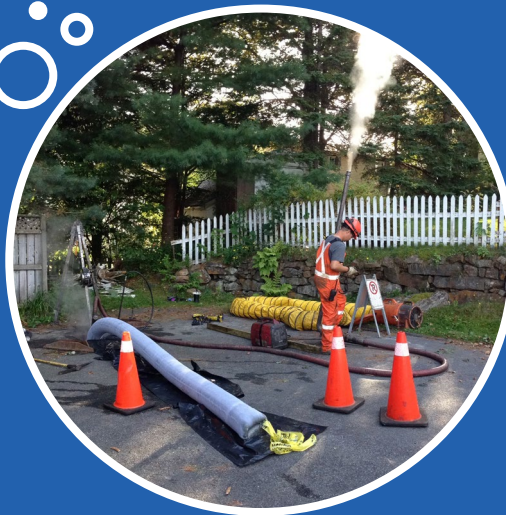


Twenty-Third Annual Report

March 31, 2019



 Halifax
Water

**STRAIGHT from
the SOURCE**



Cover Page:

Photos representing the “One Water” approach Halifax Water takes to managing water, wastewater, stormwater, and environmental protection. Each section of the Annual Report mirrors a line in Our Vision.



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.

Board of Commissioners

March 31, 2019



Darlene Fenton,
Chair



Councillor Russell Walker,
Vice Chair



Carl Yates, M.A.Sc., P.Eng.
General Manager



Cathie O'Toole, MBA, CPA, CGA, ICD.D
Director, Corporate Services



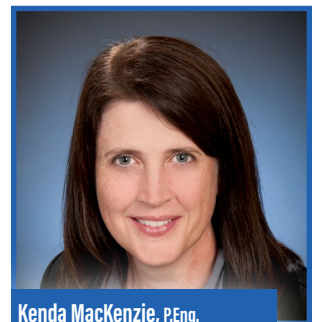
Colleen Rollings,
Commissioner



Councillor Lisa Blackburn,
Commissioner



Jamie Hannam, MBA, P.Eng.
Director, Engineering &
Information Services



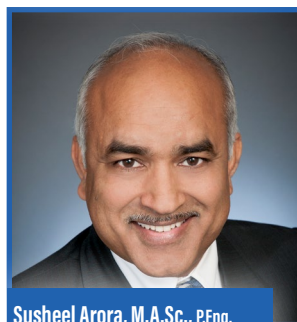
Kenda MacKenzie, P.Eng.
Director, Regulatory Services



Jaques Dubé,
Commissioner



Craig MacMullin,
Commissioner



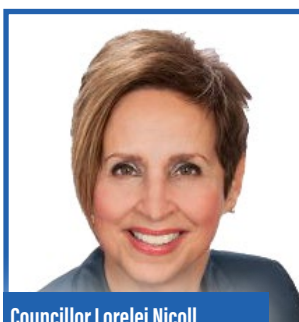
Susheel Arora, M.A.Sc., P.Eng.
Director, Wastewater &
Stormwater Services



Reid Campbell, M. Eng., P.Eng.
Director, Water Services



Councillor Richard Zurawski,
Commissioner



Councillor Lorelei Nicoll,
Commissioner

Executive Staff

Letter from the Chair

On behalf of the Halifax Water Board, I am pleased to report the utility has had another successful year, with several notable achievements. These include the completion of the project to upgrade the Aerotech Wastewater Treatment Facility; progress made on wet weather management; water and wastewater research initiatives; and the Customer Connect water meter installation project that achieved a milestone of 50,000 meter installations.



Darlene Fenton
Chair

The completion of the Aerotech Wastewater Treatment Facility upgrade is a significant step forward in achieving compliance with federal wastewater regulations. Similarly, the progress made on wet weather management improves wastewater service operations; and in the long term helps create capacity and enhance environmental compliance.

The Halifax Water Board is extremely proud of the water research being conducted in partnership with Dalhousie University. In 2018/19 Halifax Water also initiated the development of a wastewater research program with Dalhousie University; and entered into a tailored collaboration project with Dalhousie University and the Water Research Foundation on Lake Recovery.

It has been a year of transformation for Halifax Water, and I am pleased to have been part of it as a Commissioner and Chair on the Halifax Water Board.

Key senior positions in the organization such as the Board Chair, General Manager, Corporate Legal Counsel, and Director of Corporate Services/Chief Financial Officer have changed, or are in the process of changing.

To the customers, the change within the organization is not visible, but they see the benefits of projects such as Customer Connect, the lead service line replacement program, and expansions to Halifax Water's Help to Others (H2O) customer assistance program.

On behalf of the Halifax Water Board, I would like to extend my thanks, and congratulations to all Halifax Water staff for a job well done!

A stylized, handwritten signature in blue ink that reads "Darlene Fe".

Darlene Fenton
Chair of the Board



Carl Yates, M.A.Sc., P.Eng.
General Manager

Halifax Water has morphed several times since its inception in 1945 as new challenges and opportunities were presented. The utility was significantly transformed when it commissioned the Pockwock water supply system in 1977 to serve not only the former City of Halifax but also the Halifax County Municipality. Commissioned as a regional water supply, it finally lived up to its billing in 1996 with the merger of metro municipalities when Halifax Water took on a regional mandate supplying drinking water and fire protection services to the residents of the Halifax Regional Municipality (HRM). With this new mandate came an immediate challenge to construct a new water supply plant at Lake Major to supply residents of the greater Dartmouth area. Although the project was successful, on its own right, on time and on budget, it was a catalyst for change and inspired Halifax Water to become a world leader in water loss control recovering over 40 million litres of leakage per day in the distribution system. It transformed the utility as the data collected through the program made staff more knowledgeable about the system and a more efficient and effective service delivery emerged. This did not go unnoticed by the municipality, the sole shareholder of Halifax

Water, when it assessed the state of wastewater and stormwater service in 2006 and determined that things needed to change. With direction from Regional Council and the Halifax Water Board, an agreement was reached whereby the wastewater and stormwater assets were transferred from the municipality to the utility in 2007 and Halifax Water became the first regulated water, wastewater and stormwater utility in Canada. With clear governance established through the Halifax Water Board and oversight by the Nova Scotia Utility and Review Board, the utility went right to work making investments to bring all wastewater treatment facilities into compliance with federal wastewater regulations. In a similar fashion to water loss control, compliance with the new regulations was also a catalyst to drive the utility to excellence in wet weather management. The primary focus of wet weather management was to reduce inflow and infiltration into the wastewater system to free up capacity and improve the level of service for customers. With a methodological and holistic approach, Halifax Water is recognized as a leader in wet weather management with well documented results.

All through these progressive changes, Halifax Water remained committed to keeping the customer satisfied and annual surveys conducted by an independent research firm confirm their satisfaction. It is this feedback that continues to motivate the utility to meet or exceed customer expectations. This is evident with the Customer Connect project which will see the installation of advanced metering infrastructure throughout the service area by the end of 2019. With this system in place, Halifax Water will transform once more to become the utility of the future and put consumption information in the hands of the customer. All this under the watchful eye of the next General Manager, Cathie O'Toole, who will lead the utility after serving as the Director of Corporate Services and Chief Financial Officer since 2011. She is capable and committed, the very traits needed to navigate a very fast paced world to ensure that Halifax Water remains true to its mission.

A handwritten signature in blue ink that reads "Carl Yates". The signature is fluid and cursive, with the first name "Carl" and last name "Yates" clearly legible.

Carl Yates,
General Manager



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Get in touch!

24-Hour Emergency Line:
902-420-9287

Website
halifaxwater.ca

Customer Care Centre
Hours of Operation:
Monday - Friday
8:00 AM - 8:00 PM
customercare@halifaxwater.ca
902-420-9287

Office Hours:
Monday - Friday
8:30 AM - 4:30 PM
450 Cowie Hill Road
Halifax, NS

Social Media
Monitored:
Monday - Friday
8:30 AM - 4:30 PM
Twitter: @HalifaxWater
Facebook: @HalifaxWater
YouTube: @HalifaxWater
LinkedIn: HalifaxWater

Halifax Water Customers by Service

Halifax Water provides one or more of the following services to our customers: water, wastewater and stormwater. See the table below for a breakdown of the number of customers who receive each type/combination of services.

