHMOND HILL	100 VIA RENZO DR	ON	CAD	7,834.95
HRWC	2020	1266	ALL-TECH ENVIRONMENTAL SERVICE	CA	B4A 2Z5	BEDFORD	20 DUKE STREET, SUITE 109	NS	CAD	7,797.00
HRWC	2020	3461	CUES CANADA INC	CA	L4W 1P9	MISSISSAUGA	2-1675 SISMET RD	ON	CAD	7,789.61
HRWC	2020	2129	THE SALVATION ARMY	CA	B3K 3A9	HALIFAX	2044 GOTTINGEN ST	NS	CAD	7,750.00
HRWC	2020	3582	KOOLTRONIC	US	8534	PENNINGTON	30 PENNINGTON-HOPEWELL ROAD	NJ	CAD	7,746.69
HRWC	2020	769	BENTLEY SYSTEMS INC.	CA	M5L 1K1	TORONTO	PO BOX 3695 COMMERCE CRT POSTAL STA	ON	CAD	7,745.25
HRWC	2020	2953	ZEROWATER	US	19053	Trevoze	7 Neshaminy Interplex, Suite 1116	PA	CAD	7,558.08
HRWC	2020	1721	COMPUTATIONAL HYDRAULICS INC	CA	N1H 4E9	GUELPH	147 WYNDHAM STREET NORTH	ON	CAD	7,360.00
HRWC	2020	1409	HOSKIN SCIENTIFIC LTD	CA	L6L 0B1	OAKVILLE	5-3280 SOUTH SERVICE RD. W	ON	CAD	7,274.90
HRWC	2020	3515	SPRAY-NET PEI/NB	CA	C1A 4A9	CHARLOTTETOWN	600-97 QUEEN ST	PE	CAD	7,101.25
HRWC	2020	1573	SAFETY MADE EASY	CA	B2H 5W1	NEW GLASGOW	450 MOUNTAIN RD	NB	CAD	7,059.39
HRWC	2020	3141	LZG CONTRACTING	CA	B0N 1P0	KENNETCOOK	6060 HIGHWAY 354	NS	CAD	7,015.00
HRWC	2020	3607	MELT WATER NEWS CANADA, INC	CA	M5H 1J9	TORONTO	150 KING ST. W, FLOOR 7	ON	CAD	6,911.50
HRWC	2020	774	TROY LIFE & FIRE SAFETY LTD.	CA	N4K 2H7	OWEN SOUND	1042-2ND AVENUE, EAST	ON	CAD	6,841.57
HRWC	2020	3664	VTGROUP SOLUTION INC	CA	R3T 2A7	WINNIPEG	205-1200 PEMBINA HIGHWAY	MB	CAD	6,810.30
HRWC	2020	3066	SCHOONER EXCAVATION LTD.	CA	B3T 1P3	GOODWOOD	8 MILLS DR	NS	CAD	6,785.00
HRWC	2020	2200	INDEPENDENT ARMORED TRANSPORT	CA	B3M 3Y7	HALIFAX	287 LACEWOOD DR (UNIT 103) SUITE 14	NS	CAD	6,767.98
HRWC	2020	834	PETROMAX	CA	B3B 1E1	DARTMOUTH	16A FIELDING AVENUE	NS	CAD	6,722.80
HRWC	2020	3596	ST NICHOLAS ANGLICAN CHURCH	CA	B3Z 1H4	UPPER TANTALLON	29 WESTWOOD HILLS	NS	CAD	6,653.00
HRWC	2020	2708	ROYAL FLUSH	CA	B4C 4B1	LOWER SACKVILLE	69 COLONEL JOSEPH SCOTT DR	NS	CAD	6,613.98
HRWC	2020	1757	HARRIS INDUSTRIAL TESTING SERV	CA	B2R 1P4	WAVERLEY	21 OLD COBEQUID ROAD	NS	CAD	6,612.50
HRWC	2020	3518	EVOLVED METALWORK	CA	B3B 1R3	DARTMOUTH	24 SIMMONDS DR - UNIT 10	NS	CAD	6,532.00
HRWC	2020	1556	SVM SERVICES/ACE PEEST CONTROL	CA	B3B 0M4	DARTMOUTH	204 BROWNLOW AVE, UNIT 155	NS	CAD	6,458.40
HRWC	2020	1699	OFFICE-TEC ATLANTIC LTD	CA	B3L 4T7	HALIFAX	PO BOX 22022, BAYERS RPO	NS	CAD	6,440.00
HRWC	2020	1323	CABOT SHIPPING SUPPLIES	CA	B3B 1R7	DARTMOUTH	79 AKERLEY BLVD., UNIT P	NS	CAD	6,405.17
HRWC	2020	2673	TERRAPURE REVOLUTION ENVIRONME	CA	B3B 1W8	DARTMOUTH	3 SPECTACLE LAKE DRIVE, UNIT 290	NS	CAD	6,390.04
HRWC	2020	1174	KEMPTON APPRAISALS LIMITED	CA	B2Y 1K8	DARTMOUTH	376 PORTLAND STREET	NS	CAD	6,325.00
HRWC	2020	2717	BOOMER TECHNICAL RESOURCES LTD	CA	B3B 1R6	DARTMOUTH	34 TRIDER CRES	NS	CAD	6,164.00
HRWC	2020	1578	GRATEC LIMITED	CA	L3K 4C5	CONCORD	30 RITIN LANE, UNIT 1	ON	CAD	6,129.50

**HALIFAX REGIONAL WATER COMMISSION**  
**Reporting Periods - April to Dec 31, 2021**

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**Regulations Respecting Rates and Charges for the Provision of Water, Wastewater,  
Stormwater, Public and Private Fire Protection Service**

**PART I - INTERPRETATION**

Short Title

1. These Regulations may be cited as the “Halifax Water Regulations”.

Adoption of Statutory Definitions

2. All terms defined in the *Halifax Regional Water Commission Act* have the same meaning in these Regulations, unless otherwise defined.

Definitions

3. In these Regulations,

- (a) "Accredited Laboratory" means any laboratory accredited by an authorized accreditation body in accordance with a standard based on "CAN-P-1585: Requirements for the Accreditation of Environmental Testing Laboratories" established by the Standards Council of Canada, as amended, or "ISO/IEC/EN 17025: General Requirements for Competence of Calibration and Testing Laboratories" established by the International Organization for Standardization, as amended;
- (b) "Adverse Effect" means an effect that impairs or damages the environment or the operation of a Water System, Wastewater System or Stormwater System, including an adverse effect respecting the health of humans or the reasonable enjoyment of life or property;
- (c) "Animal" means any creature that is not human and includes any other thing prescribed as an animal, but does not include any thing prescribed as excluded;
- (d) "Animal by-product" means a part of an animal or its carcass that is extracted, collected or otherwise obtained from an animal or its carcass for purposes that are not a principal intention of growing or raising the animal and includes blood and any of its components, antlers, bones, bristles, feathers, flesh, hair, hides, skins, hoofs, horns, offal and anything containing any of those things or derived from any of those things;
- (e) "Automated Meter Infrastructure (AMI)" means a system which uses radio frequency transmission technology for measuring individual Customer's water consumption at intervals of an hour or less and communicating such information at frequent intervals to the Commission;
- (f) "Best Management Practices" means an integrated plan to control and reduce the Release of restricted and prohibited substances into Wastewater or Stormwater Systems, through methods including physical controls, pretreatment processes, operational procedures and staff training;
- (g) "Biochemical Oxygen Demand" (BOD) means the five-day BOD being the determination

of the molecular oxygen utilized during a five-day incubation period for the biochemical degradation of organic material (carbonaceous demand), and the oxygen used to oxidize inorganic material, including sulphides and ferrous iron, and the amount of oxygen used to oxidize reduced forms of nitrogen (nitrogenous demand) as determined by the applicable procedure in Standard Methods;

- (h) "Biosolids" means an organic, stabilized material produced during the treatment of domestic Wastewater and septage sludge which has undergone treatment to reduce pathogen content;
- (i) "Board" means the Nova Scotia Utility and Review Board;
- (j) "Chemical Oxygen Demand" ~~(COD)~~ means a measure of the capacity of water to consume oxygen as a result of oxidation of inorganic chemicals and decomposition of organic matter;
- (k) "Combined Sewer" means a sewer intended to function simultaneously as a Stormwater and a Wastewater sewer;
- (l) "Combustible Liquid" means a liquid that has a flash point not less than 37.8 degrees Celsius and not greater than 93.3 degrees Celsius;
- (m) "Commission" means the Halifax Regional Water Commission;
- (n) "Common Customer Location" means two or more locations in respect of which Service is provided by way of separate accounts to the same Customer;
- (o) "Composite Sample" means a volume of Wastewater, Stormwater, Uncontaminated Water, or effluent made up of three or more Grab Samples that have been combined automatically or manually and taken at intervals during the sampling periods;
- (p) "Customer" means a person who arranges to be or is supplied with water and/or Wastewater Service at a specified location or locations and includes a person receiving Stormwater Service;
- (q) "Discharge" means to directly or indirectly discharge, Release, permit or cause to be discharged or Released into Wastewater or Stormwater Systems;
- (r) "Discharger" means an owner, occupant or person who has charge, management or control of effluent, Wastewater, Stormwater, Uncontaminated Water or any combination thereof, which is Discharged to Wastewater or Stormwater Systems;
- (s) "Ditch" means an excavated or constructed open channel, which is vested in or under the control of the Commission;
- (t) "Driveway Culvert" means a culvert pipe within a portion of a street right of way intended for the purpose of providing passage of water along a drainage ~~d~~Ditch, under a driveway, from one side of the driveway to the other side of the driveway, and such culvert pipe is deemed to be part of the Stormwater System;
- (u) "Dwelling Unit" means the whole or any part of a building or structure that is kept or

occupied as a permanent or temporary residence and includes (i) a building within the curtilage of a Dwelling Unit that is connected to it by a doorway or by a covered and enclosed passage-way, and (ii) a unit that is designed to be mobile and to be used as a permanent or temporary residence, regardless of whether it is being used as such a residence;

- (v) "Encoder Receiver Transmitter" (ERT) means a device used to transmit data from a water meter to the Commission and is deemed to be a part of such meter;
- (w) "Extraneous Water or Wastewater" means water or Wastewater originating from a source other than the Commission's water supply, but does not include water originating from private wells for domestic use where a connection to the Commission's Water System is not available;
- (x) "Extra Strength Wastewater" means Wastewater Released to a sewer that is higher in concentration for one or more constituent concentrations than those set out in Table 6 in these Regulations;
- (y) "Fuel" includes alcohol, gasoline, naphtha, diesel fuel, fuel oil or any other ignitable substance intended for use as a fuel;
- (z) "Grab Sample" means a volume of Wastewater, Stormwater, Uncontaminated Water or effluent which is collected over a period not exceeding 15 minutes;
- (aa) "Hauled Waste" means any Waste, including Hauled Wastewater, which is transported to and deposited into, or proposed to be deposited into, any location in a Wastewater or Stormwater System;
- (bb) "Hauled Wastewater" means Waste removed from a Wastewater facility, including a cesspool, a septic tank, a vault privy or pit privy, a chemical toilet, a portable toilet or a Wastewater holding tank;
- (cc) "Hazardous Substance" means:
  - i) any substance or mixture of substances, other than a Pesticide, that exhibits characteristics of flammability, corrosivity, reactivity or toxicity; and
  - ii) any substance that is designated as a hazardous substance within the meaning of any applicable provincial or federal legislation, as amended from time to time;
- (dd) "Hazardous Waste" means any Hazardous Substance disposed of as Waste;
- (ee) "HRM" means the Halifax Regional Municipality;
- (ff) "Ignitable Waste" means a substance that:
  - i) is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 93 degrees Celsius, as determined by the Tag Closed Cup Tester (ASTM D-56-97a), the Setaflash Closed Cup Tester (ASTM D-3828-97 or ASTM D-3278-96e1), the PenskyMartens Closed Cup Tester (ASTM D-93-97), or as determined by an equivalent test method;
  - ii) is a solid and is capable, under standard temperature and pressure, of causing fire

- through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a danger;
- iii) is an ignitable compressed gas as defined in regulations made under applicable provincial or federal legislation, as amended; or
  - iv) is an oxidizing substance as defined in regulations made under applicable provincial or federal legislation, as amended;
- (gg) "Impervious Area" means an area or surface which prevents or limits the entrance or passage of stormwater, including asphalt, concrete, bricks, roofs and gravel surfaces if they are hard packed, and all of which are denoted as impervious by the satellite imagery utilized by the Commission in that determination;
  - (hh) "Industrial, Commercial or Institutional" (ICI) includes or pertains to industry, manufacturing, commerce, trade, business, or institutions and includes multi-unit dwellings of four or more units;
  - (ii) "Infrastructure Charge" means a development charge levied as a condition of subdivision approval or at a building permit stage;
  - (jj) "Interceptor" means a receptacle that is installed to prevent oil, grease, sand or other materials from passing into a Wastewater System or a Stormwater System;
  - (kk) "Landlord" has the same meaning as set out in Section 2 of the Residential Tenancies Act;
  - (ll) "Leachate" includes any liquid that has percolated through solid waste and, during percolation, has extracted dissolved or suspended materials from such solid waste, including the liquid produced from the decomposition of waste materials and liquid that has entered the waste material from external sources including surface drainage, rainfall and groundwater;
  - (mm) "Monitoring Access Point" means an access point, including a chamber, in a Wastewater or Stormwater Service Connection to allow for observation, sampling and flow measurement of the Wastewater, Uncontaminated Water or Stormwater within such a Service Connection;
  - (nn) "No-Corrode Pipe" means a coal tar impregnated wood fibre pipe, also known generically as Orangeburg pipe;
  - (oo) "Non-contact Cooling Water" means water that is used in a process for the purpose of removing heat and that has not, by design, come into contact with any raw material, intermediate product, waste product, or finished product, but may include blow down water;
  - (pp) "Non-Residential Property" means a property that has more than three Dwelling Units, or has a commercial building, or has been identified by property tax authorities as commercial, mixed use (i.e., as both residential and non-residential), or as having more than three residential assessments;
  - (qq) "NORM" means naturally occurring radioactive material found in industrial wastes or by-products enriched with radioactive elements found in the environment, including uranium, thorium and potassium and any of their decay products, including radium and

radon;

- (rr) "PAHs" means the total of all of the following polycyclic aromatic hydrocarbons: Acenaphthene, acenaphthylene, anthracene, benza(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysenes, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylanthracene, naphthalene, phenanthrene, pyrene;
- (ss) "Pathological Waste" includes fluids or materials which may contain pathogens of human or ~~a~~Animal origin;
- (tt) "PCBs" means any monochlorinated or polychlorinated biphenyls or any mixture of them or a mixture that contains one or more of them;
- (uu) "Pesticides" includes any substance that is a pest control product within the meaning of the *Pest Control Products Act* (Canada) or a fertilizer within the meaning of the *Fertilizers Act* (Canada) and that contains a pest control product;
- (vv) "Phenolic Compounds" means hydroxyl derivatives of benzene and its condensed nuclei;
- (ww) "Pretreatment Facility" means Wastewater treatment processes designed to remove pollutants from Wastewater prior to Discharge to the Commission's Wastewater System;
- (xx) "Prime" means the prime rate of interest set by the Commission's chartered bank from time to time.
- (yy) "Reactive Waste" means a substance that:
- (i) is normally unstable and readily undergoes violent changes without detonating;
  - (ii) reacts violently with water;
  - (iii) forms potentially explosive mixtures with water;
  - (iv) when mixed with water, generates toxic gases, vapours or fumes in a quantity sufficient to present danger to human health or the environment;
  - (v) is a cyanide or sulphide bearing Waste which, when exposed to pH conditions between 2 and 12.5 can generate toxic gases, vapours or fumes in a quantity sufficient to present danger to human health or the environment;
  - (vi) is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement;
  - (vii) is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure; or
  - (viii) is an explosive (Class 1) as defined in the Explosives Regulations, C.R.C., c. 599, as amended from time to time;
- (zz) "Regular Working Hours" means any time between the hours of eight o'clock in the forenoon and four o'clock in the afternoon on any day which is not a Saturday, a Sunday or a holiday, as that term is defined in the Interpretation Act;
- (aaa) "Release" means a substance that has spilled, leaked, seeped, drained, sprayed, emptied or has been emitted, Released, Discharged, disposed of, injected, inoculated, abandoned, deposited, poured, thrown, dumped, pumped, exhausted or placed in the environment or the Water, Wastewater or Stormwater System;
- (bbb) "Residential Property" means a property that has three or less Dwelling Units or has been identified by property tax authorities as residential or a combination of residential

and resource.

(ccc) "Right of Way Charge" means the charge imposed by the Regulations on HRM for the ~~i~~Impervious ~~a~~Area in the street right of way.

(ddd) "Service" means water Service, Wastewater Service or Stormwater ~~S~~service or any combination of each of them;

(eee) "Service Connection" means Water Service Connection, Wastewater Service Connection, or Stormwater Service Connection, or any combination of each of them;

(fff) "Site Related Flow Charge" means the charge for service and for the benefit a Customer receives, including access to a property over a Commission owned culvert, and management of stormwater from a property that enters any part of the Commission's stormwater system.

~~(ggg) "Solvent Extractable Matter" includes grease or oils from a~~Animal, vegetable, mineral or synthetic sources;

~~(hhh)(ggg)~~ "Standard Methods" means *Standard Methods for the Examination of Water and Wastewater* (the edition current at the time of testing), published jointly from time to time by the American Public Health Association, the American Water Works Association and the Water Environment Federation;

~~(iii)(hhh)~~ "Stormwater" means water from precipitation of all kinds, and includes water from the melting of snow and ice, groundwater discharge and surface water;

~~(iii)(iii)~~ "Stormwater Service Connection" includes a piping system that conveys Stormwater from a property to a Stormwater System;

~~(iii)~~ "Stormwater System" means the method or means of conveying stormwater, within ~~d~~Ditches, swales, mains, drains, canals, retention ponds, and culverts under public streets, private roads, public easements and driveways, which are vested in or under control of the Commission;

~~(kkk)~~ "Stormwater Catchment Boundary" an area of land that drains to the Stormwater System which may encompass a number of properties either in whole or in part.

~~(kkk)(lll)~~ "Stormwater Service Boundary" means the boundary within which the Commission provides Stormwater Service using the Stormwater System.