Customer Numbers by Type		
March 31, 2019 (Fiscal Year: 2018/2019)		
	Number of Accounts	Percentage of Total
Water, Wastewater & Stormwater	74,081	70.25%
Stormwater Only	19,373	18.87%
Water & Wastewater	6,416	6.06%
Water & Stormwater	4,064	3.87%
Wastewater & Stormwater	654	0.63%
Water Only	286	0.26%
Wastewater Only	80	0.07%
Total of All Types	104,954	100%

Photo Caption: Rehabilitated Ellenvale Run Channel Section with Naturalized Bottom

General Information of Utility

Year Ended March 31, 2019

Water

Treatment Processes

J. D. Kline Water Supply Plant

Source: Pockwock Lake
 Process: Dual Media Direct Filtration, Iron & Manganese Removal
 8 Filters: 143 m²/each
 Max. Flow Rate: 0.137 m³/m²/min
 Design Capacity: 227 000 m³/day
 Design Avg. Flows: 84 230 m³/day

Lake Major Water Supply Plant

Source: Lake Major
 Process: Upflow Clarification, Iron & Manganese Removal
 4 Filters: 85 m²/each
 Max. Flow Rate: 0.192 m³/m²/min
 Design Capacity: 94 000 m³/day
 Design Avg. Flows: 33 840 m³/day

Bennery Lake

Source: Bennery Lake
 Process: Sedimentation, Dual Media Filtration, & Manganese Removal
 2 Filters: 26.65 m²/each
 Max. Flow Rate: 0.10 m³/m²/min
 Design Capacity: 7 950 m³/day
 Design Avg. Flows: 956 m³/day

Middle Musquodoboit

Source: Musquodoboit River
 Process: Raw Water Infiltration Gallery, Ultra/Nano Filtration
 Design Avg. Flows: 48 m³/day

Collins Park

Source: Lake Fletcher
 Process: Ultra/Nano Filtration
 Design Avg. Flows: 40 m³/day

Bomont

Source: Shubenacadie River
 Process: Nano Filtration/ Ionic Exchange Resin
 Design Avg. Flows: 8 m³/day

Silver Sands

Source: 2 Wells
 Process: Green Sand Pressure Filters, Iron & Manganese Removal
 Design Avg. Flows: 27 m³/day

Five Island Lake

Source: 1 Well
 Process: UV Disinfection
 Design Avg. Flows: 8 m³/day

Miller Lake

Source: 3 Wells
 Process: Arsenic Removal
 No Production - Bulk Water Supply

Infrastructure Information

Precipitation

Measured at Pockwock
 Rainfall 1501.7 mm
 Snowfall 161.5 cm
 Measured at Lake Major
 Rainfall 1547.2 mm
 Snowfall 108.5 cm

Sources of Supply & Watershed Areas

Pockwock Lake 5 661 ha
 Safe Yield 145 500 m³/day
 Chain Lake 206 ha
 Safe Yield 4 500 m³/day
 Lake Major 6 944 ha
 Safe Yield 65 900 m³/day
 Lake Lemont/Topsail 346 ha
 Safe Yield 4 500 m³/day
 Bennery Lake 644 ha
 Safe Yield 2 300 m³/day

Water Supply Production

Pockwock Lake 30 744 079 m³
 Lake Major 12 351 620 m³
 Bennery Lake 326 585 m³
 Small Systems 46 201 m³

Total 43 468 485 m³

Storage Reservoirs

(Elevation above Sea Level)

Reservoir	Elevation (m)	Capacity (m ³)
Lake Major	(60 m)	9 092 m ³
Pockwock	(170 m)	13 600 m ³
Geizer 158	(158 m)	36 400 m ³
Geizer 123	(123 m)	31 800 m ³
Cowie	(113 m)	11 400 m ³
Robie	(82 m)	15 900 m ³
Lakeside/ Timberlea	(119 m)	5 455 m ³
Mount Edward 1	(119 m)	22 728 m ³
Mount Edward 2	(119 m)	22 728 m ³
Akerley Blvd.	(119 m)	37 727 m ³
North Preston	(125 m)	1 659 m ³
Meadowbrook	(95 m)	9 091 m ³
Sampson	(123 m)	12 273 m ³
Stokil	(123 m)	23 636 m ³
Waverley	(86 m)	1 364 m ³
Middle Musq.	(81 m)	275 m ³
Aerotech	(174 m)	4 085 m ³
Beaver Bank	(156 m)	6 937 m ³

Total 259 213 m³

Transmission & Distribution System

Size of Mains 19 mm - 1 500 mm
 Total Water Mains 1 558 km
 Main Valves 15 715
 Fire Hydrants 8 404
 Distribution of
 Pumping Stations 21
 Pressure Control/
 Flow Meter Chambers 143

Services & Meters

Water Sprinkler Systems
 (25 mm - 300 mm) 2 172
 Supply Services
 (10 mm - 400 mm) 84 849
 Meters
 (15 mm - 250 mm) 84 489
 Wastewater Services 81 233

Population Served

Halifax Municipality
 Estimated Population Served 370 000
 Consumption per Capita
 (all customers) 260 litres/day

General Information of Utility

Year Ended March 31, 2019

Wastewater/Stormwater

Treatment Processes

Halifax

Process: Enhanced Primary - UV
Design Avg. Flows: 139 900 m³/day
Area Served: Halifax
Receiving Water: Halifax Harbour
Volume Treated: 32 544 904 m³

Dartmouth

Process: Enhanced Primary - UV
Design Avg. Flows: 83 800 m³/day
Area Served: Dartmouth
Receiving Water: Halifax Harbour
Volume Treated: 19 597 543 m³

Herring Cove

Process: Enhanced Primary - UV
Design Avg. Flows: 28 500 m³/day
Area Served: Halifax - Herring Cove
Receiving Water: Halifax Harbour
Volume Treated: 3 880 692 m³

Mill Cove

Process: Secondary - UV/Pure Oxygen Activated Sludge
Design Avg. Flows: 28 400 m³/day
Area Served: Bedford/Sackville
Receiving Water: Bedford Basin
Volume Treated: 10 219 553 m³

Eastern Passage

Process: Secondary - UV/Conventional Activated Sludge
Design Avg. Flows: 25 000 m³/day
Area Served: Cole Harbour & Eastern Passage
Receiving Water: Halifax Harbour
Volume Treated: 4 578 869 m³

Timberlea

Process: Secondary - Sodium Hypochlorite/RBC
Design Avg. Flows: 4 540 m³/day
Area Served: Lakeside & Timberlea
Receiving Water: Nine Mile River
Volume Treated: 904 612 m³

Aerotech

Process: Secondary - UV/Membrane Bioreactors
Design Avg. Flows: 3 000 m³/day
Area Served: Aerotech Park & Airport
Receiving Water: Johnson River
Volume Treated: 269 146 m³

Springfield Lake

Process: Secondary - UV/Activated Sludge
Design Avg. Flows: 543 m³/day
Area Served: Springfield Lake
Receiving Water: Lisle Lake
Volume Treated: 155 140 m³

Fall River

Process: Tertiary - UV/Activated Sludge & Post Filtration
Design Avg. Flows: 454.5 m³/day
Area Served: Lockview - McPherson Road
Receiving Water: Lake Fletcher
Volume Treated: 58 726 m³

North Preston

Process: Tertiary - UV/SBR & Engineered Wetland
Design Avg. Flows: 680 m³/day
Area Served: North Preston
Receiving Water: Winder Lake
Volume Treated: 233 142 m³

Middle Musquodoboit

Process: UV/RBC
Design Avg. Flows: 114 m³/day
Area Served: Middle Musquodoboit
Receiving Water: Musquodoboit River
Volume Treated: 32 264 m³

Uplands Park

Process: Secondary - UV/Trickling Filter & Wetland
Design Avg. Flows: 91 m³/day
Area Served: Uplands Park
Receiving Water: Sandy Lake
Volume Treated: 36 793 m³

Wellington

Process: Tertiary - UV/Activated Sludge/Reed Bleed
Design Avg. Flows: 68 m³/day
Area Served: Wellington
Receiving Water: Grand Lake
Volume Treated: 7 164 m³

Frame Subdivision

Process: Tertiary - UV/Membrane Reactor
Design Avg. Flows: 80 m³/day
Area Served: Frame Sub-Division
Receiving Water: Lake William
Volume Treated: 9 955 m³

Infrastructure Information & Glossary

Glossary of Terms

ha - hectare
m - metre
m² - square metre
m³ - cubic metre (1,000 litres)
mm - millimetre
cm - centimetre
km - kilometre

Wastewater & Stormwater Collection System

Size of Pipes 50 mm - 3 000 mm
Total Coll. System Length 2 337 km
Total Manholes 38 777
Total Pumping Stations 167
Total Ditch Length Aprx. 600 km
Driveway Culverts Aprx. 16 000
Cross Culverts 2 337
Holding Tanks & Retention
Ponds (12-244 00 m³) 45
Catchbasins 24 398

HIGH QUALITY WATER





Guidelines for Canadian Drinking Water Quality

All Halifax Water treatment facilities continue to consistently produce water that meets the Guidelines for Canadian Drinking Water Quality, published by Health Canada.

In the previous year, Health Canada released two new health related guidelines that may be of interest to Halifax Water customers. Any health related guidelines set or changed by Health Canada are deemed to be operating approval requirements from Nova Scotia Environment.

Health Canada reduced its lead guideline from 10 to 5 parts per billion (ppb or ug/L). Further, the sampling protocol was changed from samples taken after flushing the premise plumbing for 10 minutes to one of two sampling protocols designed to reflect actual water use within the home. This has the effect of moving Canada's standard for lead to one of the most protective in the world.

Halifax Water practices corrosion control treatment and has removed many lead service lines from our system. We also have a mature lead service line replacement program with financial incentives for customers to remove sources of lead in drinking water so we are well positioned to meet this guideline. Water consumed in most homes has a lead level well below the guideline. Lead occurrence, however, is very site specific and related to the occurrence of a lead service line. We routinely discover high lead levels in individual homes with lead service lines. Any customer with the potential for a lead service line (constructed before 1960) should contact our Water Quality Group for assistance on determining if they have a lead service line, and for information on how to replace a lead service line.

Health Canada also released a new guideline on manganese. Manganese is a naturally occurring metal found in water sources throughout Nova Scotia. For many years, Health Canada has had in place an aesthetic guideline for manganese because at sufficiently high levels it can tinge water black and stain laundry and plumbing fixtures. In 2019, for the first time, Health Canada has released a health related guideline of 120 ppb. Halifax Water complies with the new Health Canada guideline. Because many of our source waters contain manganese, Halifax Water will be adopting additional surveillance and monitoring programs for manganese, particularly to guard against treatment plant and distribution system water quality changes which have the potential to temporarily elevate manganese levels.

WRF Subscriber of the Year

Halifax Water has been a subscriber of the Water Research Foundation (WRF) for over 30 years. WRF funds research into a variety of water research issues on behalf of its subscribers, particularly water utilities. In June 2018, Halifax Water was recognized as one of two "Subscriber of the Year" recipients by the WRF.