~~(lll)(mmm)~~ "Total Kjeldahl Nitrogen" means the sum of organic nitrogen and ammonia nitrogen;

~~(mmm)(nnn)~~ "Toxic Substance" means any substance defined as toxic under the Canadian Environmental Protection Act 1999, as amended from time to time;

~~(nnn)(ooo)~~ "Uncontaminated Water" means potable water or any other water to which no matter has been added as a consequence of its use;

~~(ooo)(ppp)~~ "Waste" means a substance that would cause or tend to cause an Adverse Effect if added to the environment, or the Water, Wastewater or Stormwater System, and includes rubbish, slimes, tailings, or other industrial wastes, effluent, sludge, Wastewater, garbage, refuse, scrap, litter or other waste products of any kind;

~~(ppp)(qqq)~~ "Waste Radioactive Substances" includes uranium, thorium, plutonium,

neptunium, deuterium, their respective derivatives and compounds and such other substances as the Atomic Energy Control Board (Canada) may designate from time to time as being capable of releasing ionizing radiation;

~~(qqq)~~(rrr) "Wastewater" means liquid waste containing ~~a~~Animal, vegetable, mineral or chemical matter as well as water from sanitary appliances that contains human fecal matter or human urine in solution or suspension together with such groundwater, surface water or Stormwater as may be present;

~~(rrr)~~(sss) "Wastewater Service Connection" means a piping system that conveys Wastewater from a property to a Wastewater System;

~~(sss)~~(ttt) "Wastewater System" means the structures, pipes, devices, equipment, processes and related equipment used, or intended to be used, for the collection, transportation, pumping or treatment of Wastewater and disposal of effluent, which are vested in or under the control of the Commission;

~~(ttt)~~(uuu) "Watercourse" means:

- (i) the bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not; and
- (ii) all ground water;

~~(uuu)~~(vvv) "Water Service Connection" means a piping system that conveys water from a water main to a property;

~~(vvv)~~(www) "Water System" means the source, structures, pipes, hydrants, meters, devices, equipment or other things used, or intended to be used, for the collection, transportation, pumping or treatment of water, and which are vested in or under the control of the Commission.

#### Interpretation

- 4.(1) These Regulations shall be interpreted in accordance with the principles for the interpretation of legislation.
- (2) The *Interpretation Act* (Nova Scotia) applies to these Regulations, except where a contrary intention appears.

## **PART II – RATES**

### **Rates for Water Service**

- 5.(1) Bills for water Service, other than for a specific one-time Service, shall be issued on a monthly or quarterly basis and shall be comprised of a base rate and a consumption rate, each applicable as follows:

(a) Table 1. Base Rate for Water Service

Service on or after April 1, 2016:

Size of Meter (mm)	Minimum Water Monthly Bill	Minimum Water Quarterly Bill
15	\$13.00	\$39.00
19	\$18.00	\$54.00
25	\$29.00	\$87.00
38	\$55.00	\$165.00
50	\$85.00	\$255.00
75	\$170.00	\$510.00
100	\$264.00	\$792.00
150	\$527.00	\$1,581.00
200	\$946.00	\$2,838.00
250	\$1,575.00	\$4,725.00

(b) Consumption Rate

The consumption rate for water is \$0.976/m<sup>3</sup> for water sold on or after April 1, 2016.

The consumption rate for water is \$1.017/m<sup>3</sup> for water sold on or after September 1, 2022.

The consumption rate for water is \$1.128/m<sup>3</sup> for water sold on or after April 1, 2023.

- (2) Non-metered Customers will be charged the approved base water rate and the consumption rate for an equivalent size meter, as estimated by the Commission based on the best information available to the Commission.

Table 2. Non-metered Water Service Rates

Service on or after April 1, 2016:		
	Monthly Bill	Quarterly Bill
(15 mm) 158 m <sup>3</sup> /year (Domestic)	\$26.00	\$78.00
(19 mm) 541 m <sup>3</sup> /year	\$63.00	\$189.00
(25 mm) 1061 m <sup>3</sup> /year	\$116.00	\$348.00

<u>Service on or after September 1, 2022:</u>		
	<u>Monthly Bill</u>	<u>Quarterly Bill</u>
<u>(15 mm) 161 m<sup>3</sup>/year (Domestic)</u>	<u>\$27.00</u>	<u>\$81.00</u>
<u>(19 mm) 524 m<sup>3</sup>/year</u>	<u>\$63.00</u>	<u>\$189.00</u>
<u>(25 mm) 1016 m<sup>3</sup>/year</u>	<u>\$116.00</u>	<u>\$348.00</u>

<u>Service on or after April 1, 2023:</u>		
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	Monthly Bill	Quarterly Bill
(15 mm) 160 m <sup>3</sup> /year (Domestic)	\$29.00	\$87.00
(19 mm) 516 m <sup>3</sup> /year	\$67.00	\$201.00
(25 mm) 1004 m <sup>3</sup> /year	\$124.00	\$372.00

#### Rates for Wastewater Service

- 6.(1) Bills for Wastewater Service, other than those charges for a specific one time Service shall be issued on a monthly or quarterly basis and shall be comprised of a base rate and a volumetric rate, each applicable as follows;

(a) Table 3. Base Rate for Wastewater Service

(b) Service on or after April 1, 2016:

Size of Meter (mm)	Minimum WW Monthly Bill	Minimum WW Quarterly Bill
15	\$14.00	\$42.00
19	\$20.00	\$60.00
25	\$33.00	\$99.00
38	\$64.00	\$192.00
50	\$103.00	\$309.00
75	\$206.00	\$618.00
100	\$321.00	\$963.00
150	\$641.00	\$1,923.00
200	\$1,154.00	\$3,462.00
250	\$1,923.00	\$5,769.00

(c) Wastewater Discharge Rate

The Discharge rate for all Wastewater Discharged to the Wastewater System is \$1.753/m<sup>3</sup> for Wastewater Discharged on or after April 1, 2016 and \$2.073/m<sup>3</sup> for Wastewater Discharged on or after April 1, 2021, \$2.189/m<sup>3</sup> for Wastewater Discharged on or after September 1, 2021 and \$2.259/m<sup>3</sup> for Wastewater Discharged on or after April 1, 2023.

- (2) Non-metered Customers will be charged the approved Wastewater base charge and the consumption Discharge rate for an equivalent size meter, as determined by the Commission and based on the projected usage of the customer, as estimated by the Commission based on the best information available to the Commission, including comparison with other similar customers and/or the use of private meters.

Table 4. Non-metered Wastewater Service Rates

Service on or after April 1, 2016:		
	Monthly Bill	Quarterly Bill
(15 mm) 164 m <sup>3</sup> /year (Domestic)	\$38.00	\$114.00
(19 mm) 539 m <sup>3</sup> /year	\$99.00	\$297.00
(25 mm) 1046 m <sup>3</sup> /year	\$186.00	\$558.00

	Monthly Bill	Quarterly Bill
Service on or after April 1, 2021:		
(15 mm) 164 m <sup>3</sup> /year (Domestic)	\$42.00	\$126.00
(19 mm) 539 m <sup>3</sup> /year	\$110.00	\$330.00
(25 mm) 1046 m <sup>3</sup> /year	\$205.00	\$615.00
Service on or after September 1, 2022		
(15 mm) 161 m <sup>3</sup> /year (Domestic)	\$44.00	\$132.00
(19 mm) 512 m <sup>3</sup> /year	\$114.00	\$342.00
(25 mm) 991 m <sup>3</sup> /year	\$214.00	\$642.00
Service on or after April 1, 2023		
(15 mm) 159 m <sup>3</sup> /year (Domestic)	\$45.00	\$135.00
(19 mm) 505 m <sup>3</sup> /year	\$115.00	\$345.00
(25 mm) 981 m <sup>3</sup> /year	\$218.00	\$654.00

- (3) Despite subsections (1) and (2), where a Customer is discharging Wastewater from sources other than the Commission's system, or where a Customer may be discharging Stormwater into the Wastewater System, or where, in the opinion of the Commission, a Discharge into the Wastewater System by a Customer may not be accurately reflected by use of a similar size and class of Customer water meter, the Commission may require a Customer in any such circumstances to measure actual Discharge in a manner approved by the Commission, in which case the volumetric charge will be based on the actual measured Discharge into the Commission's Wastewater System.

#### Charges for Stormwater Service

- 7.(1) Bills for Stormwater Service, other than ~~these any~~ charges for a specific ~~or~~ one-time Service, shall be issued on a monthly, quarterly, semi-annual or annual basis, and levied based on Impervious Area calculated and rounded to the nearest 10m<sup>2</sup>.
- (2) (a) Effective April 1, 2018 HRM shall pay annually to the Commission for Stormwater Service associated with the HRM owned street right of way (ROW) the amount of \$3,835,012 calculated based on the Impervious Area within the HRM owned ROW.
- (b) Effective September 1, 2022, HRM shall pay annually to the Commission for Stormwater Service associated with the HRM owned street right of way the amount of \$4,602,014 plus an incremental amount calculated based on \$0.147 per m<sup>2</sup> of Impervious Area within the HRM owned street right of way. Effective April 1, 2023, HRM shall pay annually to the Commission for Stormwater Service associated with the HRM owned street right of way the amount of \$5,316,000 plus an incremental amount calculated based on \$0.174 per m<sup>2</sup> of Impervious Area within the HRM owned street right of way.
- (c) Effective September 1, 2022, the Province of Nova Scotia shall pay annually to the Commission for Stormwater Service associated with the Province of Nova Scotia owned street right of way the amount of \$1,089,900 plus an incremental amount calculated based on \$0.147 per m<sup>2</sup> of Impervious Area within the Province of Nova Scotia owned street right of way. Effective April 1, 2023, the Province of Nova Scotia shall pay annually to the Commission for Stormwater Service associated with the Province of Nova Scotia owned street right of way the amount of \$1,182,900 plus an incremental amount calculated based on \$0.174 per m<sup>2</sup> of Impervious Area within the Province of Nova Scotia owned street right of way.
- (d) Effective September 1, 2022, the Halifax Dartmouth Bridge Commission shall pay annually to the Commission for Stormwater Service associated with the Halifax Dartmouth Bridge Commission owned street right of way the amount of \$15,200 plus an incremental amount calculated based on \$0.147 per m<sup>2</sup> of Impervious Area within the Halifax Dartmouth Bridge Commission owned street right of way. Effective April 1, 2023, the Halifax Dartmouth Bridge Commission shall pay annually to the Commission for Stormwater Service associated with the Halifax Dartmouth Bridge

Commission owned street right of way the amount of \$16,500 plus an incremental amount calculated based on \$0.174 per m<sup>2</sup> of Impervious Area within the Halifax Dartmouth Bridge Commission owned street right of way.

- (3) Non-Residential Property Customers shall pay a Site Related Flow Charge of \$0.135 per m<sup>2</sup> of Impervious Area on and after July 1, 2017, \$0.145 on and after September 1, 2022 and \$0.173 on and after April 1, 2023. Impervious Area being measured through satellite imagery, provided that where a part of a property is located outside the Commission's Stormwater Service ~~b~~Boundary and/or the Stormwater Catchment Boundary, that part of the property located outside the boundary is exempt from the Charge.
- (4) Residential Property Customers shall pay a Site Related Flow Charge which shall be based on the Impervious Area of their property, provided that properties with Impervious Area falling within a tier set out in this subsection shall be subject to the standard annual charge for that tier, billed at such frequency as the Commission may determine.

Table 4A. Charges for Stormwater Service

Tier	Tier Parameters (Based on Impervious Area m <sup>2</sup> )		Charge
	From	To	
Service up to August 31, 2022:			
1	0	Less than 50	\$0
2	50	200	\$14
3	210	400	\$27
4	410	800	\$54
5	810	or more	\$81
Service on or after September 1, 2022			
1	0	Less than 50	\$0
2	50	200	\$16
3	210	400	\$32
4	410	800	\$64
5	810	or more	\$96
Service on or after April 1, 2023			
1	0	Less than 50	\$0
2	50	200	\$19
3	210	400	\$38
4	410	800	\$76
5	810	or more	\$115

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- (5) Properties that are within the Commission's service boundary and do not receive Stormwater Service from the Commission are exempt from the Site Related Flow Charge.
- (6) Properties that have ~~i~~Impervious ~~a~~Area less than 50 m<sup>2</sup> are exempt from the Site Related Flow Charge.
- (7) Notwithstanding (5) and (6), a Residential Property or Non-~~r~~Residential ~~p~~Property that has a Driveway Culvert, is deemed to be receiving Stormwater Service and will be charged therefor in accordance with tier 2 as set out in subsection (4).

- (8) Non-~~R~~esidential Property Customers may be eligible for a credit not less than 30% but not exceeding 50% of the Site Related Flow Charge if they are undertaking certain qualified Stormwater Best Management Practices that detain their peak flow on an on-going basis in accordance with the parameters and application process set out in the Commission's Stormwater Credit Manual.
- (9) Any person who objects to not being exempt from the Site-Related Flow Charge portion of the charge under subsections (5), (6) or (7) may file a notice with the Commission setting out the reasons for the objection and the relevant facts on which that person relies, such notice of objection to be accepted by the Commission by way of email, letter, facsimile, telephone or in person.
- (10) On receipt of a notice of objection the Commission shall, with all due dispatch, vary or confirm, in writing, its original decision, the onus being on the Commission to show, based on engineering or other evidence, that the property in question receives Stormwater Service.
- (11) For greater certainty, any person may register a complaint with the Dispute Resolution Officer under Part XIV of these Regulations respecting a matter which is the subject of this section.
- (12) Any person who disputes a decision of the Commission under subsection (10), after referral to the Dispute Resolution Officer, may refer the matter to the Board for resolution.

#### Charge for Temporary Water, Wastewater or Stormwater Service

- 8.(1) The Commission may furnish water, Wastewater or Stormwater Service to persons requiring temporary Service for construction of buildings or other work.
- (2) Persons referred to in subsection (1) who require water Service shall deposit with the Commission such sum as may be determined by the Commission as being sufficient to defray the cost of making the necessary connection to the Services provided, together with the cost of the meter to be installed to measure the water consumed.
- (3) Upon completion of the work referred to in subsection (2) and the return to the Commission of the undamaged meter, the Commission shall refund the deposit referred to in subsection (2) after payment for the Services provided and the Commission's determination of connection or disconnection charges calculated based on the time and materials used in providing the Service, together with the meter base charge and the consumption and/or Discharge rates in respect of such Service installation.
- (4) The Commission may approve the temporary Discharge of Wastewater or Stormwater to the Wastewater or Stormwater Systems, upon such terms and conditions as the Commission determines appropriate in the circumstances, such temporary Discharges to be subject to the Discharge rate approved by these Regulations.
- (5) Costs incurred by the Commission to sample, analyze, monitor or inspect a temporary Discharge may be charged to and recovered from the person to whom permission to Discharge has been given.

#### New Water, Wastewater or Stormwater Account Charge

9. The Commission shall charge \$25.00 for the creation of a water, Wastewater, or Stormwater account.

### **PART III - BILLING**

#### **Payment of Bills**

- 10.(1) Bills for Service issued by the Commission to Customers shall be payable on the date indicated thereon and will provide as follows:
- (a) Bills issued on a quarterly basis and which are not paid within 30 days after the billing date shall be subject to an interest charge of ~~4-5-1.1~~% per month or part thereof, or a maximum of ~~49-5614.0~~% per annum, such amount being due and payable within such 30 day period, and the effective date of the interest charge shall be clearly shown on the bill.
  - (b) Bills issued on a monthly basis and which are not paid within ~~25-30~~ days after the billing date shall be subject to an interest charge of ~~4-51.1~~% per month or part thereof, or a maximum of ~~49-5614.0~~% per annum, such amount being due and payable within such 30 day period, and the effective date of the interest charge shall be clearly shown on the bill.
  - (c) Bills may be issued annually and if not paid within 30 days after the billing date shall be subject to an interest charge of ~~4-51.1~~% per month or part thereof, or a maximum of ~~49-5614.0~~% per annum, such amount being due and payable within such 30 day period and the effective date of the interest charge shall be clearly shown on the bill.

#### **Adjustment of Bills**

- 11.(1) Any Customer desiring to question their bill shall do so in writing within two years from the date shown on such bill.
- (2) In the event the Commission determines it is necessary to make a billing adjustment as a result of a Customer being under-billed, such adjustment shall be retroactive for a maximum period of one year.
  - (3) Despite subsection (2), in the event that a billing adjustment is the result of the Customer's unauthorized connection to the Water, Wastewater and/or Stormwater System or willful interference with or damage to metering equipment, the Customer shall be responsible for all payments of such accounts from the date such unauthorized connection to the Water, Wastewater and/or Stormwater System or interference with meter equipment occurred.
  - (4) In the event the Commission determines it is necessary to make a billing adjustment as a result of a Customer being over-billed, such adjustment will be estimated by the Commission, and, based upon such estimate, the Commission will pay to such Customer the overbilled amount together with interest at the simple interest rate being paid on savings accounts by the Commission's chartered bank, such period not to exceed two years.
  - (5) If a water meter security seal is broken or if a meter does not register correctly or has been removed without the Commission's authorization, the charge for water, and Wastewater Service shall be estimated in accordance with the best data available to the Commission, provided that if the subject premises are unmetered or a non-user of the Commission's Water System, then the charge for Service will be estimated in accordance with the best available data to the Commission.
  - (6) In the event a Customer has been billed in error for a Service they did not receive, the Commission will reimburse such Customer the amount billed to and paid by the Customer, together with interest at the simple interest rate being paid on savings accounts by the

Commission's chartered bank, respecting the period during which the Customer was incorrectly billed by the Commission, such period not to exceed five years.

- (7) In the event, as a result of a decision respecting a notice of objection pursuant to subsection 7(10) or as a result of any other review carried out under the Regulations it is determined the billing determinant of chargeable Impervious Area for Stormwater accounts is inaccurate or yields an inequitable result the Commission may adjust the chargeable Impervious Area in order to rectify such inequity.
- (8) In the event, as a result of a decision respecting a notice of objection pursuant to subsection 7(9), or through a credit application process, it is determined that a portion of the Stormwater from a ~~Non-Residential~~ ~~Property~~ does not reach a Commission Stormwater System, or the Customer is only receiving the benefit of a culvert at the end of their driveway, the chargeable Impervious Area may be adjusted downward.

#### Estimated Reading for Billing Customers

- 12.(1) The Commission may estimate a meter reading provided that under no circumstances will an estimated reading be used for more than three consecutive billing periods.
- (2) In the event an estimated bill is utilized by the Commission for three consecutive billing periods, the Commission shall make every reasonable effort to obtain a meter reading.
- (3) For the purposes of subsection (2), if entry to the property on which such meter is located is required, the Commission shall notify the Customer by first class mail and undertake its reasonable efforts to obtain a reading, and failing such arrangements being made despite its reasonable efforts, the Commission may suspend Service until arrangements are made with the Customer for the Commission to obtain a reading of such meter.
- (4) When a meter reading referred to in subsection (3) has been obtained, any previously estimated bill or bills provided in respect of Service measured by such meter shall be adjusted by the Commission if required by its reconciliation of metered Service data to previously estimated Service.

#### Suspension or Refusal of Service

- 13.(1) The Commission shall have the right to suspend Service to a Customer, including a Customer at any Common Customer Location, where such Customer's water, Wastewater or Stormwater account remains unpaid for more than 40 days.
- (2) With respect to
- (a) water, Wastewater and Stormwater accounts referred to in subsection 13(1); and
- (b) a Landlord who is in default for more than 40 days under the terms of repayment arrangement referred to in subsection 31(2),
- unpaid balances will be transferred to HRM with a request from the Commission that they be registered as a lien against the property to which Service is provided or in respect of which a repayment arrangement exists under subsection (2) of Section 31, and in respect of which such accounts have been rendered as evidence of such Service or repayment arrangement.
- (3) In the event of a violation of these Regulations by a person or Customer, including liabilities and obligations owed to the Commission by any person or Customer under a private contract for Services entered into between the Commission and such person or Customer, the Commission may refuse or immediately suspend Service to such person or Customer, and may continue such refusal or suspension until the violation has been cured.