Halifax Water was selected, in part for its long history as a subscriber but also for its proven track record of using WRF funds to conduct research that advances water supply practice for the entire sector and improves service to Halifax Water customers. Examples of this include research

WRF Subscriber of the Year Continued...



General Manager Carl Yates (right) accepts WRF Subscriber of the Year Award

into advanced pressure management for water loss control; using the water distribution system to develop electrical energy and ongoing research into adapting water treatment processes to deal with changing source water as a result of lake recovery. Halifax Water staff also participate in research projects, serve on advisory committees, or engage in research projects as a participating utility which provides an opportunity for Halifax Water staff to learn from industry leaders.



Lake Recovery Research Group Watershed Tour

Tailored Collaboration – Lake Recovery

In September 2018, Halifax Water began a Tailored Collaboration Program project with the Water Research Foundation to assist the utility in dealing with the implication of lake recovery.

Lakes in Nova Scotia typically have a low pH, and in some cases a resulting low level of biotic activity. This was believed to be caused by acid rain, caused by nitrogen oxides and sulfur emissions from coal burning power plants in the US Midwest along with prevailing westerly winds.

Great strides have been taken over the last 20 years in both Canada and the US in reducing emissions from coal fired power generation. This has allowed lakes to recover from the effects of acid rain, resulting in measurably higher pH, higher levels of naturally occurring organic matter in the water and higher levels of biotic activity.

While this is a good news story from an environmental perspective, the source water has changed enough to present treatment challenges that our plants were not designed for.

The Water Research Foundation has provided Halifax Water with matching funding of US\$100,000 to conduct research to better understand source water changes, how to optimize plants and develop a capital improvement plan to manage changing source water quality. The research is being conducted by Hazen and Sawyer who have assembled a team of source water, treatment and water quality experts. The project will conclude in early 2020 and will be used to guide Halifax Water in planned upgrades to our large water supply plants.

Lead Service Lines

Last year marked the second season of Halifax Water's new lead service line (LSL) program. The program is designed to remove all utility and customer owned LSLs over a 30-year period. It also marked the first full season of Halifax Water offering 25% rebates (up to a total of \$2,500) toward the customer cost of replacing the private portion of a lead service line, and the Lateral Loan program for customers needing financing assistance to fund the balance of the private lead service line replacement.



In 2018, 105 customers received rebates totaling \$ 102,333 toward replacing their lead service lines. In total, there were 128 private replacements and Halifax Water also replaced 115 public lead service lines.

Significant effort was also placed on developing a lead service line inventory to enable Halifax Water to better inform and assist customers in determining if they have a lead service line.

Halifax Water staff also work closely with staff from Halifax Regional Municipality to coordinate lead service line replacement work with planned street improvements being undertaken by the municipality.

NSERC Research Chair with Dalhousie University

This year marked the 12th successful year of our research partnership with the National Sciences and Engineering Research Council (NSERC) Halifax Water Industrial Research Chair in Water Quality and Treatment at Dalhousie University. Dalhousie and Halifax Water work cooperatively to develop a five-year research framework to meet both Halifax Water's operational needs and to address broader sector wide needs for water quality and treatment.

The current research plan has three main themes:

- Understanding Lake Recovery: to understand the water quality changes occurring in our water supply lakes and appropriately design water treatment plant upgrades.
- Treatment Research and Source Water Monitoring: to adapt current treatment processes to changing source water.
- Distribution System Water Quality. Strategies for dealing with lead in drinking water and optimizing corrosion control treatment.

Halifax Water has also developed its own internal plan for treatment process optimization using our pilot plant facilities. The aim of this program is to refine each plant process to perform at its optimal level until such time as possible treatment plant improvements are made.

Water Supply Plant Upgrades

The J. D. Kline (Pockwock) Water Supply Plant (WSP) was commissioned in 1977. The plant has performed well, providing high quality water to customers on the west/Halifax side of the Harbour. Over the last several years, Halifax Water has continued to invest in upgrading this facility as components reached the end of their useful life or became obsolete. To that end a program to upgrade all plant chemical feed pumps was completed last year. We are also nearing the completion of an 18 month project to replace the underdrains and filter media in each of the plant's eight filters. While upgrading the filters, the opportunity was taken to install air scour capability on the backwash system. Both initiatives are providing improved performance on the already completed filters. This project is expected to be complete in the fall of 2019.



J. D. Kline Water Supply Plant

The J. D. Kline WSP is a direct filtration plant. Direct filtration plants are designed for very high quality source water which is what we have in Pockwock Lake. In recent years, as levels of naturally occurring organic matter in the lake has increased due to lake recovery, the plant can be challenged when source water quality conditions change suddenly. Planning is underway to upgrade the plant within the next five years.

The Lake Major Water Supply Plant was commissioned in 1999. In 2016, a plant optimization study was completed to lay out a plan for modernizing the plant over the next ten years. Last year the emergency power supply system was upgraded. Individual plant component systems are upgraded as needed.

Significant projects being initiated this year include a new intake and pumping station components. Improvements to other plant unit processes will begin in subsequent years.



RESPONSIBLE FINANCIAL MANAGEMENT





Annual Financial Results

Halifax Water received a clean audit opinion for the fiscal year ended March 31, 2019. The financial statements are presented in accordance with International Financial Reporting Standards. Halifax Water also produces financial information in the format required by the NSUARB - the NSUARB Accounting and Reporting Handbook (Handbook) for Water Utilities.

The differing requirements result in two unique sets of financial statements. The financial summary information shown on page 69 of the Annual Report aligns with the NSUARB Handbook. The external financial statements reproduced on pages 70 to 97 of the Annual Report align with IFRS and were prepared in conjunction with the annual audit by Grant Thornton. Ongoing differences between NSUARB and IFRS will steadily increase as debt increases. IFRS does introduce more volatility, particularly around post-employment benefits. The NSUARB handbook will continue to be used for rate making. Schedules C, D, E, F, and G of the Audited Financial Statements are based on NSUARB Accounting and Reporting Handbook. The financial statements also include the report of the auditor, Grant Thornton.

Annual Financial Results Continued...

The key differences under IFRS are:

1. depreciation on contributed assets is included in the income statement, resulting in higher depreciation expense;
2. amortization of contributed capital is included in the income statement, resulting in higher non-operating revenue;
3. Some assets are componentized with shorter useful lives, resulting in higher depreciation expense;
4. long-term debt principle payments are not included in the income statement, resulting in lower non-operating expenses;
5. the full actuarial liability of employee future benefits is reported as Other Comprehensive Income. This may result in either positive or negative impacts on income, and;
6. contributed capital is treated as a long-term liability, resulting in much higher long-term liabilities and much lower equity.

The Net Income for the year under the NSUARB Handbook is \$0.4 M. Under IFRS, Total Comprehensive Earnings are \$16.1 Million, and an explanation of the difference is shown below.

NSUARB Handbook Net Income	+ \$0.4 M
Include non-cash Pension Plan expense	- \$5.2 M
Remove debt principle appropriation expense	+ \$20.5 M
Deduct depreciation on contributed assets	- \$17.8 M (offset)
Amortize contributed capital as revenue	\$17.8 M (offset)
Various depreciation adjustments on componentized assets and pre-1985 assets	- \$3.3 M
Gain on OCI Other Comprehensive Income (benefits)	\$3.7 M
IFRS Total Comprehensive Earnings	\$16.1 M

The main differences are debt principle appropriations of \$20.5 million that are not included as an expense under IFRS, accrued pension expenses of \$5.2 million that are not included under the NSUARB Handbook, and some differences in how assets are componentized and depreciated resulting in \$3.3 million dollars of additional depreciation expense. IFRS requires the reporting of changes in the full actuarial liability of employee future benefits as Other Comprehensive Income. This may result in either positive or negative impacts on income in any given year. In 2018/19, this resulted in a gain of \$3.7 million which is reflected as Other Comprehensive Income, bringing IFRS Total Comprehensive Earnings to \$16.1 M. (\$12.4 IFRS Earnings for the Year, plus \$3.7 M Other Comprehensive Income/Loss).



Halifax Water's cash balance of \$51.6 million is on par with last year, and is higher than the utility had projected due to higher consumption revenue and Regional Development Charge (RDC) collections, and lower capital expenditures than anticipated. The liquidity on the balance sheet (ratio of current assets divided by current liabilities) is very positive at 1.99.

Plant in Service assets, net of Accumulated Depreciation, is \$1.28 billion and is \$43.3 million (3.5%) greater than last year. There were \$80.7 million in capital work orders closed during the year, increasing Plant in Service. At year end there was \$29.6 million in Capital Assets Under Construction, compared to \$24.6 million the prior year.

Capital Asset Additions	
	Cumulative '000
Aerotech Wastewater Treatment Facility	\$23,997
Fall River Water Servicing	\$10,167
AMI - Advanced Metering Infrastructure	\$6,596
Mainline Lining Program	\$4,233
Wastewater Lateral Lining Program	\$1,980
Wastewater Lateral Replacement Program	\$1,748
All Other Projects	\$31,939
Total	\$80,659

Expenditures on Capital Projects budgeted within the fiscal year total \$64.5 million. The Aerotech Wastewater Treatment Facility was the largest project completed, with a value of \$24.0 million. The Fall River Water Servicing project, valued at \$10.2 million, is completed but is treated as a donated asset as it was fully funded through Federal and Provincial programs and HRM Local Improvement Charges. Meters installed during the year through the AMI – Advanced Metering Initiative were capitalized, totaling \$6.6 million. The remaining meter installations and associated technology are expected to be capitalized in 2019/20.