#### Collection of Overdue Bills

14. The Commission may charge a \$45.00 fee for each visit by Commission staff to a Customer whose payment is overdue, if in the opinion of the Commission, such fee is warranted.

#### Customer Bill Retrievals/Copies

15. The Commission shall charge a fee of \$12.00 per copy for water, Wastewater, and/or Stormwater bill retrievals or copies issued to Customers outside the Customer's regular billing cycle, except that no such fee shall be charged for the provision of electronic copies of such bills.

#### Dishonoured Payments

16. The Commission shall charge a \$25.00 fee plus bank charges for cheques or pre-authorized payments that have been dishonoured by the Customer's bank or other financial institution.

#### Deposits

- 17.(1) The Commission may require an applicant for water, Wastewater and/or Stormwater Service to deposit with the Commission a sum equal to the estimated charges for six months of Service, which deposit shall be held by the Commission as security for the payment of the applicant's bills as a Customer of the Commission.
- (2) When a Customer referred to in subsection (1) ceases to be a Customer, a deposit paid in accordance with subsection (1) shall be returned to the Customer with interest thereon at the simple interest rate being paid on savings accounts by the Commission's chartered bank.

### **PART IV - CHARGES**

#### Connection/Disconnection of Service

- 18.(1) The Commission shall charge \$55.00 for a connection or disconnection of Service during Regular Working Hours, which charge shall be \$210.00 for a connection or disconnection of Service outside Regular Working Hours.
- (2) When water, Wastewater, or Stormwater Service has been suspended for any violation of these Regulations, such Service shall not be re-established until a connection charge has been paid.
- (3) Despite subsections (1) and (2), where suspension of Service is for non-payment only, the fees set out therein respecting connection or disconnection of Service during Regular Working Hours do not apply in respect of one disconnection and one connection of Service every year, or in any 12-month period.
- (4) The Commission may, in considering the circumstances respecting a request to reconnect Service, decline to reconnect such Service outside Regular Working Hours where the Service was disconnected as a result of a violation of these Regulations.

#### Water Meter Installation

- 19.(1) The Commission shall charge \$60.00 for the installation of a meter in a Customer's premises during Regular Working Hours for a meter size up to and including 25 mm, in a meter setting specified by the Commission and provided by the Customer unless the meter



installation is initiated by the Commission as part of an implementation of AMI or other technology, in which case no charge will be applied.

- (2) Installation of a meter referred to in subsection (1) which takes place outside of Regular Working Hours shall be subject to a charge of \$210.00, unless the meter installation is initiated by the Commission as part of an implementation of AMI or other technology change, in which case no charge will be applied.
- (3) In respect of the installation by the Commission of meters of a meter size of 38 mm or larger in a Customer's premises in a meter setting specified by the Commission and provided by the Customer, such charge shall be calculated based on the Commission's determination of any difficulties or challenges it encountered in carrying out such installation including access to the location of the meter.

#### Customer Monitoring Service

- 20.(1) The Commission may enter into an agreement with a Customer to monitor the metered flow of Service to the Customer and to provide the Customer access to the data generated by such monitoring.
- (2) The cost of providing the monitoring referred to in subsection (1) will be charged to the Customer at the rate of \$120.00 per month per meter and billed to the Customer monthly.

#### Inspection of Service Connections and Driveway Culverts

- 21.(1) The Commission shall require all Water, Wastewater and Stormwater Service Connections, including renewals and repairs, to be inspected by the Commission prior to activation of such water, Wastewater or Stormwater Service, subject to the following fees:
  - (a) Water, Wastewater or Stormwater Service Connections shall be subject to a fee of \$150.00 per inspection visit.
  - (b) Water, Wastewater or Stormwater Service Connections requiring an acceptance package under the Commission's design specifications shall be subject to a fee of \$75.00 per application.
  - (c) where Service Connection installations require work conducted on mains, inspection by the Commission shall occur as deemed necessary by the Commission and shall be subject to a fee of \$75.00 per hour during Regular Working Hours.
  - (d) where multiple Service Connections are inspected within the same inspection visit, the inspection fee shall be charged once.
- (2) Driveway Culverts inspected by the Commission shall be subject to a fee of \$150.00 per inspection visit.
- (3) Backflow prevention device installations inspected by the Commission shall be subject to a fee of \$150.00 per inspection visit.
- (4) Inspections outside Regular Working Hours may be subject to an overtime surcharge to be determined by the Commission.
- (5) Except for the overtime surcharge set out in subsection (4), replacement of a lead

Water Service Connection shall be exempt from the fees set out in this section.

#### Wastewater Rebate

- 22.(1) A Customer who uses more than 1,000 m<sup>3</sup> of water in a one-year period is eligible for a Wastewater rebate if they can demonstrate to the satisfaction of the Commission that the volume of Wastewater Discharged by the Customer into the Commission's Wastewater System is less than the volume of water used by the Customer.
- (2) Upon application for a rebate referred to in subsection (1) being made by a Customer to the Commission, a rebate of the Wastewater Discharge Charge attributable to the difference between the amount of the water used and the amount of Wastewater Discharged to the Commission's Wastewater System shall be paid to the Customer.
- (3) The rebate referred to in subsection (1) does not apply to the Wastewater Discharge Base Charge nor to leakage or wastage from a metered water supply.
- (4) Application for a rebate under subsection (1) shall be made annually by a Customer to the Commission, together with such documentation required by the Commission in support of such application for rebate, such application to be submitted to the Commission no later than 6 months after the year in respect of which the application for rebate is made.
- (5) The Commission, in its sole discretion, may deny a Wastewater rebate application if the Customer has violated these Regulations within the preceding 12 months.

#### Water Service Connection Tapping Connection Fee

- 23.(1) Installations of Water Service Connections requiring the Commission to perform a tapping connection to the water main shall be subject to the following fees:
- (a) 19mm, 25mm, 38mm, 50mm, and 75mm in diameter Water Service Connections shall be subject to a tapping fee of \$375.00 per tapping connection;
- (b) Water Service Connections greater than 75mm in diameter shall be subject to a tapping fee of \$125.00 per 25mm in diameter per tapping connection.
- (2) The Commission shall not be responsible to supply any parts, materials, rigging, traffic control or miscellaneous requirements needed to perform the tapping connection set out in this section.

#### Audit Inspections and Review of Drawings

- 24(1). The Commission shall levy a charge pursuant to a services agreement with any person requesting a review of final design drawings for additions or extensions to the Commission's system, at the following rates:
- |                                       |                         |
|---------------------------------------|-------------------------|
| (a) water mains                       | \$2.00 per linear metre |
| (b) Wastewater mains                  | \$2.00 per linear metre |
| (c) Stormwater mains/Ditches/culverts | \$2.00 per linear metre |
- (2) The charges referred to in subsection (1) are due upon receipt by the Commission of a signed systems agreement with the counterparty to such agreement.

- (3) The Commission will undertake audit inspections of Water, Wastewater and Stormwater Systems in respect of an extension of Commission infrastructure resulting from a subdivision application by an applicant to HRM or in support of a new Service Connection, such audit inspection fee being equal to 0.5% of the estimate of the construction cost of the project or \$2,500, whichever is greater, to which such systems relate.
- (4) Audit inspections fees referred to in subsection (3) which are in respect of an extension of Commission infrastructure incorporated in a subdivision application to HRM shall be remitted to HRM.
- (5) In the event the Commission incurs costs more than or less than the fees described in subsection (3), an amount equal to the difference between such estimated fees and actual cost incurred shall be payable to the Commission or reimbursed to the payor of such estimated cost, as the case may be.

#### Missed Appointment by Customer

25.(1) Where the Commission makes an appointment with a Customer respecting:

- (a) a Water, Wastewater, and/or Stormwater Service Connection;
- (b) the installation of a water meter;
- (c) water turned on or off to a property;
- (d) a Service-related visit requested by the Commission; or
- (e) a Customer's request to have the Commission visit a property,

and the Customer fails to keep or permit such appointment or the required plumbing is not completed to allow for the installation of a water meter, the Commission may levy a charge of \$55.00 for each missed appointment.

- (2) Where the Commission fails to keep an appointment with a Customer under subsection (1), the Commission shall credit the customer's account in the amount of \$55.00 for each missed appointment.
- (3) Despite subsection (2), the \$55.00 charge referred to therein shall not apply in respect of an appointment with a Customer related to an implementation of AMI.

#### Theft of Service

26. The Commission may impose penalties in addition to charges for Service approved by these Regulations for each unauthorized Water, Wastewater, and/or Stormwater Service Connection and bulk fill, as follows:

1st incident	\$300.00
2nd incident (and each incident thereafter)	\$750.00

#### Designated Bulk Fill Station

27.(1) The Commission may permit a person to have access to bulk fill water stations in accordance with the fees, consumption rates and access card use as follows:

- (a) An annual permit fee of \$115.00 will be charged for each vehicle equipped for

access to the bulk fill stations.

(b) Consumption rates for water accessed through the bulk fill stations will be \$2.24 per cubic metre effective April 1, 2016, and \$2.35 per cubic metre effective April 1, 2021.

(c) Bulk fill station account:

- (i) bulk fill station accounts will be pre-loaded in specific dollar amounts and will be recorded as deferred revenue;
- (ii) individual accounts and personal identification numbers (PIN) will be assigned to each vehicle to use the station to access water;
- (iii) when an account is closed by an authorized user any outstanding balance will be refunded to such user.

- (2) Consumption charges will be deducted from an account based on the volume of water sold in accordance with the rate structure authorized by these Regulations.
- (3) Vehicles accessing a designated bulk fill station shall be inspected and approved by the Commission on an annual basis, beginning April 1, as part of its permitting process.
- (4) Designated bulk fill station procedures as prescribed by the Commission shall be adhered to at all times by authorized users as a condition of retaining such permit.
- (5) Failure to comply with the permitting requirements set out in this section shall result in termination of a designated bulk fill station permit.
- (6) The Commission reserves the right to control flow rates at each designated fill station.

#### Area Master Capital Cost Contribution Charge

- 28.(1) The Commission may establish a water, Wastewater and Stormwater capital cost contribution charge to be collected from developers and/or future Customers requiring extension of oversized infrastructure.
- (2) The total amount of a capital cost contribution charge shall ensure that the cost impact to the Commission is neutral to the design, construction, financing and applicable overhead costs, as prescribed by the Commission.
- (3) The water, Wastewater and Stormwater capital cost contribution charge shall be calculated for charge areas referred to in Attachment 2 and allocated on the basis of the water, Wastewater and Stormwater capital cost contribution formula, as set out in Attachment 2.
- (4) Funds collected under the water, Wastewater and Stormwater capital cost contribution charge shall be placed in a reserve account and will be used for extension or improvements of the applicable system within the area related to the charge upon application and subject to the approval of the Board.
- (5) The Commission may require a capital cost contribution from developers and/or future users requiring extension or improvements of the Water, Wastewater or Stormwater

System, the total amount of such capital cost contribution having a cost impact to the Commission which is neutral to the design, construction, financing and applicable overhead as prescribed by the Commission.

- (6) Cost factors to be used in calculating the capital cost contribution in subsection (5) shall include, but not be limited to the supply, storage, transmission, distribution, pressure control and fire protection requirements as required by the Commission from time to time.
- (7) The Commission will allocate capital costs in accordance with the rates and charges approved by these Regulations.

#### Regional Development Charge for Wastewater Infrastructure

29.(1) In this Section,

- (a) "Regional Development Charge" means a regional development charge for Regional Wastewater Infrastructure;
- (b) "Regional Wastewater Infrastructure" means core regional Wastewater treatment facilities and trunk sewer systems directly conveying Wastewater to, or between, such facilities, including
  - (i) existing Wastewater treatment facilities (WWTF) that provide a regional Service including the facilities generally known as the Halifax WWTF, Dartmouth WWTF, Herring Cove WWTF, Eastern Passage WWTF, Mill Cove WWTF, Beechville/Lakeside/Timberlea WWTF, and Aerotech WWTF,
  - (ii) trunk sewers and related appurtenances which directly convey Wastewater to regional treatment facilities,
  - (iii) trunk sewers and related appurtenances which divert Wastewater from one regional treatment facility to another due to environmental concerns, capacity constraints or operational efficiency, and
  - (iv) inflow and infiltration reduction and/or sewer separation projects for the purposes of gathering capacity within the wastewater system for the benefit of planned growth.but does not include infrastructure within or directly adjacent to approved or planned development areas which is required to directly support development within an approved or planned development area;
- c) "Infrastructure Master Plan" is the long-term infrastructure planning and engineering study that identifies the optimal regional water and wastewater infrastructure implementation plan for the Commission to service growth for 30 years.

- (2) A Regional Development Charge shall be established to ensure the cost impact to the Commission is neutral to the design, construction and financing during construction of capacity expansion to Regional Wastewater Infrastructure related to planned growth.
- (3) A Regional Development Charge applicable to new buildings that will be connected to a Wastewater System, as detailed in Table 4B, shall be paid to HRM as agent for the Commission prior to the issuance of a building permit or permit to connect to the Wastewater System, as applicable.

Table 4B. Regional Development Charge - Wastewater

Type of Development	April 1, 2015	May 31, 2021
<b>SUD/TH<sup>1</sup></b>	\$ 4,080.80	\$5,495.68
<b>MUD<sup>2</sup></b>	\$ 2,740.84	\$3,691.13
<b>ICI<sup>3</sup></b>	\$ 2.24/ sq. ft.	\$27.12/sq. m (\$2.52/sq. ft.)

<sup>1</sup> SUD/TH – Single Unit Dwelling/Townhouse/Row Houses 2

MUD – Multiple Unit Dwelling

<sup>3</sup> ICI – Industrial, Commercial or Institutional

- (4) The wastewater Regional Development Charge shall be indexed each year on April 1<sup>st</sup>, in accordance with the indexing set out in the Consumer Price Index for Halifax, as published by Statistics Canada for the immediately preceding month, when compared to the same month for the immediately preceding year.
- (5) For new buildings, building additions and renovations that are undertaken as the redevelopment of an existing serviced building, the Regional Development Charge applicable under subsection (3) shall be based on the net increase in residential units and/or square footage of floor space for ~~Non-Residential~~ residential construction, as applicable, but not including interior or underground parking.
- (6) When an un-serviced lot of land, occupied by a building, existed prior to July 14, 2014, the Regional Development Charge applicable under subsection (3) shall be payable to the Commission, when the building is connected to the Wastewater System.
- (7) A Regional Development Charge applicable to Industrial, Commercial or Institutional premises will be determined by applying the Charge in subsection (3) to the area of the building.
- (8) The Regional Development Charge set out in Table 4B shall be collected by HRM on behalf of the Commission at the time an application for construction approval is submitted.
- (9) Funds collected under the Regional Development Charge pursuant to this section shall be placed in a reserve account and shall be used for providing capacity in Regional Wastewater Infrastructure as defined in the current Infrastructure Master Plan.
- (10) Subject to subsections (11) and (12) the Commission may consider and approve deferral of payment of a Regional Development Charge in its sole discretion where such Charge otherwise payable is \$100,000 or greater.
- (11) The deferral of payment referred to in subsection (10) may be, in the Commission's sole discretion, up to 25% of the Regional Development Charge otherwise payable under this Section, which deferral shall be placed as a lienable charge on the property, to be collected by HRM, pursuant to clause 33(2)(a) of the Halifax Regional Water Commission Act.
- (12) The regional level infrastructure to be supported by the Regional Development Charge is deemed to be for the benefit of the properties to be liened.

- (13) The Regional Development Charge may be deferred for units considered within the Housing Affordability initiatives as defined by Halifax Regional Municipality. Deferrals may be considered for these units up to ten years. Interest will be charged after year two. Halifax Regional Municipality will place a lien on the Property to ensure payment of the Regional Development Charge.
- (14) Subject to subsections (15) and (16), the administration of the Regional Development Charge shall, every five years after, May 31, 2021, be reviewed by the Commission, including with reference to any changes to the Infrastructure Master Plan.
- (15) In the event changes to the inputs to the Infrastructure Master Plan, including growth projections, land use, consumption rates, inflow/infiltration assumptions, capital costs, financing costs, and benefit to existing Customers, result in changes to the infrastructure requirements identified in the Infrastructure Master Plan, including the timing of their implementation, the Regional Development Charge, will be reviewed by the Commission and adjusted, subject to Board approval, prior to a five year review described in subsection (14).
- (16) In the event the changes to infrastructure requirements described in subsection (15) result in an impact of 15%, either in the positive or the negative, to the Regional Development Charge, the Commission will change the Regional Development Charge, subject to Board approval, to reflect such impact in infrastructure requirements.

#### Regional Development Charge for Water Infrastructure

30.(1) In this Section,

- (a) "Regional Development Charge" means a regional development charge for Regional Water Infrastructure;
- (b) "Regional Water Infrastructure" means core regional water supply facilities and the water transmission systems directly conveying water from such facilities to the various distribution systems, including
  - (i) existing water supply facilities that provide a regional Service including the facilities generally known as the J.D. Kline water supply facility at Pockwock Lake and the Lake Major water supply facility at Lake Major,
  - (ii) water transmission mains and related appurtenances which directly convey water from regional treatment facilities to the distribution system,
  - (iii) water transmission mains and related appurtenances which divert water from one regional treatment facility supply area to another due to environmental concerns, capacity constraints or operational efficiency, and
  - (iv) demand reduction measures to provide capacity for growth and are a cost-effective alternative to new regional hard infrastructure are considered eligible.
 but does not include infrastructure within or directly adjacent to approved or planned development areas which is required to directly support development within an approved or planned development area;
- (c) "Infrastructure Master Plan" is the long-term infrastructure planning and engineering study that identifies the optimal regional water and wastewater infrastructure implementation plan for the Commission to service growth for 30 years.

- (2) A Regional Development Charge shall be established to ensure the cost impact to the Commission is neutral to the design, construction and financing during construction of capacity expansion to Regional Water Infrastructure related to planned growth.
- (3) A Regional Development Charge applicable to new buildings that will be connected to a Water System, as detailed in Table 4C, shall be paid to HRM as agent for the Commission prior to the issuance of a building permit or application to connect to the Water System, as applicable.

Table 4C. Regional Development Charge - Water

Type of Development	April 1, 2015	May 31, 2021
<b>SUD/TH<sup>1</sup></b>	\$ 182.88	\$1,723.84
<b>MUD<sup>2</sup></b>	\$ 122.83	\$1,157.80
<b>ICI<sup>3</sup></b>	\$ 0.09/sq. ft.	\$8.51/sq. m. (\$0.79/sq. ft.)