Debt is an important funding source for Halifax Water's capital program. Long Term Debt is down \$8.2 million from the prior year as debt repayments have been greater than new debt acquired for the capital program. The debt service ratio of 20.3% is well below the maximum 35% ratio allowed under the blanket guarantee agreement with the Halifax Municipality.

Capital Asset Under Construction	
	Cumulative '000
AMI - Advanced Metering Infrastructure	\$9,794
J. D. Kline WSP Filtration Replacement	\$6,623
Lake Major Dam Replacement	\$4,693
Ellenvale Run Retaining Wall System	\$2,878
All Other Projects	\$10,409
Total Capital Expenditures	\$34,397
External Funding Received	(\$4,792)
Net Assets Under Construction	\$29,605

The discussion of Operating Results is based on the NSUARB Accounting and Reporting Handbook, as this is what budgets and rates are based on. The following table compares the results, excluding Other Comprehensive Income (OCI), with the budget approved by the Halifax Water Board. The final results are \$9.5 million better than budget with Operating Revenue finishing higher than budget, and on par with prior year. Operating Expenses finished lower than budget, but higher than prior year. The year end results were on par with the last forecast.

Summarized Consolidated Operating Results			
	Actual YTD 2018/19 '000	Twelve Month Budget 2018/19 '000	\$ Variance
Operating Revenue	\$138,413	\$135,182	\$3,231
Operating Expenses	\$106,731	\$108,770	(\$2,039)
Operating Profit (Loss)	\$31,682	\$26,412	\$5,270
Non Operating Revenue	\$1,898	\$1,006	\$892
Non Operating Expenditure	\$33,190	\$36,564	(\$3,374)
Net Surplus (Deficit)	\$390	(\$9,146)	\$9,536

Halifax Water's rates, however they are expenses associated with liabilities that the utility is required to record. The following table shows operating results for each service.

Halifax Water has a cumulative Operating Surplus of \$19.4 which will be drawn down by a budgeted loss of \$14 million in 2019/20. This allowed for another year with no rate increases for water, wastewater, and stormwater service.

Revenues

Rates for services did not change this fiscal year, having last been adjusted in 2016 for water and wastewater and 2017 for stormwater. It is anticipated that an application for new rates will be submitted to the NSUARB in late 2019/20 to take effect in mid-2020.

Year to Date Operating Results by Service		
	2018/19 '000	2017/18 '000
Water	(\$402)	\$1,043
Wastewater	(\$3,190)	\$2,884
Stormwater	(\$1,226)	(\$124)
Net Surplus (Deficit)	(\$4,818)	\$3,804

Annual Financial Results Continued...

Operating Revenue is slightly ahead of the previous year and \$3.2 million ahead of budget with Metered Sales accounting for the difference. Metered Sales consist of base and volumetric charges. Base charges are slightly below budget expectations. Volumetric revenue budgets for 2018/19 were based on a 2.5% decrease in metered consumption, however metered consumption increased by 1.4%. New growth, as well as the replacement of old water meters, that may have been under registering, contributed to this.

Operating Revenue Results			
	Actual YTD 2018/19 '000	YTD Budget 2018/19 '000	\$ Variance
Consumption Revenue	\$86,244	\$81,748	\$4,496
Base Charge Revenue	\$33,191	\$33,257	(\$67)
Wastewater Rebate	(\$1,494)	(\$1,252)	(\$242)
Metered Sales Sub-Total	\$117,941	\$113,754	\$4,187
Stormwater Site Related Flow Charge	\$5,906	\$6,752	(\$846)
HRM Fire Protection & ROW	\$10,909	\$10,909	\$0
Other Operating Revenue	\$3,657	\$3,767	(\$111)
Operating Revenue Total	\$138,413	\$135,182	\$3,231

Although metered sales for water service were up, metered sales revenue for wastewater service is down \$0.1 million (0.1%) as compared to the prior year. The lower revenue is attributable to higher Wastewater Rebates. The Wastewater Rebate is an offset to revenue. It is available to certain large customers whose water does not enter the wastewater system.

Site Related Flow Charge Stormwater Revenue was below budget the prior year. Revenue had been expected to increase from the prior year, which was also below budget. A review of the stormwater billing process is underway to ensure new customers and new development are recorded in a timely manner.

Non-Operating Revenues were higher than budget. Higher than anticipated cash balances and rising interest rates generated interest income of \$1.2 million, which was more than double the budgeted amount.

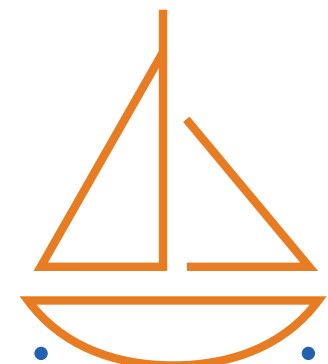
Expenses

Operating Expenses of \$106.7 million are \$7.3 million higher than the prior year and \$2.0 million below the pro-rated budget for the year. Compared to the previous year, expense categories with the largest increases in costs are Depreciation, Water Transmission and Distribution, Administration and Pension.

Long Term Debt costs decreased \$1.2 million from the prior year. Debt servicing savings are a result of new debt issues having lower interest rates than older, maturing issues. This is the third consecutive year where debt repayments have been greater than new debt issues, resulting in a reduced liability for long term debt. New debt was issued in the Municipal Finance Corporation's (MFC's) Fall Debenture in the amount of \$15.0 million. The Dividend/Grant In Lieu of Taxes is paid annually to the municipality. The amount is based on the net asset value of water assets and increased this year to \$5.2 million.

Activities regulated by the NSUARB (including accrued pension expense) show a loss of \$6.2 million, a decline from the profit of \$2.2 million profit in the prior year. Unregulated activities show a profit of \$1.3 million, a slight decline in the profit of \$1.6 million for the prior year. The declining profit is a result of lower revenue in several contracted services where there was a one-time income last year.

Results by Activity		
	2018/19 '000	2017/18 '000
Regulated Activities	(\$6,186)	\$2,214
Unregulated Activities	\$1,368	\$1,590
Net Surplus (Deficit)	(\$4,818)	\$3,804



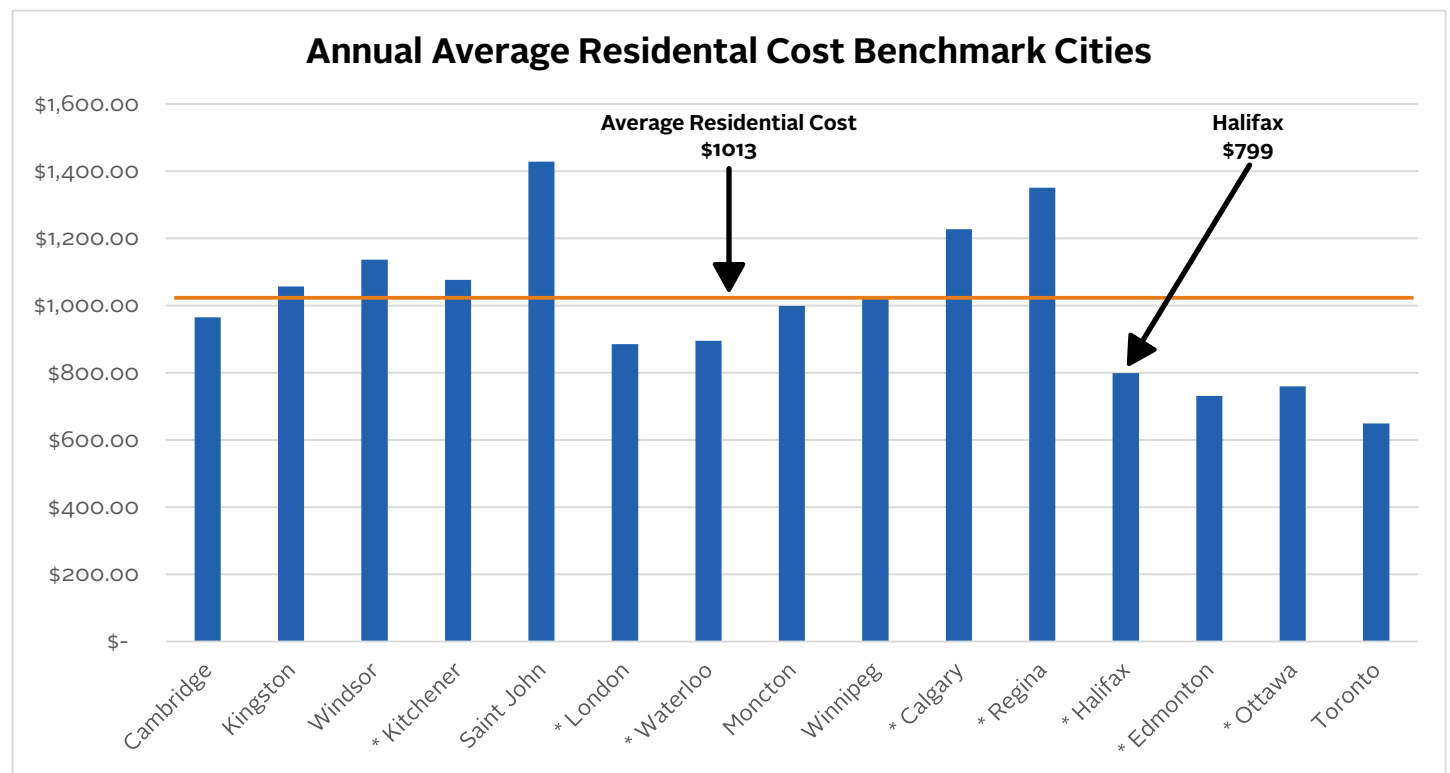
Regulatory Activity

Rates for water and wastewater service did not change this fiscal year, having last been adjusted on April 1, 2016. The rate structure for stormwater service took effect July 1, 2017. The current rates for service are shown on this page.

Summary of Rates	
	Effective April 1, 2016
Volumetric Charges (per m³)	
Water	\$0.976
Wastewater	\$1.753
Combined	\$2.729
Bases Charges (per year)	
Water	Varies by Meter Size
Wastewater	Varies by Meter Size

Summary of Rates - Stormwater	
	Effective July 1, 2017
Residential - Impervious Area	
Less than 50 m ²	-
50 m ² to 200 m ²	\$14.00
210 m ² to 400 m ²	\$27.00
410 m ² to 800 m ²	\$54.00
Greater than 810 m ²	\$81.00
Culvert Only Service	\$14.00
ICI Rate per m ²	\$0.135

From a competitiveness perspective, Halifax Water's rates compare very favorably and continue to be among the lowest in Canada. The average residential bill for water, wastewater and stormwater service is \$799 per year, compared to the average of \$1013 (excluding Halifax) from benchmarked Canadian cities.



Note: Cities with "*" before the name include water, wastewater and stormwater

Annual Financial Results Continued...

Cost Containment

Cost Containment is an on-going focus for the Utility to help maintain and stabilize rates. A formal cost containment program has been in place for five years. New cost containment initiatives implemented during the 2018/19 fiscal year resulted in cost savings amounting to \$0.4 million. These initiatives are available for ease of reference on the Summary Report-Cost Containment Initiatives below. Cost savings resulting from these new initiatives fall within the following categories, ranked in order of cost savings:

Human Resource Strategies	\$216,000
Facilities/ Process Strategies	\$92,000
Procurement Strategies	\$27,000
Technology & Business Process Changes	\$23,000
Reduce Paper & Printing Costs	\$10,000

The cumulative impact of cost containment initiatives in 2018/19 is estimated at \$5.4 million, as reported to the NSUARB in June 2019.

Halifax Water - Helping Customers

In 2018/19, Halifax Water introduced changes and new programs that benefit customers with low incomes, and also benefit the utility.

H2o (Help to Others) Program - Since 2011, Halifax Water has partnered with the Salvation Army to provide emergency assistance to low income customers through the H2o Program. In April 2018 the income eligibility thresholds and amount of assistance were increased. The income eligibility thresholds are \$21,000 for single income and \$39,000 for family income. The amount of assistance available increased to a maximum grant of \$275 once in a 24 month period. Halifax Water increased communications around the program and looked at how to make the application process easier for customers. As a result of these efforts, for the first time since inception all of the available funds in the annual program were utilized, and 135 customers received assistance. This year, we will explore ways of generating more money for the fund, so we can assist more customers.



Lead Service Line Replacement Rebates – Halifax Water has a program to provide a rebate to customers of 25% of the cost of private lead service line replacements, up to a maximum of \$2,500. This benefits all customers replacing lead service lines, as there is no income threshold. In 2018/19, there were 105 customers that took part in the program for a total rebate cost of \$102,333. The mean rebate cost was \$974, with a min and max of \$143 and \$2,500 respectively.

Private Lateral Replacement Assistance Program - Halifax Water can provide financing assistance to customers doing full replacement of the private portion of water or wastewater laterals, or private laterals as part of a new deep stormwater installation in areas where none previously existed. The program is designed to provide a financing option for customers who do not have other more favourable means to pay for or finance their private lateral replacement. This program came into effect May 2018. Only one customer has utilized the program to date.

SERVICE EXCELLENCE



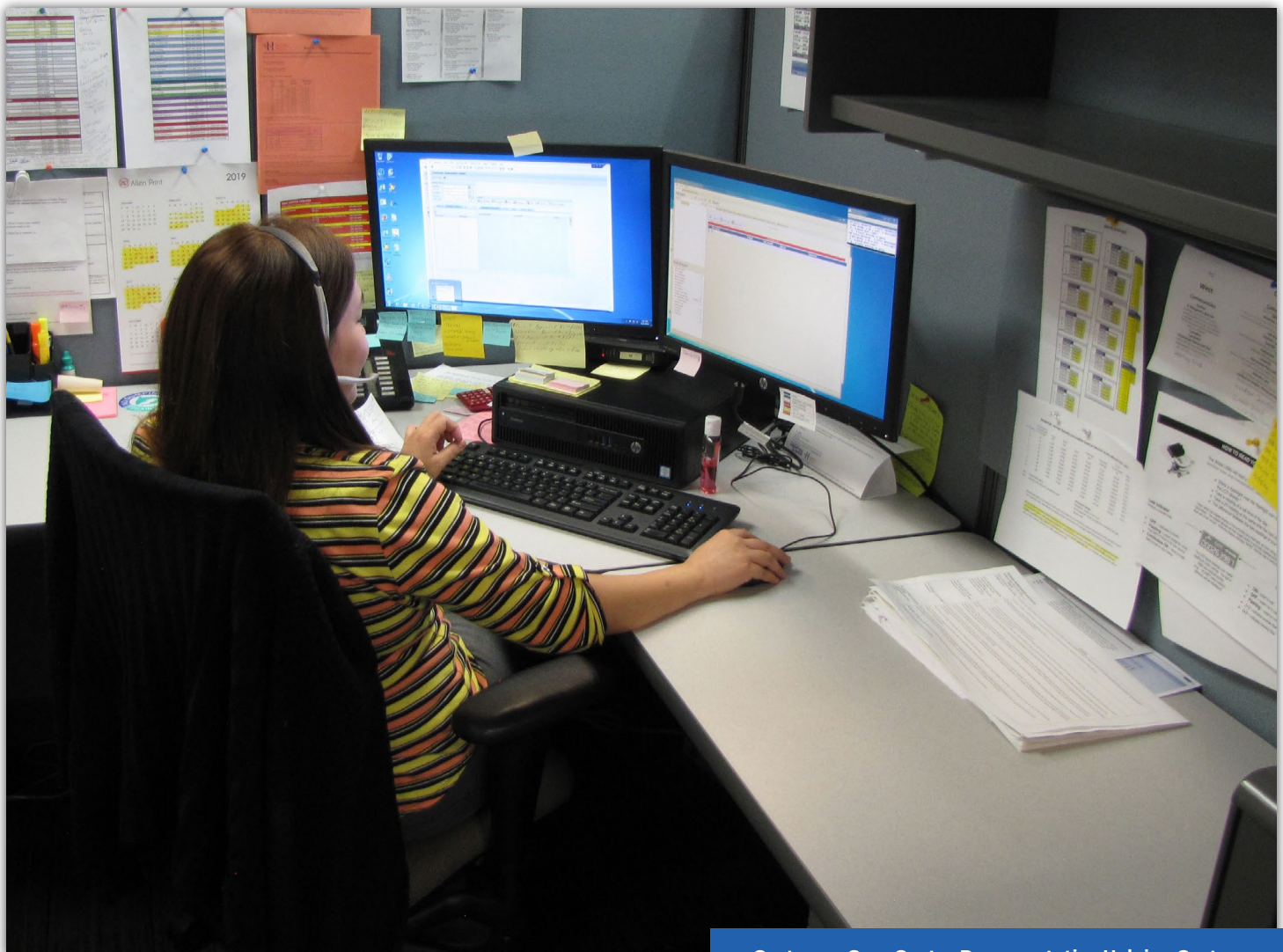
Customer Care Centre

2018/19 was the second complete fiscal year operating as a full service Customer Care Centre, as opposed to a billing and account contact centre. The transition from a historical billing and account contact centre began in 2016 and involved implementing a Customer Relationship Management System (CRM), integration with a work order system for operational service requests, and centralization of wastewater and stormwater calls formerly handled by HRM's 311 centre and water operations staff.

2018/19 Call Centre Performance					
Total Calls Answered	Average Number of Calls Daily	Abandonment Rate	Average Speed of Answer	Busiest Day of the Year	Busiest Month of the Year
74,519	330	11%	84 seconds	January 23, 2019 593 calls	January 2019 8035 calls

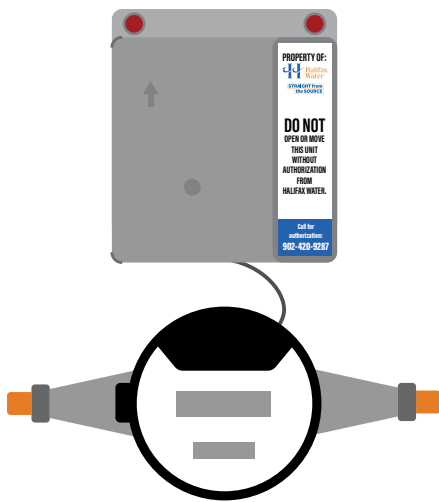
Customer Care Centre performance in 2018/19 achieved performance targets for part of the year, but fell short from spring to early-summer 2019 primarily due to under resourcing brought on by attraction and retention issues.

Customers also contact Halifax Water using online service requests and through a generic email: customercare@halifaxwater.ca. There is a steady growth in email volumes. The email volume in 2018/19 was 8,226.



Customer Care Centre Representative Helping Customers

Advanced Metering Infrastructure



Graphic of an AMI Meter & Transmitter

In 2016/17 Halifax Water received NSUARB approval to proceed with an Advanced Meter Infrastructure (AMI) project. By the end of 2018/19, 50,000 AMI meters were installed. The project is scheduled to be complete in November of 2019. AMI is a system whereby, in lieu of meter

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. Large institutional, commercial and industrial customers are currently billed on a monthly basis.
- Halifax Water will be able to alert customers to high consumption due to things like plumbing leaks, almost as they happen, reducing billing disputes and high bill amounts.
- If they choose, customers will have the ability to manage their water consumption through a web portal in real time and see the effect of any conservation measures they take.

readers walking, or driving routes to read meters with radio devices, a fixed network of radio devices is established over the service area to read meters on a much more frequent basis (typically hourly).