<sup>1</sup> SUD/TH – Single Unit Dwelling/Townhouse/Row Houses

<sup>2</sup> MUD – Multiple Unit Dwelling

<sup>3</sup> ICI – Industrial, Commercial or Institutional

- (4) The water Regional Development Charge shall be indexed each year on April 1<sup>st</sup>, in accordance with the indexing set out in the Consumer Price Index for Halifax, as published by Statistics Canada for the immediately preceding month, when compared to the same month for the immediately preceding year.
- (5) For new buildings, building additions and renovations that are undertaken as the redevelopment of an existing serviced building, the Regional Development Charge applicable under subsection (3) shall be based on the net increase in residential units and/or square foot of floor space for ~~Non-Residential~~ residential construction, as applicable, but not including interior or underground parking.
- (6) When an un-serviced lot of land, occupied by a building, existed prior to July 14, 2014, the Regional Development Charge applicable under subsection (3) shall be payable to the Commission, when the building is connected to the Water System.
- (7) A Regional Development Charge applicable to Industrial, Commercial or Institutional premises will be determined by applying the Charge in subsection (3) to the area of the building.
- (8) The Charge set out in Table 4C will be collected by HRM on behalf of the Commission at the time an application for construction approval is submitted.
- (9) Funds collected under the Regional Development Charge pursuant to this section shall be placed in a reserve account and shall be used for providing capacity in Regional Water Infrastructure as defined in the current Infrastructure Master Plan.
- (10) Subject to subsections (11) and (12) the Commission may consider and approve deferral of payment of a Regional Development Charge in its sole discretion where such Charge otherwise payable is \$100,000 or greater.



- (11) The deferral of payment referred to in subsection (10) may be, in the Commission's sole discretion, up to 25% of the Regional Development Charge otherwise payable under this Section, which deferral shall be placed as a lienable charge on the property, to be collected by HRM pursuant to clause 33(2)(a) of the Halifax Regional Water Commission Act.
- (12) The regional level infrastructure to be supported by the Regional Development Charge is deemed to be for the benefit of the properties to be lienied.
- (13) The Regional Development Charge may be deferred for units considered within the Housing Affordability initiatives as defined by Halifax Regional Municipality. Deferrals may be considered for these units up to ten years. Interest will be charged after year two. Halifax Regional Municipality will place a lien on the Property to ensure payment of the Regional Development Charge.
- (14) Subject to subsections (15) and (16), the administration of the Regional Development Charge for water shall, every five years after May 31, 2021, be reviewed by the Commission, including with reference to any changes to the Infrastructure Master Plan.
- (15) In the event changes to the inputs to the Infrastructure Master Plan, including growth projections, land use, consumption rates, inflow/infiltration assumptions, capital costs, financing costs, and benefit to existing Customers, result in changes to the infrastructure requirements identified in the Infrastructure Master Plan, including the timing of their implementation, the Regional Development Charge, will be reviewed by the Commission and adjusted, subject to Board approval, prior to a five year review described in subsection (14).
- (16) In the event the changes to infrastructure requirements described in subsection (15) result in an impact of 15%, either in the positive or the negative, to the Regional Development Charge, the Commission will change the Regional Development Charge, subject to Board approval, to reflect such impact in infrastructure requirements.

#### Recovery of Costs

- 31.(1) The Commission may recover from a person who has violated these Regulations its costs incurred as a result of any such violation.
- (2) The Commission may recover costs and expenses from a person who has entered into a repayment arrangement with the Commission, respecting an amount not to exceed \$10,000.00, to enable full replacement of the private portion of a lead service line, full replacement of the private portion of No-Corrode Pipe, full replacement of a non-compliant water, Wastewater or Stormwater lateral, or installation of the private portion of a new deep Stormwater sewer lateral, such repayment arrangement not to exceed 60 months at an interest rate not to exceed Prime plus 2%.

#### Fire Hydrant Flow Testing

- 31A.(1) The Commission may, upon request, attend a site to operate the Water System for the purpose of facilitating fire hydrant flow testing.
- (2) Where a person or company has made a request pursuant to subsection (1), such person or company shall:

- (a) Pay for all traffic control expenses, as deemed necessary by the Commission; and
- (b) Pay the Commission the cost of having Commission staff attend as follows:
  - (i) One Commission staff attending: \$300;
  - (ii) Two Commission staff attending: \$600;
  - (iii) More than two Commission staff attending: cost-recovery basis.

## **PART V - FIRE PROTECTION CHARGES**

### **Public Fire Service Charge**

32. The Commission shall annually render to HRM not later than the last day of August, an invoice for fire protection service calculated in accordance with these Regulations.

### **Public Fire Protection Rate**

33. (1) For the period April 1, 2020<sup>1</sup> to ~~March~~ March 31<sup>34</sup>, 2024<sup>2</sup>, HRM shall pay to the Commission for public fire protection services the sum of ~~\$7,336,440~~ \$7,627,564.

~~(2) For the period April 1, 2022 to March 31, 2023, Effective April 1, 2024,~~ HRM shall pay annually to the Commission for public fire protection services the sum of ~~\$7,627,564~~ \$7,627,564.

~~(2)(3) Effective April 1, 2023, HRM shall pay annually to the Commission for public fire protection services the sum of \$8,056,564.~~

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### **Special Service Supplied from Fire Hydrants**

34. (1) Water supplied from fire hydrants is reserved for firefighting or for Commission Water, Wastewater or Stormwater System maintenance purposes.
- (2) Any person, other than the Halifax Regional Fire and Emergency Service or the Commission, who desires to use a fire hydrant for the supply of water, shall obtain prior written approval from the Commission.
- (3) The Commission may furnish water from a fire hydrant to persons requiring temporary supply pursuant to section 8 of these Regulations.
- (4) Any connection to a fire hydrant other than in accordance with this section shall constitute an offence against these Regulations.

### **Building Fire Protection Systems**

35. (1) A Customer, in respect of each of its buildings having a fire protection system installed shall pay annually to the Commission fees for such service as follows:

Table 5. Charges for Sprinklers

<u>Service on or after April 1, 2021:</u>			
<u>Service up to and including September 30, 2020:</u>			
Description	Diameter mm	Ratio of Area to Reference Size	Annual Charge

Reference size	25	1.0	\$50.00
Fire Lines	50	4.0	\$68.00
Fire Lines	75	9.0	\$170.00
Fire Lines	100	16.0	\$269.00
Fire Lines	150	36.0	\$373.00
Fire Lines	200	64.0	\$478.00
Fire Lines	250	100.0	\$478.00
Fire Lines	300	144.0	\$478.00
Service on or after October 1, 2020 up to and including March 31, 2021:			
Reference size	25	1.0	\$50.00
Fire Lines	50	4.0	\$68.00
Fire Lines	75	9.0	\$170.00
Fire Lines	100	16.0	\$269.00
Fire Lines	150	36.0	\$459.00
Fire Lines	200	64.0	\$588.00
Fire Lines	250	100.0	\$588.00
Fire Lines	300	144.0	\$588.00
Service on or after April 1, 2021:			
Reference size	25	1.0	\$50.00
Fire Lines	50	4.0	\$68.00
Fire Lines	75	9.0	\$170.00
Fire Lines	100	16.0	\$269.00
Fire Lines	150	36.0	\$544.00
Fire Lines	200	64.0	\$697.00
Fire Lines	250	100.0	\$697.00
Fire Lines	300	144.0	\$697.00
Service on or after September 1, 2022 up to and including March 31, 2022:			
Reference size	25	1.0	\$50.00
Fire Lines	50	4.0	\$69.00
Fire Lines	75	9.0	\$170.00
Fire Lines	100	16.0	\$272.00
Fire Lines	150	36.0	\$582.00
Fire Lines	200	64.0	\$815.00
Fire Lines	250	100.0	\$815.00
Fire Lines	300	144.0	\$815.00
Service on or after April 1, 2022:			
Reference size	25	1.0	\$50.00
Fire Lines	50	4.0	\$69.00
Fire Lines	75	9.0	\$170.00
Fire Lines	100	16.0	\$275.00
Fire Lines	150	36.0	\$619.00
Fire Lines	200	64.0	\$932.00
Fire Lines	250	100.0	\$932.00
Fire Lines	300	144.0	\$932.00

- (2) A Customer shall be responsible for the cost of installing a private fire line from the street water main to a building, including a shut-off valve approved by the Commission.
- (3) The charges set out in Table 5 shall be based on the size of the line of a building fire protection system at the point of its connection with a hydrant line or sprinkler line.

#### **PART VI - PROVISION OF SERVICE**

#### Liability for Payment of Service

- 36.(1) Any person who applies to the Commission for water or Wastewater Service is deemed to agree to take and pay for such Service according to the rates and charges in accordance with these Regulations.
- (2) Any person receiving Stormwater Service is liable for payment for such Service according to rates and charges in accordance with these Regulations.
- (3) Any person who receives water or Wastewater Service whether metered or unmetered, without the consent of the Commission, shall be liable for the cost of such Service as determined in the sole discretion of the Commission based upon its reasonable estimate of the amount of Service utilized.
- (4) Where Service is supplied to a condominium unit, the condominium corporation in which the unit is situated shall be deemed to be the Customer of record and shall be liable for payment of Service to the condominium unit, except where the Commission determines an alternate arrangement to be appropriate.
- (5) The Commission may, in its sole discretion, require a property owner who rents or leases a property, or a self-contained unit within such property, to open an account with the Commission for Service to such property or self-contained unit.

#### Plumbing to be Satisfactory

- 37.(1) (a) All plumbing, pipes, fittings, vents, fixtures, and other devices used by a Customer in receiving Service from the Commission but which devices are not the property of the Commission, shall be installed in a manner provided by the *Building Code Act* (Nova Scotia) and regulations made thereunder and be approved by a person appointed as a building inspector under HRM's By-law B-201 respecting the Building Code, including its successor, and as amended from time to time.
- (b) Despite clause (a), in order to facilitate a conversion to AMI technology and eliminate the requirements for multiple visits to a Customer's premises, any additional costs to the Commission related to the implementation of AMI, including meter installation, shall be borne by the Commission.
- (2) Service shall not be provided, except for construction and testing purposes, until an applicant for Service has complied with the requirements set out in subsection (1).
- (3) Water Service may be discontinued at any time, if in the opinion of the Commission, a person has not complied with the requirements of subsection (1).
- (4) Water Service to a Customer may be discontinued at any time if, in the opinion of the Commission, the water meter measuring such Service is in a dirty, unsanitary or inaccessible place.

#### Prohibited Appliances

- 38.(1) Water Service may be refused or suspended by the Commission to a Customer who installs or uses any device or appurtenance, including booster pumps, quick opening or quick closing valves, water operated pumps or siphons, stand pipes, private fire hydrants or large outlets for supplying ships, which may cause sudden large demands of any duration or affect the stability of regulation of water pressure in the Commission's Water System.

- (2) Permission to install or use any device or appurtenance listed in subsection (1) shall be obtained from the Commission.

#### Improper Use of Water, Wastewater, or Stormwater

39. No Customer shall permit the improper use of water, Wastewater, or Stormwater, nor sell or give water to any person, except upon such conditions and for such purposes as may be approved in writing by the Commission.

#### Capacity of Wastewater and/or Stormwater Systems

40. In the event the Commission deems that the Wastewater and/or Stormwater Systems, or any portion thereof, have insufficient capacity to accept existing or proposed Wastewater and/or Stormwater flows, the Commission may require that the amount of flow which can be Discharged into the Wastewater and/or Stormwater Systems be limited according to such terms and conditions as the Commission may approve.

#### Pipe Installation

41. The Commission shall not be required to install pipe in any short term or seasonal conditions which, in its opinion, are not suitable for such installations and under which the Commission cannot guarantee a free flow of water, Wastewater and/or Stormwater in service pipes.

#### Unauthorized Extensions, Additions, or Connections

42. No person shall, without the prior written consent of the Commission, make or cause to be made any connection to any part of the water, Wastewater or Stormwater System, or in any way obtain or use the Water, Wastewater or Stormwater System in any manner other than as set out in these Regulations.

#### Interference with Commission Water System

- 43.(1) No person shall, unless authorized by the Commission in writing:

- (a) draw water from, open, close, cut, break, infill, alter or in any way injure or interfere with any fire hydrant, water main, service pipe, or property of the Commission;
- (b) obstruct the free access to any hydrant, valve, service box, meter, or property of the Commission.

Nothing in this section shall be deemed to prevent an officer or member of the Halifax Regional Fire and Emergency engaged in discharge of his duties and responsibilities, from using any hydrant or other source of water supply of the Commission for such purpose.

#### Interference with Commission Wastewater or Stormwater System

44. No person shall, unless authorized by the Commission in writing:

- (a) Discharge Wastewater or Stormwater into the Wastewater System or Stormwater System in a manner that is not permitted by these Regulations;
- (b) open, cut, break into, or in any way injure or interfere with any part of the Wastewater System or Stormwater System, or any property of the Commission;
- (c) obstruct the free access by the Commission to any portion of the Wastewater System or Stormwater System.

## **PART VII – METERING**

### **Water to be Supplied Only by Meter**

- 45.(1) All water Service shall be metered, except as otherwise provided in these Regulations.
- (2) The Commission shall approve the size and type of meter to be installed for water Service, which meters remain the property of the Commission while metering such Service.
  - (3) Where a Customer chooses to sub-meter to allocate costs, such sub-meter shall be installed downstream of the Commission's meter.
  - (4) Sub-meters referred to in subsection (3) shall be considered by the Commission to be owned, installed, read and maintained by the Customer at the Customer's expense.
  - (5) Despite subsections (3) and (4), data provided by the Commission's meter shall be used to prepare billings for Service.
  - (6) In the event of a discrepancy between readings displayed by a meter and a meter reading device located on the exterior of a building to which water service is provided the reading of the meter shall govern.
  - (7) A Customer shall not sell unmetered water to any person without the prior written approval of the Commission.

### **AMI Meters**

- 45A(1) Where AMI becomes available to a Customer, the Commission is authorized to require such Customer to have an AMI meter installed for the metering of Service.
- (2) Where AMI is the standard meter in use, and an AMI meter is not installed, such Customer will be subject to a charge of \$50.00 per read for the measurement of Service by a meter which is required to be read manually and such meter will be read on a quarterly basis.
  - (3) Where a Customer has water Service measured by a meter using radio frequency technology to report meter readings to a receiving device, such Customer cannot refuse replacement of such meter with an AMI meter.

### **Installation and Removal of Water Meters**

- 46.(1) All meters, outside register devices, and radio frequency units, shall be installed, maintained and removed with the approval of and under the supervision of the Commission.
- (2) No person shall install, alter, change or remove a meter without the prior written permission of the Commission.
  - (3) Each metered Service shall have a stop device located at the property line or outside the building foundation wall of a premises where Service is provided, as determined by the Commission, to permit control of such Service.
  - (4) Each water Service line shall be metered individually.

- (5) A Service Connection to a meter shall be installed with a shut-off valve on both sides of the meter, inside the building, to the satisfaction of and without expense to the Commission, and as prescribed by the Commission.

#### Location of Water Meters

- 47.(1) The Commission shall have the right to refuse water Service to, or suspend the water Service of any Customer who does not provide a place which, in the opinion of the Commission, is suitable for a meter, and a related reading device located on the exterior of the building to which Service is provided.
- (2) A meter shall be located in the building to which water Service is provided in close proximity to the point of entry into such building of the service pipe, in a location where it can be easily read, and replaced, and where it will not be exposed to temperatures below the freezing point of water.
- (3) A meter reading device located on the exterior of a building to which water Service is provided shall be located where it can be easily read and replaced.
- (4) In the event of an alteration or renovation to a building to which water Service is provided, the Customer shall be responsible, as required by the Commission, to relocate the meter, including, as may be required by the Commission, a meter reading device located on the exterior of such building, at the Customer's expense and to a location approved by the Commission.
- (5) Where the premises of a Customer are of such a nature that a meter cannot be adequately installed in a building or if the building is not sufficiently resistant to the effects of frost to maintain the proper and accurate functioning of the meter, the Commission may order the Customer to provide a reasonably frost resistant insulated receptacle in which the meter can be placed for its safe and accurate functioning.
- (6) Until a Customer complies with the requirements set out in subsection (5) the Commission may refuse or suspend water Service to the premises.
- (7) In order for a Customer to comply with the requirements set out in subsection (5), the Commission may require such Customer to have installed at the Customer's expense a by-pass around a meter which is 75 mm or larger in diameter.

#### Master Water Meters

- 48.(1) In circumstances where a Customer or Customers is or are, as the case may be, provided Service by the Commission with multiple water meters, the Commission may supply, at its expense, a master meter and install such master meter in a location on such Customer's premises in a manner approved by the Commission.
- (2) A Customer is liable to pay for water which passes through the meter measuring Service to such Customer, provided, however, that if the aggregate of the amounts of water passing through the meters of individual Customers is less than the amount of water passing through the master meter associated with the meters of such individual Customers, the difference in cost of Service obtained by subtracting the aggregate cost of metered water Service measured by the meters of individual Customers from the cost of metered water Service measured by the master meter shall be shared equally among such individual Customers.
- (3) The Commission may suspend water Service without notice to those individual Customers

referred to in subsection (2) who fail to pay their respective portion of the difference in cost of water Service described therein.

(4) Customers receiving water Service where there is a master meter providing Service as described in subsection (1) are jointly and severally liable for all water passing through such master meter and for the minimum charges therefor as provided herein.

- (5) The Customer, or group of individual Customers referred to in this section, as the case may be, is responsible for the distribution of water from the Commission's master meter to the properties of a Customer or Customers, and the Commission shall be under no obligation to install, maintain or replace any pipes, appliances, fixtures, or other apparatus connected therewith.

#### Damage to Water Meters

49.(1) A Customer is responsible for the condition of the ERT and the water meter installed on the Service Connection through which Service is provided to the Customer's premises and shall take reasonable measures to protect the condition of such water meter.

- (2) A Customer is liable for any damage to a water meter, ERT and related equipment, providing Service to such Customer's premises, including damage resulting from any willful act, carelessness, hot water, steam, or the action of frost.

- (3) Where the Commission determines a Customer is liable pursuant to subsection (2), such customer shall pay to the Commission:

(i) Damaged ERT	\$80.00
(ii) Wire to ERT cut	\$80.00
(iii) Damaged 15mm water meter	\$110.00
(iv) Damaged 19mm water meter	\$145.00
(v) Damaged 25mm or larger water meter	market price/cost recovery

- (4) After tendering a bill to a Customer for costs referred to in subsection (3), and such bill remains unpaid 30 days thereafter, the Commission may suspend water Service to such Customer.

#### Meter Testing

50.(1) Subject to subsection (2), and in respect of meter sizes 15mm to 50mm, upon receiving a request from a Customer to have such Customer's meter tested the Commission may charge the sum of \$100.00 to defray in part the cost of conducting the test.

- (2) If the test referred to in subsection (1) indicates that:

- (a) for positive disc type displacement meters the meter is over-registering by more than 1.5 %, or  
(b) for turbine or compound meters the meter is over-registering by more than 3%,

the sum charged to a Customer under subsection (1) shall be refunded to such Customer and the bill for Service rendered to that Customer shall be adjusted accordingly, provided that no volumetric adjustment shall be made for a period beyond two years prior to such test and one refund shall be made only to the Customer who, based on such test results, overpaid for Service.



(3) For meters of 75 mm and larger which require on-site testing, the Commission shall levy

a fee to cover the expenses in contracting a third party to conduct testing.

- (4) The amount referred to in subsection (3) shall be billed to the Customer if the testing conducted confirms to the satisfaction of the Commission that the meter was providing accurate readings prior to the Customer's request that the meter be tested.
- (5) If a meter has been removed from service due to its replacement any dispute between the Commission and the Customer will be resolved based on the best information available in the absence of the meter, including historic metered consumption and occupancy and use of the premises in respect of which such Service is provided.