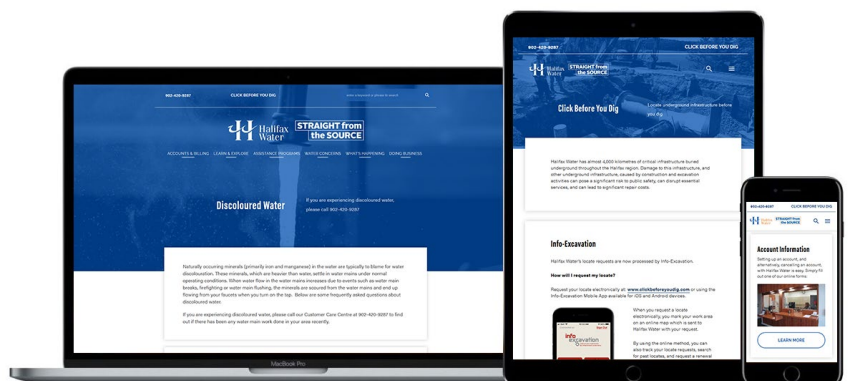
AMI Project Name & Logo

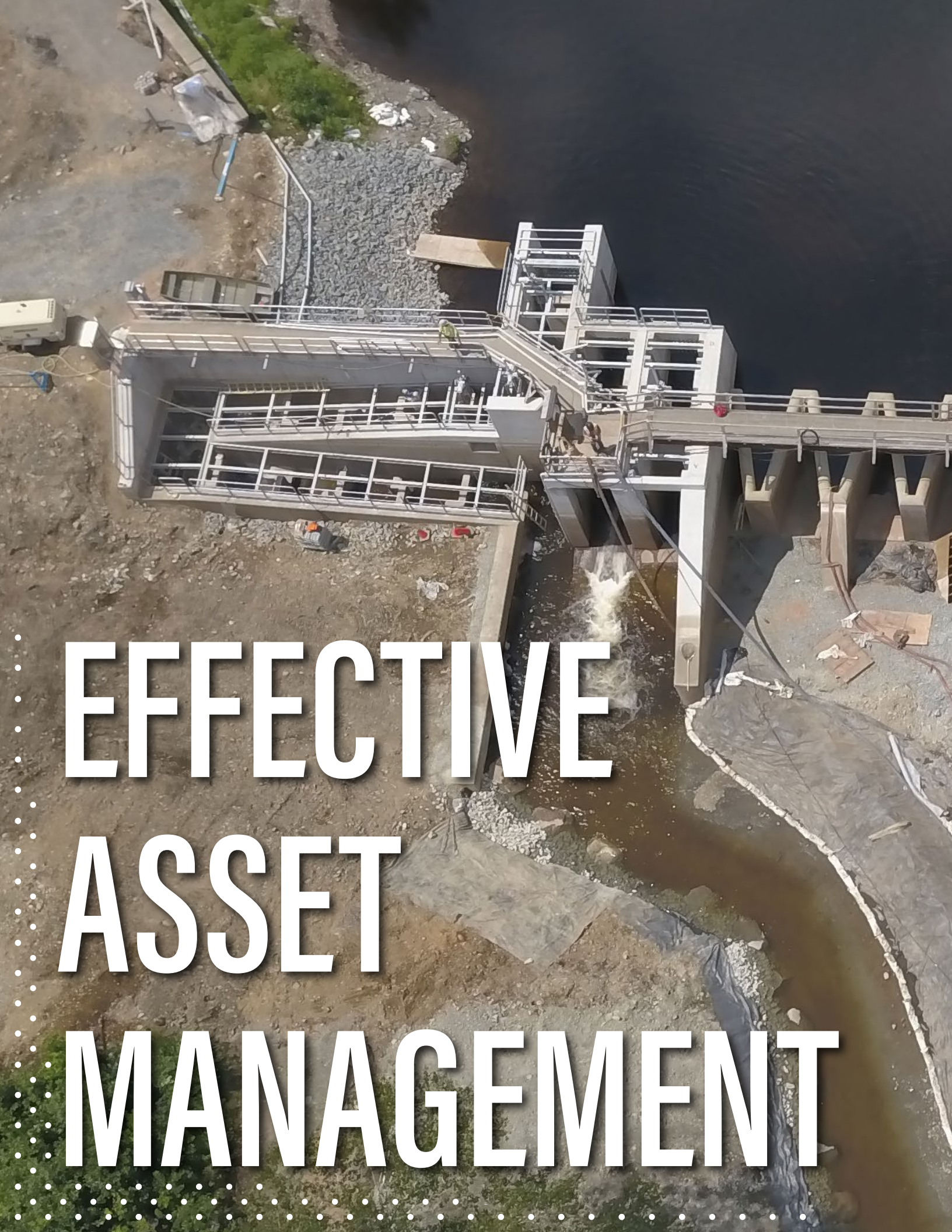
In addition to streamlining the meter reading process and reducing its cost, AMI promises many features that will improve the level of service Halifax Water can offer in future to its customers.

AMI will provide much more data about customer consumption and distribution system operations. This may enable earlier identification of distribution system leaks. Overall it will improve the customer focus of the organization by providing the ability to identify and rectify customer issues proactively, rather than after the fact upon the customers' receipt of a high bill. This will result in reduced costs for billing and collection, and reduce the need for the high cost activity of sending technicians to customer homes.

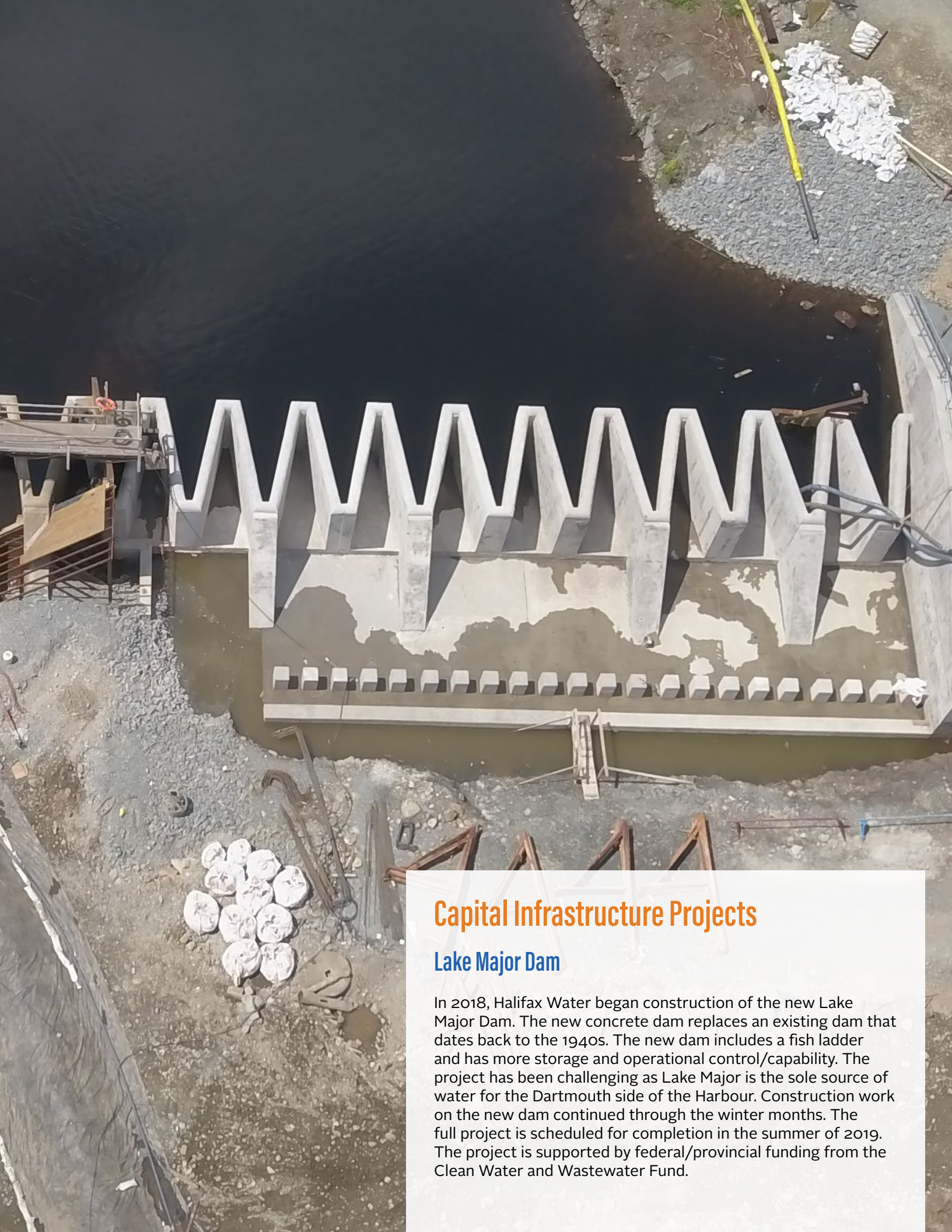
Modernizing Communication & Interaction with Customers

In 2018/19, Halifax Water completed a project to build a new website, designed with customers in mind. Customer feedback and a customer focus group helped shape the new website which was launched April 2019. The next phase of modernization is development of a customer portal that will enable customers to view their consumption data and account details, have access to some self-serve transactions and service requests. Halifax Water's utilization of social media has also been steadily increasing through Twitter and Facebook.