## **PART VIII - WATER SERVICE**

### **Water Service Connection**

- 51.(1) Upon receipt of an application for water Service to any premises fronting on a public street, where there exists adjacent to such section of public street a Commission owned and active water main and such premises are not already provided with water Service, the Commission shall allow the installation of a Service Connection which it considers to be of suitable size to provide the Service required, provided that
- (a) no Water Service Connection smaller than 19 mm in diameter shall be installed;
  - (b) the necessary excavation for the laying of the Service Connection, backfilling, and replacement of the street and sidewalk surfaces from the water main in the street to the premises, including the supply and laying of the Service Connection and fittings to the specifications of the Commission, shall be the responsibility of the applicant for water Service and all such work shall be performed without cost to the Commission;
  - (c) such excavation may be the same excavation as is used for the Service Connection or if minimum horizontal and vertical separation between water and Service Connections cannot be obtained, a separate excavation for the water Service Connection shall be required, provided, however, that in either case, the excavation shall be carried out by the applicant to the satisfaction of the Commission;
  - (d) should any person make application for more than one Service Connection to a premises, the decision respecting the necessity of the additional service pipe shall be made by the Commission;
  - (e) all Service Connections shall be installed in accordance with the *Building Code Act*, R.S.N.S. 1989, c. 46 and regulations made under the authority of that Act and to the satisfaction of the Commission;
  - (f) when a Service Connection has been installed without objection from the Customer as to its location, no subsequent removal of or alteration to the position of the Service Connection shall be made except at the expense of the Customer requesting such removal or alteration;
  - (g) each water Service Connection shall be individually metered;
  - (h) in the event of a change of the use of such premises, including by way of rezoning, re-subdivision, condominium conversion or otherwise, where such use would result in an increased occupancy of the premises, the owner of such premises shall apply to the Commission for a determination of whether the existing Service Connection or Connections is or are, as the case may be, of a suitable size to provide the increased demand required, pursuant to which application:

- (i) the applicant may be required to provide a hydraulic analysis of the proposed water use and existing system to determine the suitability of the Service for the new use, subject to the Commission, in its sole discretion, determining whether existing Service Connections are not suitable;
  - (ii) all such Service Connections shall be installed at the owner's expense, from the main water line in the public street or right of way to the applicant's premises, such installation to be in accordance with the *Building Code Act*, R.S.N.S. 1989, c.46 and regulations made under the authority of that Act and to the satisfaction of the Commission.
- (2) When a Water Service Connection is abandoned or is to be abandoned, the Commission may require the owner of the property serviced by such Water Service Connection to, at its expense, cap off such Water Service Connection at the water main water line or as otherwise prescribed by the Commission.
- (3) The Commission may require the owner referred to in subsection (2) to provide either a maintenance bond in the amount of ten thousand dollars (\$10,000.00) respecting residential Water Service Connections and twenty thousand dollars (\$20,000.00) respecting ICI Water Service Connections, or a certified cheque payable to the Commission to ensure performance of such abandonment.
- (4) Where an owner fails to carry out an abandonment referred to in subsection (3) within six months of issuance of a demolition permit by HRM, the Commission shall be entitled to negotiate the maintenance bond or certified cheque, as the case may be, referred to in subsection (3) without notice to the owner, and apply the proceeds to the cost of completing such abandonment, together with other costs related thereto, and the balance of the proceeds, if any shall be returned to the owner without interest.
- (5) Where an application for a Service Connection is submitted to the Commission with a building permit for a construction project with a value greater than \$100,000.00, or where a property is being redeveloped, and the Service Connection is 30 years of age or older, the owner shall install a replacement or new Service Connection at the owner's expense and in accordance with the Commission's design specifications.

#### Lead Water Service Connection Replacement

- 51A.(1) The Commission shall implement a program to replace all public and Customer-owned lead Water Service Connections within its water Service boundary, which shall consider:
- (a) Overall cost to the Commission;
    - (b) Disturbance to the public and environment;
    - (c) Public health impacts;
    - (d) Sensitive and vulnerable populations; and
    - (e) Other factors as determined by the Commission.
  - (2) For the purposes of this section, a Customer-owned lead Water Service Connection is deemed to begin at the Customer's property line abutting the street right of way and terminate at the point it connects to the water meter on the Customer's premises.
  - (3) Where the Commission causes an unplanned disturbance of a lead Water Service

Connection, the Commission shall replace any disturbed Customer-owned lead Water Service Connections as soon as practicable at the Commission's expense.

- (4) Where the Commission determines in its sole discretion, that replacement of a Customer-owned lead Water Service Connection should be undertaken on a priority basis, the Commission shall replace such lead Water Service Connection as soon as practicable. The Commission is authorized to pay reasonable expenses for replacements pursuant to this subsection up to a maximum of ten thousand dollars (\$10,000.00) per replacement.
- (5) The Commission shall integrate replacement of public and Customer-owned lead Water Service Connections with HRM paving renewal programs, where such integration would be cost-effective and practical. The Commission is authorized to pay reasonable expenses for replacements of Customer-owned lead Water Service Connections pursuant to this subsection up to a maximum of ten thousand dollars (\$10,000.00) per replacement.
- (6) The Commission shall consider replacement of Customer-owned lead Water Service Connections where an application has been submitted to the Commission for replacement, and the Commission has, in its discretion approved such application. The Commission is authorized to pay reasonable expenses for replacements pursuant to this subsection up to a maximum of ten thousand dollars (\$10,000.00) per replacement.
- (7) The Commission shall offer reimbursement of reasonable expenses for replacements of Customer-owned Water Service Connections done at the Customer's expense. Reimbursements pursuant to this subsection shall not exceed 25% of the total reasonable expenses up to a maximum of two thousand five hundred dollars (\$2,500.00) per replacement.
- (8) Where a Customer-owned lead Water Service Connection is replaced, the Commission shall replace the lead Water Service Connection leading to such Customer's property as soon as practicable thereafter.
- (9) The Commission shall obtain the consent of the Customer in advance of the Commission replacing any Customer-owned lead Water Service Connection. In the event a Customer refuses such consent, and the Commission determines refusal of consent may result in an increase in lead levels in drinking water within the Customer's premises, the Commission may suspend water service until such time as consent is provided.
- (10) Upon receipt of consent pursuant to subsection (9), the Customer shall grant access to the Commission to such portions of the Customer's lead Water Service Connection as deemed necessary by the Commission. Such access shall be at the Customer's expense, including any costs associated with restorations inside the Customer's premises.
- (11) A Customer who refuses consent pursuant to subsection (9) may not be entitled to the benefit of any payment or reimbursement by the Commission pursuant to this section.

#### Water Service Cross Connection Control & Backflow Prevention

- 52.(1) In the event of any breach, contravention or non-compliance by a person of any of the provisions in subsections (2), (3), (4) or (5), the Commission may:

- (a) suspend water Service to such person, or
  - (b) give notice to the person to correct the breach, contravention or non-compliance within 96 hours, or a specified lesser period, provided that, if such person fails to comply with such notice, the Commission may immediately suspend water Service to such person.
- (2) No person shall connect, cause to be connected, or allow to remain connected to a Water System, or a plumbing installation, without the prior written approval of the Commission, any piping fixtures, fittings container or sanitary appliance in a manner which may cause water, Wastewater, or any other liquid, chemical or substance, to ingress or egress the Water System.
- (3) Where, in the opinion of the Commission, there may exist a risk of contamination to the Water System, the Commission may, despite subsection (1), require a Customer, at the Customer's sole cost and expense, to install at any point on the Customer's Water Service Connection, one or more backflow prevention (BFP) devices, which devices shall be of a quality and type approved by the Commission.
- (4) All BFP devices installed pursuant to subsection (3) shall be maintained in good working order, inspected and tested by a certified tester approved by the Commission, at the expense of the Customer, and carried out annually or at such other intervals as the Commission may require.
- (5) A Customer shall submit a report in a form approved by the Commission respecting all tests performed pursuant to subsection (4) on a BFP device within 7 days of a test, such report form to be displayed on or adjacent to the BFP device on which the tester shall record:
- (a) the name and address of the owner of the device;
  - (b) the location, type, manufacturer, serial number, and size of the device;
  - (c) the test date, the tester's initials, the tester's name, the name of the tester's employer, and the tester's license number.
- (6) The Commission shall maintain a program for the issuance, renewal and cancellation of cross connection control tester's licenses, which shall include minimum standards, insurance requirements, fees and administrative procedures.
- (7) Installation, maintenance, field-testing and selection of all BFP devices shall conform to the standards and requirements as approved by the Commission.

#### Alternate Water Supply Prohibited

- 53.(1) Subject to subsection (2), where a Customer's plumbing is connected to the Commission's Water System, connection to any other source of water supply is prohibited.
- (2) The prohibition in subsection (1) does not apply where a Customer has installed on its private water supply or Water Service Connection a device acceptable to the Commission to prevent the flow of water from another source of water supply into the Commission's Water System.

#### Repairs to Water Service Connection

54. Where a repair to a Water Service Connection is required:

- (a) it shall be carried out as soon as practicable at the Commission's expense if the repair is located between the main and the street boundary line or the easement boundary, and otherwise at the Customer's expense;
- (b) despite clause (a) the Commission may make such repairs for any Customer provided the Customer agrees to pay the cost of repair and provided the Customer requesting the Commission carry out such work deposits with the Commission a sum equal to the estimated cost of the work; and
- (c) should a repair be required on the Customer's portion of the Service Connection, and the Customer, after being notified, refuses or unreasonably delays to have repairs made, the Commission may, upon notice to the Customer, discontinue the Customer's water Service in order to prevent wastage of water or property damage;
- (d) for greater clarity, a repair does not include lead Water Service Connection replacement.

#### Water Service Pressure Reducing Valves

55. Where, in the opinion of the Commission, a pressure reducing valve is required for proper Service to a Customer:

- (a) the valve shall be installed on the service pipe between the meter and the shutoff valve on the supply side of the meter;
- (b) the type of valve shall be satisfactory to the Commission; and
- (c) the Customer shall be responsible for the cost of purchasing, installing and maintaining the valve.

#### Water Service Control Valves

56. In respect of water service control valves:

- (a) the service box or valve housing the premises' control valve shall be exposed for access by Commission personnel at all times,
- (b) all control valve service boxes or valves shall be fully exposed and adjusted to final landscape grade before the installation of the premises' water meter,
- (c) any adjustment to the service box or valve box shall be the responsibility of the Customer,
- (d) the Commission may provide the service to adjust the service box or valve box and invoice the Customer for all expenses incurred in providing such service,
- (e) in the event the service box is buried, paved over, back-filled or damaged as a result of carelessness, willful obstruction or any other like occurrence that, in the opinion of the Commission, results in the Commission being required to expose, adjust or repair the service box and/or valve box, such activity of the Commission shall be at the Customer's expense,
- (f) the Commission may undertake such activities as it deems necessary to gain access to the premises' control valve or curb-stop without expense to the Commission,
- (g) in respect of actions undertaken by the Commission pursuant to clauses (e) and (f), reinstatement of the road, right-of-way, driveway, sidewalk, curb or landscape will, at the discretion of the Commission, be charged to and recovered from the Customer.

#### Water Conservation Directives

- 57.(1) The Commission may implement water conservation measures, if in the opinion of the Commission, such measures will permit the Commission to provide a reliable, continuous water supply to all Customers serviced by the Commission.
- (2) During such times as water conservation measures referred to in subsection (1) are implemented, Customers who do not comply with such measures may have their water Service suspended during such period as the Commission's water conservation measures are in place.
- (3) The cost of turning on a water Service suspended pursuant to subsection (2) will be the responsibility of the Customer.

#### Acceptance of Private Community Water, Wastewater and Stormwater Systems

58. The acceptance of private community water, Wastewater and Stormwater systems by the Commission shall be in accordance with Attachment 1 to these Regulations, entitled "Procedure for Acceptance of Private Community Water, Wastewater and Stormwater Systems".

### **PART IX - FIRE PROTECTION**

#### Fire Protection Service Pipes

- 59.(1) Upon receipt of an application, the Commission will permit an applicant to install a fire protection service pipe from the street main to the applicant's premises, subject to the applicant being responsible for all excavation, backfill, labour, material and street and sidewalk restoration costs related to such fire protection Service pipe installation and subject to the Commission making the required connection to the street main at the applicant's cost.
- (2) If requested by an applicant, and subject to the applicant having applied for and received all required approvals, a metered Service pipe may be connected to the fire protection Service pipe outside the serviced premises provided such metered Service pipe is fitted with a shutoff valve approved by the Commission.
- (3) The portion of a private fire line that extends from the water main in a street to the street boundary line of a property shall be, and is hereby deemed to be, vested in the Commission and the Commission's portion of such line shall be maintained by the Commission.
- (4) Discharge of water from fire protection systems for maintenance purposes shall be in accordance with these Regulations.

#### Private Fire Protection

- 60.(1) Fire protection plumbing within buildings shall be installed in such manner that all pipes will be open and readily accessible for inspection at any time by authorities having jurisdiction in such matters, and no connection for any purpose other than fire protection

shall be made thereto,

- (2) Unless approved by the Commission in writing, no fire protection charge line shall be connected in any manner to a metered Service,
- (3) A Customer is solely responsible for the maintenance, repair and replacement of all privately-owned fire protection systems, including fire protection plumbing, valves, sprinklers, hydrants, and related appurtenances.

#### **PART X - WASTEWATER AND/OR STORMWATER SERVICE**

##### Wastewater and/or Stormwater Service Connections

- 61.(1) Every Wastewater and Stormwater Service Connection shall be designed and constructed at the expense of the Customer served by such Service Connection, whether on privately owned property or otherwise.
- (2) No person shall make a physical pipe connection to the Wastewater System or the Stormwater System without the prior written approval of the Commission.
- (3) The Commission may require a Wastewater or Stormwater Service Connection to be inspected and brought into compliance with these Regulations and the Commission's design and construction specifications as amended from time to time.
- (4) The Commission shall determine the necessity of having more than one Wastewater Service Connection or more than one Stormwater Service Connection to a premises upon application by any person requesting more than one such Connection.
- (5) When the portion of a Wastewater or Stormwater Service Connection located within a street right of way or easement has been installed without objection from a Customer respecting location of such Service Connection, no subsequent removal or alteration of the location of such Service Connection shall be made except at the expense of the Customer requesting such removal or alteration.
- (6) In the event of a change of the use of premises, by way of rezoning, re-subdivision, condominium conversion or otherwise, where such use would result in an increased occupancy of the premises, the owner of such premises shall apply to the Commission for a determination as to whether the existing Wastewater or Stormwater Service Connection or Connections is or are, as the case may be, of a suitable size to provide the increased demand required on such Service Connection or Connections and, in respect of such application:
  - (a) the applicant may be required to provide a hydraulic analysis of the proposed Wastewater and/or Stormwater generation and existing downstream system capacity to determine the suitability of the Service Connection for a proposed new use;
  - (b) should the Commission determine that the existing Wastewater and/or Stormwater Service Connection or Connections is or are, as the case may be, not suitable, the property owner shall comply with the requirements of the Commission with respect to its determination of the appropriate type and size of Wastewater or Stormwater Service Connection to be utilized; and
  - (c) such Wastewater and/or Stormwater Service Connections shall be installed at the



owner's expense and all installation shall be to the satisfaction of the Commission.

- (7) When Wastewater or Stormwater Service Connections are abandoned or are to be abandoned, the Commission shall require the owner of the property serviced by such Wastewater or Stormwater Service Connections to, at its expense, cap off such Service Connection or Connections at the main, or as otherwise prescribed by the Commission.
- (8) The Commission may give notice in writing to an owner of a property serviced by the Wastewater System or Stormwater System, requiring such owner, within the time specified in such notice, to connect to the Wastewater System or Stormwater System through a Wastewater or Stormwater Service Connection.
- (9) Where an application for a Service Connection is submitted to the Commission with a building permit for a construction project with a value greater than \$100,000, or where a property is being redeveloped, and the Service Connection is 30 years of age or older, the owner shall install a replacement or new Service Connection at the owner's expense and in accordance with the Commission's design specifications.

#### Repairs to Wastewater and/or Stormwater Service Connections

62. In the event a Wastewater or Stormwater Service Connection is obstructed, the following procedure shall be followed in removing the obstruction:
- (a) at the Customer's expense, the Customer shall be responsible for the initial investigation and clearing of the obstruction with the services of a licensed plumber to identify the cause and the location of the obstruction and take all necessary measures to remove the obstruction before requesting the Commission for assistance;
  - (b) if the obstruction is located in the portion of the Service Connection on private property, the Customer shall be responsible for all the costs of removal of the obstruction, including the expenses of any contractor to excavate and replace the pipe if necessary and including obtaining any permits required by HRM by-laws or the Commission before commencing any excavation;
  - (c) if the obstruction is located in the portion of the Service Connection on HRM property, between the main and the street line or the easement boundary, and a plumber is unable to remove it, the Customer shall submit to the Commission a written report from a plumber and a video identifying the location and probable cause of the obstruction and on receipt of such report and video, the Commission shall investigate the obstruction and if it is determined by the Commission that the cause of the obstruction was:
    - (i) non-structural, the Commission shall advise the Customer of its determination and the Customer shall be responsible for clearing the obstruction, including replacing the pipe, if necessary;
    - (ii) caused by a broken, sheared, sagged, or collapsed pipe or some other structural cause, the Commission will rectify the deficiency and reimburse the Customer for the cost of plumbing and video services in an amount not exceeding \$400.00, including HST; and
    - (iii) caused by the roots from an HRM owned tree, the Commission will clear the obstruction and, on behalf of HRM, reimburse the Customer for the cost of plumbing and video services in an amount not exceeding \$400.00, including HST.

## **PART XI - WASTEWATER AND STORMWATER DISCHARGE**

### **Discharge into the Wastewater System**

- 63.(1) No person shall Discharge into a Wastewater System, Wastewater which causes or may cause:
- (a) a health or safety hazard;
  - (b) obstructions or restrictions to the flow in the Wastewater System;
  - (c) an offensive odour to emanate from the Wastewater System, including with respect to Wastewater containing hydrogen sulphide, mercaptans, carbon disulphide, other reduced sulphur compounds, amines, or ammonia in such quantity that may cause an offensive odour;
  - (d) damage to a Wastewater System;
  - (e) interference with the operation and maintenance of the Wastewater System;
  - (f) a restriction of the beneficial use of Biosolids from the Wastewater System;
  - (g) effluent from the Wastewater System to be in violation of any Provincial or Federal Acts or Regulations;
  - (h) capacity or hydraulic impacts which may interfere with the operation of the Wastewater System.
- (2) No person shall Discharge into the Wastewater System, Wastewater with any one or more of the following characteristics:
- (a) a pH less than 5.5 or greater than 9.5;
  - (b) two or more separate liquid layers;
  - (c) a temperature greater than 65 degrees Celsius.
- (3) No person shall Discharge, into the Wastewater System, one or more of the following:
- (a) Combustible Liquids;
  - (b) Fuel;
  - (c) Hauled Waste or Leachate, except with the prior written approval of the Commission;
  - (d) Ignitable Waste including but not limited to, flammable liquids, solids, or gases, capable of causing or contributing to an explosion or supporting combustion in the Wastewater System;
  - (e) detergents, surface-active agents or other substances that may cause excessive foaming in the Wastewater System;
  - (f) dyes or colouring materials which pass through the Wastewater System and discolour the Wastewater infrastructure or effluent;
  - (g) Pathological Waste in any quantity;
  - (h) PCBs;
  - (i) Pesticides;
  - (j) Reactive Waste;
  - (k) Waste Radioactive Substances, including ~~naturally-occurring-radioactive-material (NORM)~~, in excess of concentrations greater than those specified for Release to the environment under the *Nuclear Safety and Control Act* and Regulations made thereunder, each as amended from time to time;
  - (l) Hazardous Waste;
  - (m) Extraneous Water or Wastewater without the prior written approval of the Commission;
  - (n) ~~a~~Animal by-product;

(o) seawater;

- (4) Subject to Sections 65 and 74, no person shall Discharge into the Wastewater System, Wastewater containing a substance with a concentration in excess of any of the limits set out in Table 6:

Table 6: Limits for Discharge to Wastewater System

Parameter	Milligrams Per Litre
Aluminum, Total	50
Antimony, Total	5
Arsenic, Total	1
Barium, Total	5
Benzene	0.01
Beryllium, Total	5
Biochemical Oxygen Demand	300
Bismuth, Total	5
Cadmium, Total	0.7
Chemical Oxygen Demand	600
Chloride	1500
Chloroform	0.05
Chromium, Total	2
Cobalt, Total	5
Copper, Total	1
Cyanide, Total	2
1,2 - Dichlorobenzene	0.05
1,4 - Dichlorobenzene	0.08
cis - 1,2 - Dichloroethylene	4.0
trans - 1,3 - Dichloropropylene	0.15
Ethylbenzene	0.06
Fluoride	10
Iron, Total	50
Lead, Total	1
Manganese, Total	5
Mercury, Total	0.01
Methylene chloride	0.2
Molybdenum, Total	5
Nickel, Total	2
Oil & Grease - mineral or synthetic in origin (TPH)	15
Oil & Grease - animal or vegetable in origin	100
Phenolic Compounds (4AAP)	1
Phosphorus, Total	10
Selenium, Total	1
Silver, Total	2
Sulphates Expressed as SO <sub>4</sub>	1500

Parameter	Milligrams Per Litre
Suspended Solids, Total	300
Sulphide (as H <sub>2</sub> S)	1.0
1,1,2,2 - Tetrachloroethane	0.5
1,1,2,2 - Tetrachloroethylene	0.5
Tin, Total	5
Titanium, Total	5
Toluene	0.01
Total Kjeldahl Nitrogen	100
Trichloroethylene	0.5
Vanadium, Total	5
Xylene, Total	0.3
Zinc, Total	2

\*Refer to section 63(2) for pH limit

\*\*A reference to "Total" in this table denotes total concentrations of all forms of the metal and ion including both particulate and dissolved species.

- (5) No person shall dilute Wastewater in order to become compliant with these Regulations, without the prior written approval of the Commission.
- (6) No person shall Discharge Uncontaminated Water into the Wastewater System without the prior written approval of the Commission.

#### Stormwater Discharge to the Wastewater System

- 64.(1) The Commission may from time to time undertake testing or inspections to identify and locate connections that convey Stormwater into the Wastewater System.
- (2) No person shall, without the prior written approval of the Commission connect, cause to be connected, or allow to remain connected to the Wastewater System or plumbing installation, any piping, fixtures, sump pumps, downspouts, fittings appliances or like equipment or device in a manner which allows or may allow Stormwater to ingress or flow into the Wastewater System.
  - (3) The Commission may direct a person to Discharge Stormwater to the Stormwater System, a surface area or Watercourse.
  - (4) Upon the Commission creating a new Service account for a person, the Commission may require a Wastewater Service Connection to be inspected and brought into compliance with these Regulations, at such person's expense.
  - (5) The inspection required in subsection (4) shall include the Discharge location of any roof or foundation drain or sump pump and such other inspection activities as will permit the Commission to determine whether a Wastewater Service Connection is in compliance with these Regulations.
  - (6) The Commission may determine, in its discretion, that this Section does not apply to existing premises connected to an existing Combined Sewer system or to new premises intended to be connected to a Combined Sewer system, provided that those premises are

not serviced or able to be serviced by a separate Stormwater System.

Discharge of Extra Strength Wastewater and Extraneous Water or Wastewater

65.(1) The Commission, at its sole discretion, may enter into an agreement with a person or Customer who Discharges Extra Strength Wastewater and/or Extraneous Water or Wastewater.

(2) An agreement referred to in subsection (1) shall include:

- (i) terms and conditions under which such Discharge will be permitted by the Commission;
- (ii) the testing program, as approved by the Commission, to determine value of the Discharge load;
- (iii) the measurement mechanism and frequency, as approved by the Commission, to determine the Discharge flow; and
- (iv) costs and fees, as determined by the Commission.

Discharge into and Obstruction of the Stormwater System

66.(1) No person shall Discharge into a Stormwater System, matter which causes or may cause:

- (a) a health or safety hazard;
- (b) interference with the operation of a Stormwater System;
- (c) obstruction or restriction of a Stormwater System or the flow therein;
- (d) damage to a Stormwater System;
- (e) impairment to the quality of the water in a Stormwater System; or
- (f) the quality of the water Discharged from a Stormwater System owned or operated by the Commission to be in violation of Provincial or Federal Acts or regulations.

(2) No person shall Discharge into a Stormwater System, matter which results in one or more of the following:

- (a) visible sheen, film or discolouration;
- (b) two or more separate layers;
- (c) a pH less than 6.0 or greater than 9.5;
- (d) a temperature greater than 40 degrees Celsius; or
- (e) foam or any matter which, by itself or in combination with another substance, is capable of producing foam that will persist for 5 minutes or more.

(3) No person shall Discharge into a Stormwater System:

- (a) Hazardous Waste;
- (b) Combustible Liquids;
- (c) floating debris;
- (d) Fuel;
- (e) Hauled Waste;
- (f) Pathological Waste;
- (g) PCB's;
- (h) Pesticides;
- (i) Reactive Waste;

- (j) Toxic Substances;
  - (k) Waste Radioactive Substances, in excess of concentrations greater than those specified for Release to the environment under the *Nuclear Safety and Control Act* and regulations made thereunder, each as amended from time to time;
  - (l) E. coli colonies in excess of 200 per 100 mL;
  - (m) water from sprinkler systems and Non-contact Cooling Water,
  - (n) water from washing equipment used in the mixing and delivery of concrete and cement based products;
  - (o) ~~animal~~ animal by-product or ~~animal~~ animal waste;
  - (p) oil and grease, ~~animal~~ animal or vegetable in origin;
  - (q) any substance other than Stormwater or Uncontaminated Water except as authorized in writing by the Commission; or
  - (r) groundwater or surface water used for or caused by a renovation, repair, demolition, maintenance, construction or land development activity, except as authorized in writing by the Commission.
- (4) No person shall Discharge into a Stormwater System, matter containing a concentration, expressed in milligrams per litre, in excess of the limits set out in Table 7 as follows:

Table 7. Limits for Discharge to Stormwater System

Parameter	Milligrams per litre
Arsenic, Total	0.02
Benzene	0.002
Biochemical Oxygen Demand	15
Cadmium, Total	0.008
Carbon tetrachloride	0.02
Chloroform	0.002
Chromium, Total	0.02
Copper, Total	0.03
Cyanide, Total	0.02
Ethylbenzene	0.002
Fluoride	1.5
Lead, Total	0.05
Mercury, Total	0.0004
Nickel, Total	0.08
Phenols	0.008
Phosphorus, Total	0.4
Selenium, Total	0.01
Silver, Total	0.001
Suspended Solids, Total	15
Thallium, Total	0.01
Toluene	0.002
1,1,2 - Trichloroethylene	0.0076
Xylene, Total	0.0044
Zinc, Total	0.04
1,2 - Dichlorobenzene	0.0056

1,4 - Dichlorobenzene	0.0056
cis -1,2 - Dichloroethylene	0.0056
trans - 1,3 - Dichloropropylene	0.0056
Methylene chloride	0.0052
1,1,2,2 - Tetrachloroethane	0.017
1,1,2,2 - Tetrachloroethylene	0.0044
Di-n-butyl phthalate	0.015
Bis (2-ethylhexyl) phthalate	0.0088
PAHs	0.002

\*Refer to section 66(2) for pH limit

\*\*A reference to "Total" in this table denotes total concentrations of all forms of the metal and ion including both particulate and dissolved species.

- (5) No person shall permit erosion or sediment runoff which results in an exceedance of any of the limits in Table 7 to enter a Stormwater System.
- (6) No person shall infill or alter a Stormwater Ditch unless authorized by the Commission in writing.
- (7) The Commission may direct and require a person or property owner who infilled or altered a Stormwater Ditch to remove the infill or remediate any alteration.
- (8) The cost of removal or remediation of Ditch alterations not authorized by the Commission shall be the responsibility of the person or property owner.
- (9) The Commission may prohibit a person or Customer from connecting sump pumps or downspouts to a Stormwater Service Connection and may require a person or a Customer to disconnect sump pumps or downspouts from the Stormwater Service Connection if, in the opinion of the Commission, the Stormwater System may be subject to capacity restrictions as a result of the connection of such sump pumps and downspouts.

#### Wastewater Discharges to Stormwater Systems

- 67.(1) The Commission may, from time to time, undertake testing or inspections to identify and locate Wastewater entering into a Stormwater System.
- (2) No person or Customer shall connect, cause to be connected, or allow to remain connected to the Stormwater System or plumbing installation, without the express written consent of the Commission, any piping, fixtures, fitting or appliance in a manner which may allow Wastewater or any other liquid not authorized by these Regulations to ingress or flow into the Stormwater System.
- (3) No person or Customer shall Discharge Wastewater anywhere except into the Wastewater System, a private on-site Wastewater system or a private central Wastewater collection system and treatment facility.
- (4) Where in the opinion of the Commission, there exists a risk of Wastewater or any other liquid not authorized by these Regulations, flowing into a Stormwater System, the Commission may require a Customer, at such Customer's sole cost and expense, to install or remove at any point on a Stormwater System, one or more fittings or appurtenances to

prevent such connection.

- (5) The Commission may require a Stormwater Service Connection to be inspected and brought into compliance with the provisions of these Regulations, at the property owner's expense, when a new Service account is created.

#### Swimming Pools and Spas

- 68.(1) Water from swimming pools, wading pools, whirlpools, hot tubs, spas and other similar facilities may be Discharged into the Wastewater or Stormwater System, subject to compliance with these Regulations, including Part II of these Regulations if the water is Extraneous Water or Wastewater.

### **PART XII - PRETREATMENT**

#### Pretreatment Facilities

- 69.(1) Where a Customer installs a Pretreatment Facility, such Facility shall be installed upstream of a Monitoring Access Point, where a Monitoring Access Point exists or is proposed.
- (2) An owner or operator of a Pretreatment Facility shall ensure the design, operation and maintenance of a Pretreatment Facility achieves its treatment purpose in accordance with its manufacturer's operating specifications.
- (3) An owner or operator of a Pretreatment Facility shall ensure that any waste products recovered from a Pretreatment Facility are not Discharged into the Wastewater or Stormwater System
- (4) Maintenance records and waste disposal records respecting a Pretreatment Facility shall be available to the Commission upon request, which records shall be retained by an owner or operator of a Pretreatment Facility for a minimum of two years following the generation of such records.

#### Food Related Grease Interceptors

- 70.(1) Any person who has a permit to operate a restaurant or like food service establishment, or an ICI premises where food is cooked, processed or prepared, and which premises are connected directly or indirectly to a Wastewater System, shall install a grease Interceptor and comply with these Regulations.
- (2) Where a grease Interceptor is installed or is required to be installed pursuant to subsection (1),
  - (a) the grease Interceptor shall not Discharge to the Stormwater System;
  - (b) the grease Interceptor shall be installed in compliance with the most current requirements of the *Building Code Act*, R.S.N.S. 1989, c. 46 and regulations made under the authority of that Act;
  - (c) the grease Interceptor shall be installed and maintained to meet the standards and requirements as determined and approved by the Commission, including but not limited to:



- (i) when a grease Interceptor is required to service a dishwasher, it shall be a dedicated grease Interceptor or a bypass of such Interceptor as may be approved by the Commission;
- (ii) grease Interceptors shall be cleaned by removing 100% of intercepted substances when the thickness of the grease and solids layers therein become greater than 25% of the Interceptor volumes with a cleaning frequency of at least once every four weeks, unless otherwise permitted by the Commission;
- (iii) during each cleaning, grease Interceptors shall be inspected while empty to ensure that the internal components, such as baffles and walls are structurally sound and damaged components will be replaced to ensure that the grease Interceptor will continue to perform as intended;
- (iv) all grease Interceptors not approved in accordance with the standards and requirements set out in clause (c) shall be replaced with grease Interceptors meeting the standards and requirements set out in clause (c) by January 1, 2024.
- (d) maintenance requirements for grease Interceptors shall be posted in the workplace in proximity to the grease Interceptor;
- (e) a maintenance schedule and record of maintenance for each grease Interceptor shall be made available to the Commission upon request for each such device installed, and, if requested, such record of maintenance shall include a measurement of the thickness of the grease and solids layer present at each cleaning, expressed as a percentage of the liquid volume of the grease Interceptor, together with an indication of the structural condition of its internal components;
- (f) the owner or operator of a premises referred to in subsection (1) shall keep documentation respecting proof of the grease Interceptor clean-out and maintenance and oil and grease disposal for a period of two years following the generation of such a record;
- (g) no person shall use enzymes, bacteria, solvents, hot water or other agents to facilitate the conveyance of oil and grease through a grease Interceptor to a sewer system; and
- (h) removal of retained or trapped materials from a grease Interceptor shall be accomplished by pumping or other physical means and the resulting recovered material shall be hauled away and disposed in accordance with applicable statutes and regulations.

#### Vehicle and Equipment Service Oil and Grease Interceptors

- 71.(1) Every owner or operator of a vehicle or equipment service station, repair shop or garage or of an ICI premises or any like establishment where motor vehicles are repaired, lubricated or maintained, and from which premises the Wastewater Discharge is directly or indirectly connected to a sewer, shall install an oil and grease Interceptor in accordance with these Regulations, and otherwise comply with these Regulations.
- (2) Where an oil and grease Interceptor is installed or is required to be installed pursuant to subsection (1),
- (a) the oil and grease Interceptors shall not Discharge to the Stormwater System;
  - (b) oil and grease Interceptors shall be installed in compliance with the most current requirements of the *Building Code Act*, R.S.N.S. 1989, c. 46 and regulations made under the authority of that Act;
  - (c) all oil and grease Interceptors and separators shall be installed and maintained in accordance with standards approved by the Commission, and otherwise shall be maintained in good working order by the owner or operator of the premises where they

are located, according to the product manufacturer's recommendations and shall be inspected regularly to ensure performance of such Interceptors is maintained to the manufacturer's specifications for performance and to ensure oil and grease concentrations do not exceed the recommended level;

- (d) a maintenance schedule and record of maintenance for each oil and grease Interceptor installed shall be available to the Commission upon request;
- (e) the owner or operator of a premises referred to in subsection (1) shall keep documentation respecting proof of the Interceptor clean-out and oil and grease disposal for a period of two years following the generation of such a record;
- (f) no person shall use enzymes, solvents, hot water or other agents to facilitate the conveyance of oil and grease through an oil and grease Interceptor to a sewer system; and
- (g) removal of retained or trapped materials from an oil and grease Interceptor shall be accomplished by pumping or other physical means and the resulting recovered material shall be hauled away and disposed of in accordance with applicable statutes and regulations.

#### Sediment Interceptors

72.(1) Every owner or operator of a premises from which sediment may directly or indirectly enter the Wastewater System or Stormwater System, including premises using a ramp drain or area drain and including vehicle wash establishments, shall comply with these Regulations.

- (2) Where a sediment Interceptor or similar facility is installed or is required to be installed pursuant to subsection (1):
  - (a) catch basins installed on private property for the purpose of collecting Stormwater and carrying it into the Stormwater System shall be equipped with an Interceptor, as required by the Commission;
  - (b) the installation of catch basins referred to in clause (a) shall comply with the Commission's design and construction specifications, as amended from time to time;
  - (c) all sediment Interceptors shall be maintained in good working order by the owner or operator of the premises, according to the product manufacturer's recommendations and shall be inspected regularly to ensure performance of such Interceptors is maintained to the manufacturer's specifications for performance;
  - (d) despite clause (c), sediment or other retained or trapped materials shall be removed from a catch basin Interceptor when the sump basin has been filled or when accumulated materials are capable of passing into a Wastewater System or Stormwater System;
  - (e) removal of retained or trapped materials from a sediment Interceptor shall be accomplished by pumping or other physical means and the resulting recovered material shall not be Discharged to the Wastewater or Stormwater System;
  - (f) the owner or operator of a premises referred to in subsection (1) shall keep documentation respecting proof of the of the Interceptor clean-out and sediment disposal for a period of two years following generation of such a record; and
  - (g) a maintenance schedule and record of maintenance for each sediment Interceptor shall be available to the Commission upon its request

## **PART XIII - MONITORING, SAMPLING AND REPORTING**

### **Wastewater Service Reporting Requirements**

- 73.(1) No person shall Discharge Wastewater, Stormwater, Non-contact Cooling Water, or any combination thereof, from an ICI premises to the Wastewater System without first submitting to the Commission reports in a form prescribed by the Commission, known as Form 1: Abbreviated Discharger Information Report and Form 2: Detailed Discharger Information Report, and as amended from time to time.
- (2) A person who files reports with the Commission in Form 1 and Form 2 shall file further reports in Form 1 and Form 2 as information contained in such Forms, as filed, changes.
- (3) The Commission may require additional information to that which is contained in either Form 1 or Form 2 at any time.

### **Wastewater Service Compliance Agreement**

- 74.(1) The Commission may enter into a compliance agreement with a person who Discharges or intends to Discharge into a Wastewater System but who is not in compliance with these Regulations, for the purpose of having such person comply with these Regulations.
- (2) A compliance agreement referred to in subsection (1) shall:
- (a) be for a fixed term;
  - (b) contain requirements to report to the Commission on significant stages in a process or a person to comply with these Regulations;
  - (c) include terms and conditions for Discharges into a Wastewater System during the term of such compliance agreement; and
  - (d) include a termination clause providing for termination by the Commission where, in the opinion of the Commission, any party to a compliance agreement is not meeting the terms and conditions thereof.

### **Monitoring, Sampling, and Reporting**

- 75.(1) The Commission may require a person to undertake monitoring, flow metering, or sampling and reporting to the Commission of any Discharge to a Wastewater System or Stormwater System on such terms and conditions as may be required by the Commission.
- (2) All sampling and analysis conducted as part of monitoring referred to in subsection (1) shall be carried out in accordance with Standard Methods by an Accredited Laboratory at the expense of the person referred to in subsection (1).

### **Wastewater and/or Stormwater Service Sampling and Analytical Requirements**

- 76.(1) Where the Commission requires sampling to determine the concentration of substances in Wastewater or Stormwater, the sample may:
- (a) be collected manually or by using an automatic sampling device;
  - (b) be collected by Grab Sample or Composite Samples; and

(c) contain additives for its preservation.