EFFECTIVE ASSET MANAGEMENT



Capital Infrastructure Projects

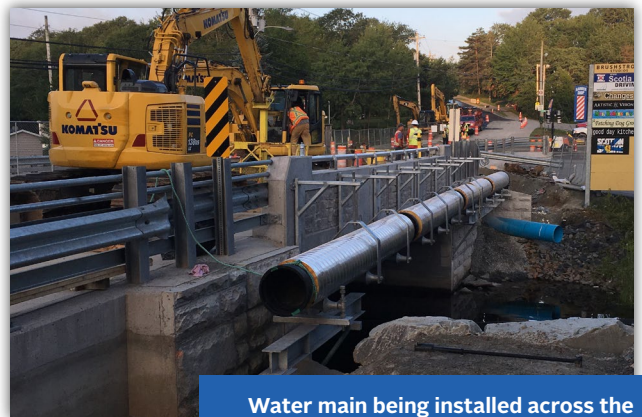
Lake Major Dam

In 2018, Halifax Water began construction of the new Lake Major Dam. The new concrete dam replaces an existing dam that dates back to the 1940s. The new dam includes a fish ladder and has more storage and operational control/capability. The project has been challenging as Lake Major is the sole source of water for the Dartmouth side of the Harbour. Construction work on the new dam continued through the winter months. The full project is scheduled for completion in the summer of 2019. The project is supported by federal/provincial funding from the Clean Water and Wastewater Fund.

Capital Infrastructure Projects Continued...

Fall River Servicing

In partnership with, and on behalf of HRM, Halifax Water was the lead agency for the extension of water service to the community of Fall River. The work involved the installation of approximately 6.9 kilometers of water mains, at a total project cost of \$10.2 million to service residents, schools, and businesses along Fall River Road, sections of Lockview Road, McPherson Road, Ingram Drive and Highway #2. The project was substantially completed and put in to service in December 2018. The project was supported by funding from the Federal and Provincial governments under the Clean Water and Wastewater Fund.



Water main being installed across the Fletchers Run Bridge in Fall River



New J. D. Kline Blower Equipment Building

J. D. Kline WSP Filter & Underdrain Replacement

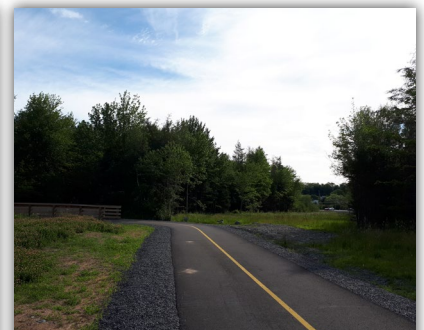
Construction to replace the underdrains and filter media for all eight filters at the J. D. Kline (Pockwock) Water Supply Plant began in early 2018. The project has funding support from the federal/provincial Clean Water and Wastewater Fund. The project also includes upgrading the filter system to accommodate air scour in the backwash process. The project is on track for full completion by the end of 2019.

Glendale Drive to Sackville Trunk Sewer Wastewater System Upgrade

The Glendale Drive project is a good example of collaboration with various stakeholders.

The project upsized a section from Glendale Drive to the Bedford/Sackville Trunk Sewer, in Lower Sackville, to improve the hydraulics of the system.

This work consisted of the replacement of approximately 275m of pipe from the Bedford/Sackville Trunk Sewer to the intersection of Glendale Drive and Rankin Drive, with 750mm diameter pipe. The project also widened the existing HRM easement.



Project work on the Sackville Greenway Trail

The project scope also included crossing of the adjacent wetlands of Rankin Brook and the Little Sackville River, which border this project. Communicating with the Sackville Rivers Association and related stakeholders throughout was an important part of this undertaking.

Once Halifax Water's work was complete, HRM concluded the section of the Sackville Greenway Trail pictured above.

Aerotech Wastewater Treatment Facility Upgrade & Expansion - Update



Aerotech WWTF



Bioreactor Tanks

The expansion and upgrade of the Aerotech WWTF focused on biological nutrient removal (BNR), utilizing ultrafiltration membrane bioreactor treatment technology. The facility supports the long-term environmental and growth plans for the region encompassing the Halifax Stanfield International Airport and Aerotech Business Park. The project commenced in 2012 with a focus on environmental sustainability, energy efficiency, asset renewal, life cycle cost, and operational automation for process control. Construction commenced in September 2016 and achieved substantial completion on August 23rd, 2019.

Aerotech WWTF has an average daily flow of 3.0 million litres per day (MLD) and a peak design flow capacity of 6.0 MLD. The facility is Halifax Water's most technically advanced wastewater treatment achieving tertiary effluent quality.

Treatment performance is continuously monitored to ensure the facility meets the stringent effluent nutrient requirements of its permit. The facility has surpassed treatment performance objectives.



Ultrafiltration Membranes

Capital Infrastructure Projects Continued...

Water, Wastewater and Stormwater projects Integrated with HRM Street Program

Halifax Water proactively replaces and rehabilitates water, wastewater and stormwater infrastructure in conjunction with municipal street reconstruction projects. Halifax Water invested approximately \$7.7 M to upgrade infrastructure systems within this program in 2018/19.

Wastewater Mainline Trenchless Lining Projects



Wastewater Main Lining Work on Rosedale Avenue, Fairview

In 2018, Halifax Water conducted two separate sewer lining projects. These projects consisted of the trenchless and non-disruptive construction application of cured-in-place pipe (CIPP) technology to rehabilitate aging wastewater, and combined (wastewater and stormwater) sewer mains.

Phase 1 included the rehabilitation of mainline sewers at 11 street sites

located within peninsular Halifax. The total lined was approximately 3,650 meters.

Phase 2 rehabilitated wastewater sewers at 19 street sites in the Fairview area. The total lined over this phase was approximately 11,325 meters. The Phase 2 lining provided the added benefit of sealing the existing sewer pipe and reducing storm and groundwater infiltration.

The lining work included significant communications efforts with stakeholders and area residents throughout all stages of the work. The lining construction began in late July and wrapped up by late October. The final value for Phase 1 was \$1.3 M and Phase 2 was \$2.3 M.

Wastewater Lateral Lining Program

This program included the trenchless and non-disruptive construction application of cured-in-place pipe (CIPP) technology for the rehabilitation of aging and leaky wastewater/sewer service laterals in the Leiblin Park and the Stuart Harris Drive sewersheds. 125 laterals were lined in Leiblin Park and 135 in the Stuart Harris Drive area.

Lining began in June and wrapped up late in the year, at a cost of approximately \$1.8 M.



Wastewater Lateral Lining Work on Stuart Harris Drive, Dartmouth

Ellenvale Run Retaining Wall

Ellenvale Run conveys stormwater from Lemont Lake to Morris Lake and is a major stormwater drainage corridor. The retaining walls along the channel consist of various materials and types; gabion basket, masonry stone walls, steel sheet piles, and precast concrete blocks. The condition of the retaining walls varies along the channel. In some areas the walls are in relatively good condition, while in others the walls are failing and temporary bracing was installed to prevent them from falling into the stream.

In an effort to stabilize the channel walls and ‘naturalize’ the channel, the section of Ellenvale Run between Main Street and Portland Street

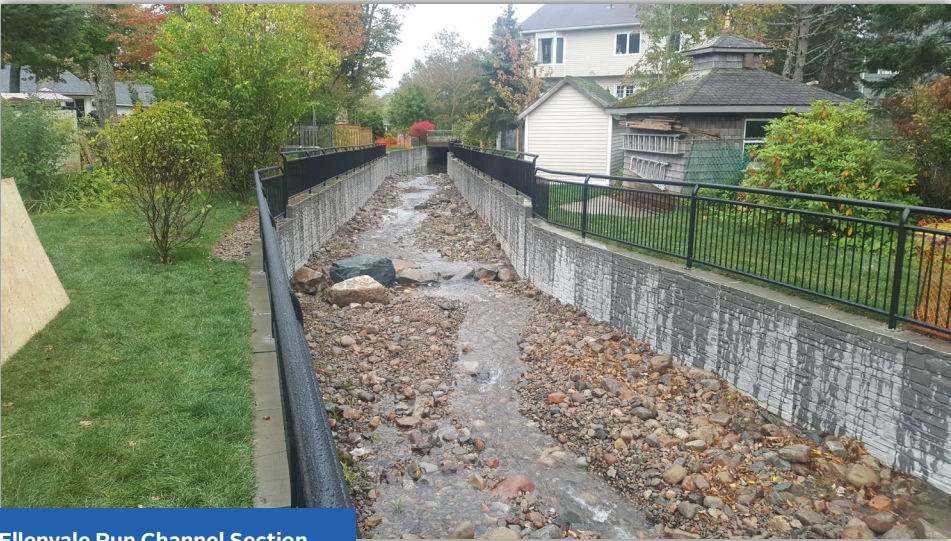
underwent a major rehabilitation in 2018. Along with stabilizing the channel walls, the project sought to reestablish or improve natural habitat through the use of energy dissipation pools, natural pool and riffle sequencing and natural stone on the bottom of the channel liner. This reduces the speed of stormwater flows, creates pools and meanders, and helps improve fish passage.