- (2) All sampling and analysis conducted as part of monitoring referred to in subsection (1) shall be carried out in accordance with Standard Methods and by an Accredited Laboratory.

#### Wastewater and/or Stormwater Monitoring Access Point

77.(1) The Commission shall require the installation of a Monitoring Access Point or the upgrading of an existing Monitoring Access Point, for each connection to a Wastewater System or a Stormwater System for the purpose of monitoring, flow metering or sampling Discharges, unless exempted by the Commission.

- (2) A Monitoring Access Point under this section shall be:

- (a) located on the property of the person discharging into a Wastewater System or a Stormwater System, unless the Commission permits an alternate location;
- (b) constructed and maintained at the expense of the person referred to in clause (a);
- (c) accessible at all times by the Commission;
- (d) constructed in a manner which meets the standards of the Commission;
- (e) maintained to ensure access and structural integrity;
- (f) offset behind the street line, unless otherwise approved by the Commission, or located on the property of the owner or operator of the premises, as close to the property line as possible, unless otherwise permitted by the Commission; and
- (g) maintained so as to be free of buildup, deposits, or such other condition as may interfere with monitoring, flow metering or sampling.

#### Releases

78.(1) In the event of a Release capable of having an Adverse Effect on a Water, Wastewater or Stormwater System or the environment, including the health of humans and reasonable enjoyment of life or property, the person having responsibility for or management or control of such Release or its source shall immediately notify the Commission and provide any requested information with regard to the Release.

- (2) [Repealed.]

- (3) The person referred to in subsection (1) shall take all reasonable measures to contain the Release, protect the health and safety of citizens, minimize damage to property, protect the environment, clean up the Release and contaminated residue, and restore the affected area to its condition prior to the Release.

- (4) The person referred to in subsection (1), or such other person with knowledge of the Release, shall, at the request of the Commission, provide a detailed report on the Release to the Commission within five business days after the request, containing, to the best of his or her knowledge, all of the following:

- (a) the location where the Release occurred;
- (b) the name and telephone number of the person who reported the Release and the location and time where they can be contacted;

- (c) the date and time of Release;
  - (d) the material Released;
  - (e) the characteristics and composition of material Released;
  - (f) the volume of material Released;
  - (g) the duration of Release event;
  - (h) the work completed and any work still in progress in the remediation of the Release;
  - (i) the preventive actions being taken to ensure a similar Release does not occur again;
  - (j) copies of applicable Release prevention and Release response plans for future events.
- (5) The Commission may invoice a person responsible for a Release to recover its costs of time, materials and services as a result of the Commission's response to the effect of such Release on the Commission's Water, Stormwater or Wastewater System, and such person responsible for a Release shall pay the Commission's costs as invoiced.

#### **PART XIV – DISPUTE RESOLUTION OFFICER**

##### **Dispute Resolution Office Established**

- 78A.(1) There is established an officer for investigations respecting Service, to be called the Dispute Resolution Officer (DRO).
- (2) The DRO shall be appointed by the Commission.
  - (3) The DRO shall not be a current or former employee of the Commission, a current or former member of the Commission, or a family member of a current employee or member of the Commission.
  - (4) The DRO shall not divulge any information received under these Regulations except for the purpose of giving effect to these Regulations.
  - (5) The DRO shall be compensated for hours worked and reasonable disbursements according to an hourly rate to be established by the Commission in consultation with the DRO and to be monitored with reference to rates for consultants and professionals with similar qualifications and experience.
  - (6) The DRO shall submit to the Commission on a monthly basis invoices for services and claims for expenses and reimbursable disbursements in accordance with the Commission's expense reimbursement policy.
  - (7) The costs and expenses incurred by the DRO may be paid from the rate regulated revenues of the Commission.

##### **Term of Office**

- 78B.(1) Unless the DRO office becomes vacant sooner, the DRO shall hold office for five years from the date of appointment under Section 78A and, if otherwise qualified, is eligible to be re-appointed.
- (2) The DRO may resign by notice in writing to the General Manager of the Commission.

#### Removal or Suspension

78C. With the approval of the Board, the Commission may remove or suspend the DRO from ~~his~~ office for cause or incapacity.

#### Extent of Disclosure in Report of DRO

78D. Despite subsection (4) of section 78A, the DRO may disclose in a report pursuant to these Regulations any matters which are necessary to disclose in order to establish grounds for any conclusions and recommendations.

#### Refusal or Cessation of Investigation

78E.(1) The DRO may refuse to investigate or may cease to investigate a complaint if:

- (a) an adequate remedy or right of appeal already exists (not including a direct appeal to the Board) whether or not the complainant has availed himself or herself of such remedy or right of appeal;
  - (b) the complaint is trivial, frivolous, vexatious or not made in good faith;
  - (c) having regard to all the circumstances of the case, further investigation is unnecessary;
  - (d) the complaint relates to any decision, recommendation, act or omission of which the complainant has had knowledge for more than one year before complaining;
  - (e) the complainant does not have sufficient personal interest in the subject matter of the complaint; or
  - (f) upon a balance of convenience between the public interest and the complainant the DRO is of the opinion that the complaint should not be investigated.
- (2) Where the DRO decides not to investigate, or to cease to investigate a complainant, the complainant and any other interested person shall be informed of such decision and may state reasons therefor.

#### Notification of Investigation

78F. Where the DRO intends to investigate a complaint under these Regulations, ~~the Director of Corporate Services at~~ the Commission shall be notified.

#### Nature of Investigation

78G.(1) Every investigation under these Regulations is to be conducted in private.

- (2) The DRO may hear or obtain information from any person and make inquiries.
- (3) The complainant and the Commission shall respond to all reasonable requests of the DRO for information which the DRO considers relevant to his investigation.
- (4) The DRO may, at any time during or after an investigation, consult the General Manager or a Director at the Commission or the complainant in the matter of the investigation.

#### Report of DRO

78H.(1) By investigation the DRO shall inquire into a valid customer complaint that the

Commission administered or is administering these Regulations in respect of Service:

- (a) unreasonably, unjustly, oppressively or in a discriminatory manner, or pursuant to a rule of law, enactment or practice that so results;
- (b) under mistake of law or fact, in whole or in part;
- (c) wrongly;
- (d) contrary to law;
- (e) by using a discretionary power for an improper purpose, or on irrelevant grounds, or by taking irrelevant considerations into account, or by failing to give reasons for the use of discretionary power when reasons should have been given.

(2) Where, upon investigation pursuant to subsection (1), the DRO is of the opinion that

- (a) the complaint should be referred to the Commission for further consideration;
- (b) an omission should be rectified;
- (c) a decision should be cancelled or rectified;
- (d) a practice by reason of which the complaint arose or may arise should be altered;
- (e) a provision of these Regulations by reason of which the complaint arose or may arise should be reconsidered;
- (f) reasons should be given for the use of a discretionary power; or
- (g) other steps should be taken,

the DRO shall report to the complainant and the Commission, the reasons therefor and any recommendations for resolution of the complaint.

(3) ~~Upon receipt of the DRO's report referred to in subsection (1) the Commission shall provide such report to the Commission to act upon the DRO's recommendations, within 45 days of receipt thereof, should the Commission consider that any such action is warranted.~~

#### Order of DRO

78I.(1) Where, after investigating a matter, the DRO determines that the complainant and the Commission are unlikely to settle the complaint by mediation, or the Commission refuses to follow a recommendation, the DRO shall, within ~~fourteen~~ 14 days, make an order to adjudicate the complaint.

(2) An order of the DRO under subsection (1) shall be binding on the complainant and the Commission.

#### Appeal from Order of DRO

78J.(1) Despite subsection 78I(2), the complainant or the Commission may appeal to the Board within ~~thirty~~ 30 days of any order of the DRO ~~to the Board~~.

(2) The Board shall inquire into ~~the matter~~ an appeal *de novo* and make such inquiries and receive such information as the Board deems appropriate.

## **PART XV - OFFENCES**

### **Offences**

79. Where the Commission believes that a person has contravened any provision of these Regulations, it may commence proceedings by issuing a Summary Offence Ticket in accordance with the *Nova Scotia Summary Proceedings Act*, and any regulations made thereunder.



## **ATTACHMENT 1**

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### **HALIFAX REGIONAL WATER COMMISSION PROCEDURE FOR ACCEPTANCE OF PRIVATE COMMUNITY WATER, WASTEWATER AND STORMWATER SYSTEMS**

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#### **INTENT:**

This procedure sets out the requirements for the Halifax Regional Water Commission (the Commission) to accept existing private community water, Wastewater and Stormwater Systems into the Commission's plant.

#### **SYSTEM DEFINITION:**

A private community water, Wastewater or Stormwater System (a community system) is defined as an existing system serving at least ten (10) individual dwellings. The portion of the system eligible for acceptance by the Commission includes:

- The treatment plant(s) and/or pumping station(s) within the public road right of way, public easement or community system owned land, and
- The system pipes and appurtenances within the public road right of way or public easement, and
- The portion of the individual service laterals within the public road right of way or public easement.

The portion of the service lateral on private property shall remain the responsibility of the individual property owner.

The Commission will not consider acceptance of a standalone community stormwater system. Stormwater systems may be considered for acceptance as an ancillary part of an existing community wastewater system.

#### **INTRODUCTION:**

The Commission's infrastructure generally conforms to industry standards and the Commission Design Specifications. Further, Nova Scotia Environment (NSE) has published its Surface Water Treatment Standard and Groundwater Treatment Standard which identify the acceptable level of treatment for surface and ground waters, respectively. Existing Commission systems meet these standards. For a community system to be accepted into the Commission's plant, the Commission requires that the community system meets or can be upgraded to Commission and Federal/Provincial standards.

**PROCEDURES FOR ACCEPTANCE:****A. Pre-Qualification**

1. To qualify for consideration of acceptance and subject to all other conditions in this Procedure being met by the applicant, it must be demonstrated by the applicant that the community system will meet, or can be upgraded to meet, the following basic design standards:

Water System

- a) A reliable source of supply from a quantity point of view.
- b) Compliance with the NSE Groundwater Treatment Standard or Surface Water Treatment Standard, as applicable.
- c) Water meters for each individual customer, and individual service lines with shutoff valves.
- d) Adherence with the Commission's Design Specifications, where directly applicable.
- e) In addition to the appropriate Treatment Standard, adherence with the health and aesthetic parameters of the Guidelines for Canadian Drinking Water Quality.

Wastewater and Stormwater Systems

- a) Wastewater and Piped Stormwater Systems Compliance with all applicable Federal and Provincial legislation, regulations and requirements.
  - b) Adherence with the Atlantic Canada Wastewater Guidelines Manual for Collection, Treatment and Disposal.
  - c) Adherence with the Commission's Design Specifications, where directly applicable.
2. To qualify for consideration of acceptance, it must be demonstrated by the applicant that the Commission will have the ability to legally take over the system if all other conditions are met.
  3. If the above requirements in 1 and 2 above cannot be established, the community system cannot be accepted by the Commission, and the application will proceed no further.

**B. Application for Acceptance**

If the requirements of 'A' have been met, the application for acceptance of the community system will be made by the community system customers. The cost of the application will be borne by the applicants. The application will consist of:

- a) A petition signed by two-thirds of the persons identified by the community system as its customers.
- b) The engineering drawings, as available.
- c) A System Assessment Report, conducted in accordance with NSE's Terms of Reference for System Assessment Reports, and sealed by a professional engineer.
- d) A pre-design report for all required upgrades to the system(s) to meet the Commission design standards including a detailed estimate of costs.

Note - The engineering drawings shall consist of:

- a) Record drawings for the water supply or wastewater treatment plant.

- b) Layout of the community showing the location of distribution and collection piping and services.
- c) Survey plan identifying property parcels and easements necessary for conveyance of the system to the Commission.

#### **C. Commission Board and NSUARB Approval**

With receipt of a complete and compliant Application for Acceptance, Commission staff shall prepare a report for recommendation of acceptance of the community system by the Commission Board. Subsequent to Commission Board approval, a request shall be sent to the NSUARB for approval of the community system acceptance.

#### **D. Transfer Agreement**

Subsequent to the approval of the NSUARB, an agreement will be executed with the applicant finalizing the transfer.

The terms and conditions of the agreement shall include:

- Requirement to design, construct and commission all required system upgrades by the applicant with all costs paid by the applicant.
- Upon completion of the required upgrade work at no cost to the Commission, certification from the applicant's engineer that all required upgrades have been completed to the required standards.
- Transfer of all assets of the community system, including any land or easements to the Commission with all costs paid by the applicant.

As an alternative mechanism for the payment of the upgrade costs, HRM Council may establish a betterment charge for the utility customers to collect the project costs.

Once the agreement with the applicant has been executed, betterment charge notices will be sent to all customers of the system. The amount of assessment will be based on equivalent units of a 15 mm water meter (or an equivalently equitable means for Wastewater Systems), with all utility customers being responsible for the total cost of the project.

The betterment charges shall be paid in accordance with the HRM Local Improvement By-law Policy and until payment is complete, shall constitute a lien against the property in respect to which the charges levied, as provided for in the Local Improvement By-law, subject to approval by HRM Council.

Upon completion of the project, staff will recommend to HRM Council that the betterment charges be levied.

When all conditions of the agreement have been met, including the full payment of all associated costs (including the final levying of any associated HRM betterment charge), the Commission will take formal ownership of the system(s) and establish customer contracts to provide Service.

**E. Rate Structure:**

The rate structure for newly accepted community systems will be based on full cost recovery with a cap at 2.5 times the actual urban core rates in effect.

**ATTACHMENT 2**

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**HALIFAX REGIONAL WATER COMMISSION****WATER, WASTEWATER AND STORMWATER CAPITAL COST CONTRIBUTION POLICY**

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**PART I:****Introduction**

The Water, Wastewater and Stormwater Capital Cost Contribution (WWS CCC) Policy provides for the recovery of costs required to provide oversized water, Wastewater and Stormwater infrastructure within a 'charge area'. The costs of providing this infrastructure are shared by developers, and in some cases, by the Commission. After the completion of a Master Plan Study, a charge area will be established that becomes the basis for the development of a WWS CCC Charge. The WWS CCC Charge shall take into consideration all aspects of the required infrastructure, financial risks to the Commission, timing of contributions, phasing of development and any other considerations that could have a financial impact on the Commission.

**Section 1: Master Plan Study Area & Charge Area**

- a) The Master Plan area and terms of reference for the study as it relates to the Commission must consider such factors as density, existing Water, Stormwater and Wastewater Systems, drainage basins, existing & proposed water service districts, service boundaries, land use development areas, soil conditions, topography, and other factors deemed appropriate. The Master Plan area is not constrained by landownership.
- b) The charge area will generally be the Master Plan study area. However, depending on service considerations, the charge area may also include areas outside the Master Plan area.
- c) Oversized water, Wastewater and Stormwater infrastructure will be defined in the Master Plan for the charge area. Notwithstanding, the impact on existing or planned infrastructure outside the Master Plan study area will be taken into account in the Master Plan Study.

The Commission may require information from the developer(s) regarding the planning and system requirements in the preparation of the Master Plan.

**Section 2: Oversized Components**

- a) Oversizing components of a charge area may include, but are not necessarily limited to water distribution and transmission system including pumping stations, pressure reducing chambers and reservoirs, Wastewater collection system including pumping stations and stormwater collection systems including retention ponds. The infrastructure required to service a charge area may be located outside of the charge area and may include land costs (including easements) associated with providing required infrastructure.
- b) Infrastructure which is exterior to a charge area, such as water and Wastewater treatment plants and related infrastructure may be included in the capital cost calculations. In any event, all costs of Oversized Infrastructure to provide service to the charge area will form part of the WWS CCC.

### Section 3: Oversized Infrastructure Required to Serve Future Developments

- a) Where oversizing of infrastructure within a charge area is identified as providing benefit to future development, the Commission may invest in the Oversized Water, Wastewater and Stormwater Infrastructure required for the future development.
- b) The oversizing required to service future development on lands adjacent the charge area, shall be determined, and the investment by the Commission shall be evaluated in accordance with the Funding Criteria defined in Section 18.

### Section 4: Drainage from Adjacent Lands

In a Master Plan Area, if drainage from adjacent lands requires the oversizing of storm sewers, the cost of providing the oversizing will form part of the WWS CCC for the charge area.

### Section 5: Oversized Infrastructure that Benefits Existing Developed Areas

- a) Where an existing developed area receives a direct service benefit from Oversized Water, Wastewater and Stormwater Infrastructure, the Commission may pay a share of the oversized system costs based upon the Capital Costs per acre. The Commission's share is not included in the WWS CCC recovered from new development within the charge area.
- b) The Commission will establish the extent to which the existing developed areas receive a benefit from Oversized Water, Wastewater and Stormwater Infrastructure. This benefit will be determined according to the procedures and guidelines of this Policy.
- c) Where system capacity provided by new infrastructure within a charge area is used by existing serviced areas, to a degree less than or equal to that existing system capacity used by the charge area, the Oversized Water, Wastewater and Stormwater Infrastructure required for the charge area will not be considered a benefit to the existing area.
- d) Existing developed areas may be excluded from a charge area if they are not included in the new infrastructure design calculation, or do not derive a direct benefit from these new systems.
- e) Where the Commission has contributed to existing developed areas contained in a charge area, the Commission may recover from WWS CCC from infilling or by way of rezoning, or subdivision, the Equivalent Capital Cost Contributions from new development within the existing community. In effect, the Commission may make payment of water, Wastewater and Stormwater Capital Cost Contributions in advance for future development in existing areas and recover the contributions when new development occurs.
- f) The Commission's expenditures shall be evaluated in accordance with the Funding Criteria defined in Section 18, Funding Criteria.

### Section 6: Upfront Payment of Oversized Infrastructure by the Commission

- a) To fulfill its leadership role, the Commission may consider it necessary to invest in the oversized and required water, Wastewater and Stormwater infrastructure in a charge area in advance of the revenue stream necessary to construct the systems.
- b) The Commission may also decide to facilitate the acquisition of rights-of-ways, land, and other required systems or facilities beyond the control of one or more developers. Commission investments shall be evaluated in accordance with the criteria determined in

## Section 18, Funding Criteria.

### Section 7: Infrastructure Exterior to the Charge Area

- a) Oversized and required infrastructure exterior to the charge area will be included in the capital Oversized water, Wastewater and Stormwater Infrastructure for the charge area. The Commission will be required to accurately establish the Oversized Infrastructure that is attributed to a specific charge area.
- b) water, Wastewater or Stormwater facilities would only be included in the capital cost if their upgrade or expansion can be directly attributable to a specific charge area.

### Section 8: Cost Estimates

- a) The basis for the WWS CCC is an estimate of the Oversized Infrastructure required to service the charge area. The estimated costs shall be escalated to account for the year in which the construction takes place and shall include interest during construction. The Commission will use the ENR Canada Indices to estimate costs in the future, in accordance with Section 14, Timing and Sequencing of Development. In addition, the Commission will include appropriate administration costs for the projects.
- b) The Commission, in consultation with the developers, will develop the cost estimates for Oversized water, Wastewater and Stormwater Infrastructure, both within and outside the charge area, that will form the basis of the CCC. The Commission will make every effort to establish cost estimates in consultation with the Stakeholders. The Commission may accept the developers' estimates to construct the systems if the developers agree to construct the Oversized water, Wastewater and Stormwater Infrastructure at the estimated cost.

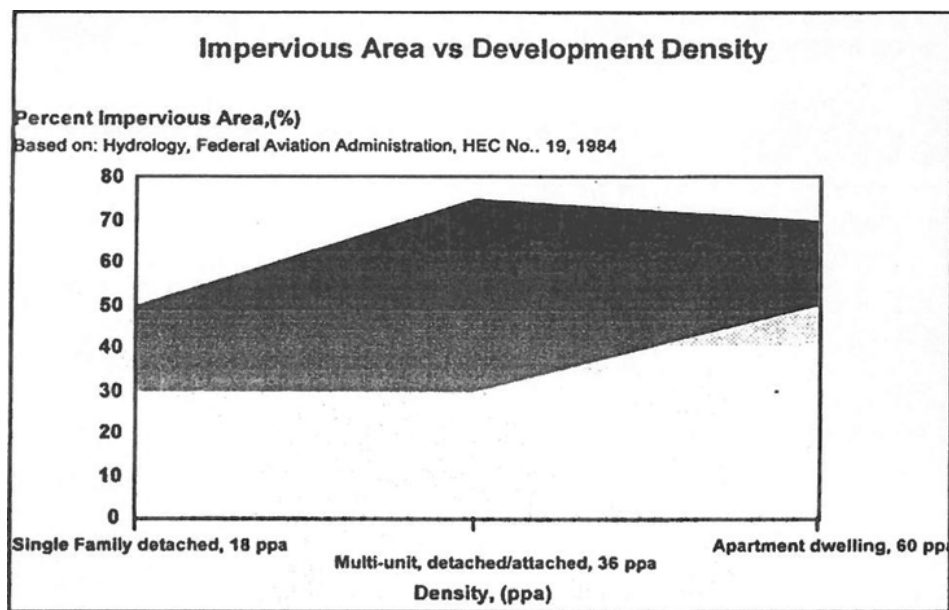
### Section 9: Cost Apportionment Criteria

- a) The revenue stream arising from cost apportionment will be used in the Financial Plan of the charge area.
- b) For water, wastewater and stormwater infrastructure costs, a density factor related to system demand will be utilized to apportion costs.
- c) The WWS CCC is based on average density per acre for the entire charge area, adjusted for the actual density or land use within the parcel being subdivided. Actual density of the parcel being subdivided shall be determined at the time of Subdivision Approval using the maximum density which is permitted by the Municipal Planning Strategy or land use permitted by HRM's Land Use Bylaw.
- d) If the density in a sub-division is lower than the average, the WWS CCC may be accelerated based on the average, ratio amount until the total WWS CCC for the subdivision is collected from a developer. This process may be applied if cash flow requirements dictate more funds are needed to pay for required infrastructure.
- e) In Industrial, Commercial or Institutional zones or uses, the average density for the charge area will apply. The area of the parcel being developed will be adjusted to allow for multiple units or equivalent people.
- f) Stormwater Collection Systems are considered in the same manner as Wastewater systems. This approach implies there is a relationship between development density and the amount of Stormwater run-off which is generated. Given the accuracy and factor of safety inherent in estimating run-off, there is a direct relationship between density and run-off for Residential development. (Refer to Figure 1).
- g) Although the same relationship does not exist for Industrial, Commercial or Institutional uses, this policy accepts that apportioning Stormwater collection system costs on the basis

of density is a reasonable, fair, and equitable approach. This approach is also supported by the fact that storm sewers often share the same trench as other services, and are administered in the same construction contract.

- h) The fairness and equity of this approach may be enhanced by implementing design specifications which require run-off levels to be maintained at residential levels. Such policies are easily implemented through the site design specifications.

**Figure 1:** Impervious Area vs Development Density



#### Section 10: Charge Area Boundary Changes

After a charge area has been established and phased development has commenced, there may be reasons to increase or decrease the charge area. The Commission may permit a change in the charge area based on the Oversized water, Wastewater and Stormwater Infrastructure capacity to provide service to the new area. Changes to charge area boundaries will be considered as either minor additions or major changes.

- a) A minor addition to a charge area may be considered when the infrastructure within the existing charge area is adequate to provide the required service to the additional area. All new development within the adjusted charge area boundary will pay WWS CCCs, based on the same charges that apply to the original charge area.
- b) A major change to a charge area is required when the proposed additional area cannot be adequately serviced by the existing infrastructure. New, Oversized water, Wastewater and Stormwater Infrastructure will be required and a new WWS CCC must be calculated. Capital costs collected from the original charge area will be applied to the



funding of the new infrastructure.

Where a major change in the charge area is required, a revised Master Plan Study, a new charge area and corresponding WWS CCC will be calculated. These changes may require amendments to the Rules and Regulations or established Charge Area as per NSUARB to the charge area under consideration. Major changes may include expansion or extension of the charge area boundary or; a combination of two existing charge areas requiring a revision to the capital cost contributions calculated from the area.

A developer in the original charge area will not be required to pay a WWS CCC which exceeds the amount calculated in the original charge area.

#### Section 11: Combined Charge Areas

Where two charge areas are adjacent and there are valid reasons to share some or all of the entire Oversized water, Wastewater and Stormwater Infrastructure, the Commission may combine the charge areas and recalculate the WWS CCC.

The Commission will determine the components of Oversized water, Wastewater and Stormwater Infrastructure that will be included in the new charge area. WWS CCC collected from the original charge area will be included in the new charge area, and they will be collected on a go forward basis.

#### Section 12: Cost Exceptions

Costs that will be deducted from the developers' portion of the WWS CCC include the following:

The proportion which is considered to benefit the existing Customers of the Commission, as determined in accordance with Section 5.

Commission investments in infrastructure for future development or another charge area determined in accordance with Section 3.

#### Section 13: Interest and Risk Mitigation

- a) The Commission supports new development; however, it is not prepared to accept the financial risk of new development. As a result, where the Commission decides to invest in the Oversized water, Wastewater and Stormwater Infrastructure before the required contribution is collected, interest will be added to the WWS CCC.
- b) In the event that a major component of infrastructure is required before the contributions are collected, the Commission may require the developers to assume the risk and invest in the infrastructure. The developer(s) would be subsequently reimbursed when CCCs are received by the Commission through continued development in the charge area.
- c)
  - (i) The WWS CCC shall be indexed by the Commission on July 1, 2012, and in each subsequent year on April 1, in accordance with the indexing set out in the Consumer Price Index for Halifax, as published by Statistics Canada for the immediately preceding month, when compared to the same month for the immediately preceding year.
  - (ii) If the Consumer Price Index calculated in (i) is negative, the WWS CCC will not be adjusted if the resulting CCC:

- A. is lower than the initial WWS CCC; or
  - B. results in a cash flow model that does not indicate a full recovery of capital costs within the time period specified in such model.
- d) The WWS CCC as indexed in clause (c) shall be:
- (i) Reduced to the next nearest dollar where it indicates a part of a dollar less than \$0.50; and
  - (ii) Increased to the next nearest dollar where it indicates a part of a dollar equal to or greater than \$0.50.
- e) The Commission will revise rates in accordance with the results of the application of calculation in clauses (c) and (d) and shall provide an annual information report of such results to the Board.

#### Section 14: Timing and Sequencing of Development

- a) The development phasing will be taken into consideration when designing and costing oversized infrastructure in the charge area. Since WWS CCCs are calculated on the basis of best estimates, reasonable and appropriate estimates must also be made in respect of development timing and corresponding cost escalators and interest rates that are dependent on the developers' schedule.
- b) The infrastructure capital cost estimate will be factored upwards to reflect prudent and appropriate cost escalators based upon interests and escalated cost of servicing, indicated through the ENR Canada index factor.
- c) The Commission will track and record all WWS CCC funds and expenditures. Interest will be charged when the account is in deficit and will be credited when the account is in surplus.
- d) The Commission may require significant components of infrastructure be built at a predetermined time frame; or based upon system demands or capacity loading arising from new or existing development. The significant components will be constructed within the time frame established by the Commission. As an example, the timing of a major interchange, pumping station or water reservoir which may be required and administered by an outside agency.
- e) The timing and sequence of development phasing may also have an impact upon the design capacity (or size) of infrastructure needed to provide adequate interim service standards throughout development stages in the charge area. It would be inappropriate for the Commission to approve the installation of services that did not adequately meet the design guidelines and minimum service standards to provide requisite services to its citizens.
- f) Additional Oversized water, Wastewater and Stormwater Infrastructure may be required at interim stages of the development as deemed appropriate by the Commission. Costs associated with interim infrastructure needed to advance the timing of the development may not be included in the CCC costs if no benefit is achieved by the Commission.
- g) The Commission may require security (irrevocable, automatically renewing letter of credit) on the property when a development agreement has been approved by HRM, to indemnify the Commission in the event that the development does not proceed in the prescribed period of time. The amount of the lien will be equal to the WWS CCC that would have been collected from the area in question.
- h) The Commission will determine the sequence of oversized system construction, based upon information from the developer, and the requirements of the development. The Commission in consultation with HRM will determine the densities for each phase of the

development in the charge area.

- i) The Commission may, in some cases, construct infrastructure prior to receiving the necessary WWS CCC; or require the developers to construct the Oversized water, Wastewater and Stormwater Infrastructure. Developers may be required to construct Oversized water, Wastewater and Stormwater Infrastructure in an earlier phase that will be used in latter phases of the development.

#### Section 15: Developers Acting as Contractors

- a) A developer may be allowed to construct some or all of the Oversized water, Wastewater and Stormwater Infrastructure based on the agreed upon estimates in compliance with the Commission's standards and guidelines. In most cases developers will be required to construct Oversized Systems in their development lands, but the Commission reserves the right to construct oversized or required infrastructure for the charge area.
- b) When the Developer is acting as a contractor, the Commission will inspect service system construction to ensure the system(s) meet Commission Design Guidelines. The developer will be required to build the infrastructure as required by the phased development determined in the Master Plan Study.
- c) Cost estimates for Oversized Systems and associated payment schedules will require a WWS Service Agreement to determine & implement WWS CCCs. The payment to the developer is based upon agreed cost estimates amongst the participating Stakeholders and approved by the Board.
- d) The Commission will inspect the system construction to ensure it meets its guidelines. The Developer will provide full inspection services and certification by a consultant for design compliance.

#### Section 16: Specific Infrastructure Components

- a) Specific components of Water, Wastewater and Stormwater Systems such as Wastewater pumping stations and Stormwater storage facilities will form part of the Capital Cost if they provide a Direct Benefit to more than one developer within the charge area. In this instance, the costs will be apportioned in accordance with the WWS CCC Policy using the appropriate design criteria, and may include land costs
- b) Components that provide only local benefits, and service a part of one development within the charge area, are solely the responsibility of the developer of the parcel.
- c) The Commission may require the developer who first requires a pumping station to build the Oversized Infrastructure and subsequently reimburse oversizing costs when the Commission has collected from future developments or apply a WWS CCC credit to the developer for the Oversized water, Wastewater and Stormwater Infrastructure investment.

#### Section 17: Oversized Infrastructure Criteria

- a) Oversizing Criteria

The cost of providing Oversized water, Wastewater and Stormwater Infrastructure will be funded through the WWS CCCs levied in a charge area.

The cost of providing Oversized water, Wastewater and Stormwater Infrastructure may also include discrete upgrades of, or new connections to, existing systems outside of the charge area.

There are several methods of calculating the oversize cost, which generally fall into one of the following categories:

i. Incremental basis:

Where the oversize cost would be calculated by determining the incremental or marginal cost of up-sizing to the required Oversized water, Wastewater and Stormwater Infrastructure defined in the Master Plan. This method is most fairly applied if there is a base value or benefit associated with providing the minimum service requirements without considering oversizing. For the purpose of oversizing, minimum service requirements would be those necessary to provide service to an area being developed and may be based on minimum pipe sizes and local road standards.

ii. Flow Proportioning:

The incremental costs of the oversized component(s) in a Master Plan Area may be distributed amongst the land owners on a flow proportionate basis as determined by their allowable densities noted in the Municipal Planning Strategies or land use in the Land Use Bylaws.

iii. Capacity basis:

Where the oversize cost is determined on the basis of capacity allocated to the charge area. The cost to be recovered through a WWS CCC would be calculated by pro-rating total cost on the basis of capacity. This method is most fairly applied for a discrete upgrade of an existing system outside of the charge area.

b) Water, Wastewater and Stormwater Systems within a Charge Area

The oversized costs to provide Water, Wastewater and Stormwater Systems within a charge area will be determined on an incremental basis. There are various methods for calculating incremental costs of piped systems:

i. Dual Design Method:

Where the oversize cost is determined by deducting the total cost of the minimum required pipe size from the total cost of the oversized pipe.

ii. Cost Ratio Method:

This method assumes a direct relationship between the cost of providing a service and the size of the pipe. A cost factor can be determined and applied similar to the Cost Sharing Policy of the former City of Halifax, or a simple percentage based on nominal dimensions may be applied.

c) Infrastructure Exterior to a Charge Area

The portion of the cost of an upgrade, expansion, or provision of a discrete component of water, Wastewater and Stormwater infrastructure to be recovered through a WWS CCC will be determined on the basis of capacity allocated to the charge area.

### Section 18: Funding Criteria

- a) Opportunity costs should be considered and calculated in an effort to prioritize the Commission's investment. These costs may be used to compare and contrast the investment potential in one charge area versus another request for funding. Opportunity costs may include consideration of existing system capacities, potential diversion of demand and capacity allocations, or mitigation of future capital expenditures arising from strategic Commission investments from a regional perspective. Other cost factors for consideration include treatment plants, trunk piping systems and other support services including operations and maintenance.
- b) The Commission in consultation with the HRM may opt to encourage development and growth in strategic areas by supporting Master Plan funding on a priority basis. The Commission may initially invest in comprehensive Master Plan studies where it wishes to promote growth and development optimizing use of existing systems and services.
- c) Inevitably, the demand for the Commission's and the HRM's contributions and investments for Capital Cost Contribution Policy may require priority decisions from the Commission's Board and Council. A balance of strategic master planning will mitigate future capital costs through good planning and optimized infrastructure utilization.
- d) The Commission may determine the risk too high in consideration of upfront payments for Oversized water, Wastewater and Stormwater Infrastructure. In this case, development may proceed if the developers build the required infrastructure. The developers may be given water, Wastewater and Stormwater Capital Cost credits to future contributions or may be re-paid when the Commission collects future WWS CCC from subsequent development utilizing these Oversized water, Wastewater and Stormwater Systems.

The requirement for security would reduce the risk to the Commission if development does not proceed. Time will be the essence of any agreement and may determine the type and condition of the security required to mitigate the Commission's financial risk.

### Section 19: WWS CCC Payment

The applicable WWS CCC shall be payable to the Commission at:

- a) the issuance of a subdivision approval; or
- b) where development is permitted to occur without a subdivision approval, prior to connection by the Commission of a water meter.

**PART II:**

## WWS CCC Policy Templates

The capital cost templates and supporting notes will be used to calculate Water, Wastewater and Stormwater Capital Cost Contributions.

## WATER, WASTEWATER AND STORMWATER CAPITAL COST CONTRIBUTION FORMULAS

Water, Wastewater and Stormwater		
A	Total cost of Oversized Infrastructure and other required infrastructure (Wastewater, Stormwater)	
B	Total cost of Oversized Infrastructure and other required infrastructure (water)	
C	Interest during construction	
D	Total cost of infrastructure	(A + B + C)
E	Deduct infrastructure that benefits the Commission	
F	Deduct fire protection charges paid by the HRM - From water Infrastructure only (Item "B" above)	
G	Total Capital Cost Contribution	(D - E - F)
H	Gross area (acres) in charge area	
I	Area of land that cannot be developed	
J	Area of land that can be developed	(H - I)
K	Development charge per acre	(G / J)
L	Average Density (ppa) of charge area	

Adjustments for Density of the Parcel being Subdivided		
M	Area of Parcel Being Subdivided	
N	Density (ppa) for parcel being subdivided	
O	Capital Cost Contribution per Acre	K x (N / L)
P	Total Capital Cost Contribution	O x M

Notes to Capital Cost Formula

- The cost of Oversized Infrastructure and other required infrastructure is based on an estimate of construction that includes engineering design. Other items to be included are planning studies, land purchases, surveying costs, legal costs and Commission audit inspection costs. The costs will be escalated based on the ENR index to the year costs are incurred for each component of the infrastructure.
- The interest rate shall be Prime plus one percent. The construction period is assumed to be two years.
- Benefits to the Commission may include infrastructure costs that benefit the existing population of the Commission.
  - If there is an area within the charge area that benefits the Commission and the Commission pays a portion of the oversized and other infrastructure costs, any vacant land within the area that is developed shall pay a WWS CCC equal to cost per acre paid by the Commission.

4. The fire protection charge paid by HRM to the Commission is a percentage of the cost of the oversized water related infrastructure. The current 29% has been calculated based on the fire protection component of the demand assets of the utility as contained in the current rate study. Future rate studies may result in a change in the percentage.
5. Gross area includes all land, including streams and lakes within the charge area.
6. Area that cannot be developed will include streams, lakes, flood plains and any other land deemed non-developable by the Commission.
7. Average density shall be established by the Commission or HRM.
8. For Industrial, Commercial or Institutional uses with multiple storeys, the area of the parcel being sub-divided shall be increased by an amount equal to the *allowable* floor space of the additional storeys.

For the purpose of this calculation, underground parking is considered an additional storey.

9. Development of a parcel of land within a charge area that has density below the average may be required to accelerate contributions on the basis of the average density, until the total required WWS CCC for the original parcel has been made.

For Industrial, Commercial and Institutional uses, density shall be taken as the average density for the charge area.

**Table of explanatory notes for proposed amendments to the  
Halifax Water Regulations under section 65 of the *Public Utilities Act***

Section	Explanation
3, 7, 11, 29, 30, 63, 64, 78C, 78F, 78J	Housekeeping and cleanup of typographical errors.
5, 6, 7, 33, 35	Rate changes.
3	<p>Removal of definition of Solvent Extractable Matter.</p> <p>Addition of definition of:</p> <ul style="list-style-type: none"> <li>- Non-Residential Property</li> <li>- Residential Property</li> <li>- Stormwater Catchment Boundary</li> <li>- Stormwater Service Boundary</li> </ul>
7(1)	<p>(1) Housekeeping and addition of monthly and quarterly billing for stormwater service.</p> <p>(2) (a) Revisions to HRM annual payment. (b) Addition of annual payment by Province of Nova Scotia. (c) Addition of annual payment by Halifax Dartmouth Bridge Commission.</p> <p>(3) Addition of 'Property,' 'Boundary,' and 'Stormwater Catchment Boundary' as per added definitions.</p> <p>(4) Addition of 'Property as per added definition.</p> <p>(6) – (8) Housekeeping as per added definitions.</p>
22(5)	Addition authorizing Halifax Water to deny a wastewater rebate application where a customer as violated the Regulations.
78A(5)	Deletion of reference to hourly, so as to permit more creative compensation opportunities.
78H(3)	Subsection deleted. This section reads awkwardly and prolongs the complaint process, potentially causing confusion as to when the appeal period begins. Further, the Commission either follows the DRO recommendation or appeals to the Board, as per s. 78J.