Section of channel being placed

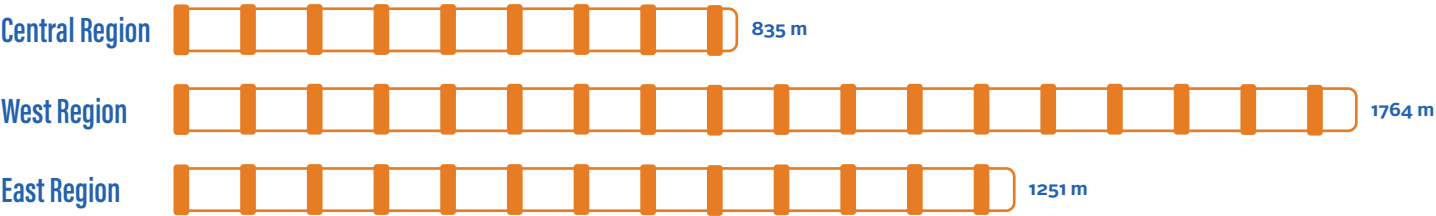
In order to complete the work, Halifax Water required permits from the provincial Department of Environment and Federal Department of Fisheries and Oceans. While construction was taking place, any fish that made their way to the channel work site were collected using dip nets at one end of the project work zone, placed in buckets and released at the other end of the work zone. The fish checks took place daily. Pickerel, trout, and alewife are species that use the waterway, but eels were the main species encountered during construction.

For 2019, further enhancement to additional sections of the Ellenvale Run will take place.



Ellenvale Run Channel Section

Water Main Renewals 2018/19



2018 Water Main Renewals = 3.85 km
 2017 Water Main Renewals = 8.02 km

Asset Management

Key achievements in Asset Management (AM) this year included development of a Climate Change Framework; progress on the Infrastructure Master Plan; initiation of the Integrated Resource Plan (IRP) Update; rebuilding the wastewater hydraulic model; updating the Asset Management Plan (AMP) for fiscal 2018; and completing year three of the corporate flow monitoring and the sewer inspection programs.

Climate Change Management Framework

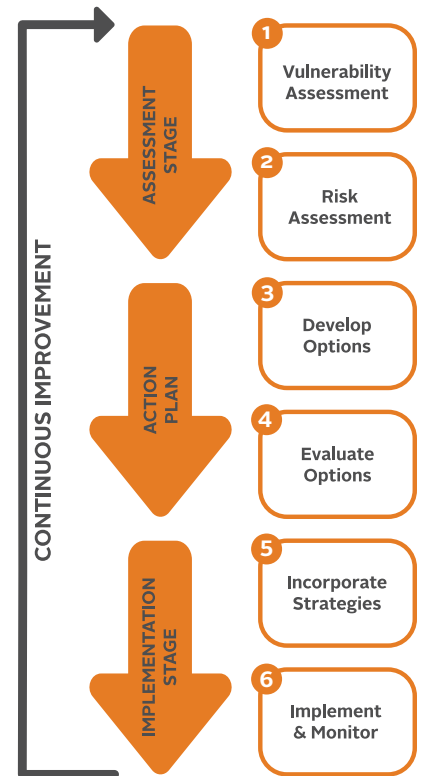
Through the Infrastructure Master Planning project, Halifax Water looked closely at climate change and how to adapt and prepare for the future. There were two components to the work:

- Development of a “Vulnerability to Climate Change” assessment framework
- Climate change considerations for design Standards and Long Term Planning

The Climate Change Management Framework was developed as a guideline to assess our infrastructure assets’ vulnerability

to climate change, prioritize those vulnerabilities based on risks, develop adaptation strategies to reduce the risk, and implement those strategies. As illustrated on this page, the framework has three stages – Assessment, Action Plan and Implementation. The framework shows how an asset progresses from being assessed against the impacts of climate change to where an adaptation strategy has been implemented.

Halifax Water will also be updating the Design and Construction Specifications to account for climate change and sea level rise boundary.

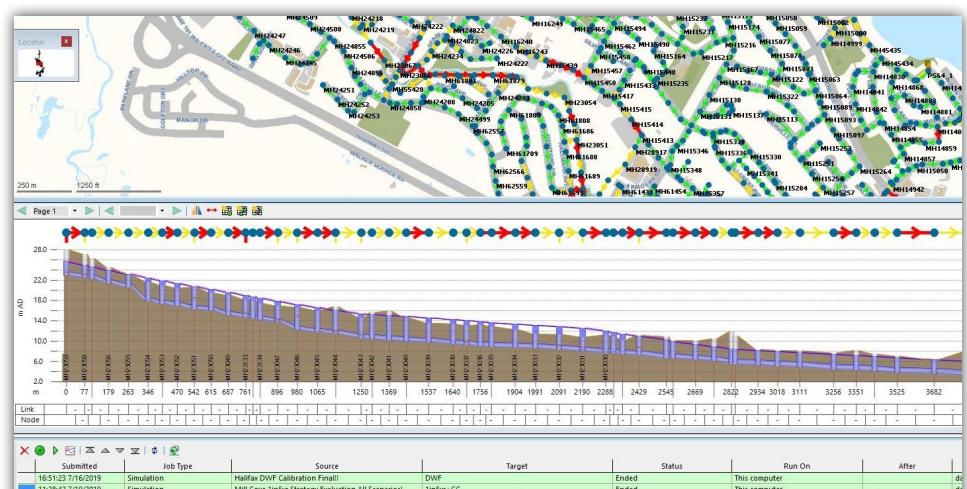


Regional System Modelling - Wastewater

Through the Infrastructure Master Plan, a new wastewater model was created using the new InfoWorks Integrated Catchment Modelling (ICM) software. The model development began with the creation of new wastewater modelling guidelines.

The new wastewater model is an “all-pipe” model closely linked with the corporate Geographic Information System (GIS) and Supervisory Control And Data Acquisition (SCADA) systems. All pipes and manholes in the wastewater and combined sanitary systems are represented in the model.

The model is currently being used in the development of the Infrastructure Master Plan. The Asset Management team will be conducting continuous updates and annual calibration of these regional models.



InfoWorks ICM Software

2018/19 Asset Management Plans

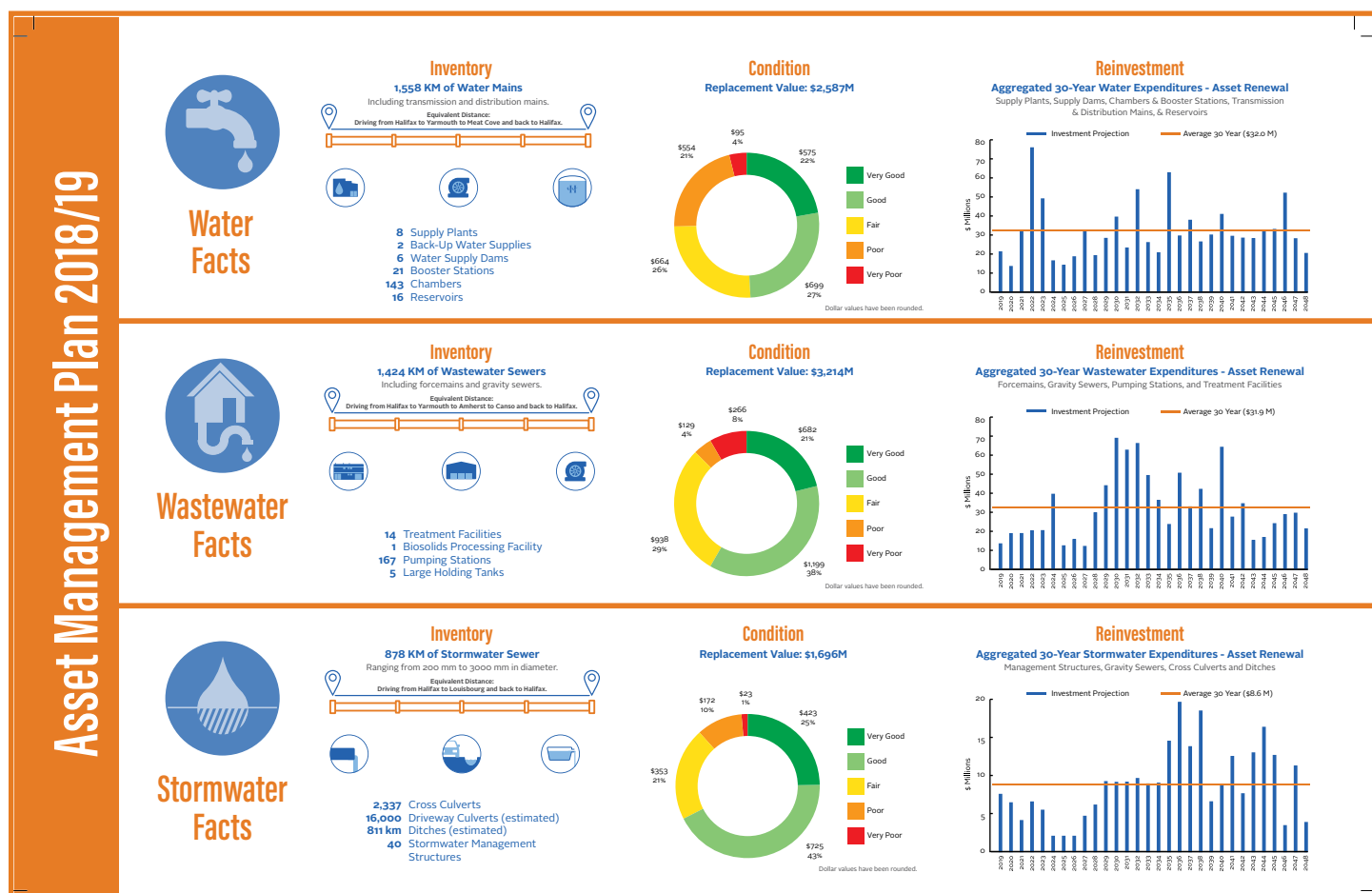
With official sign-off of the 2017/18 Asset Management Plan (AMP), the Asset Management (AM) Team had the approval to proceed with establishing the Asset Management Implementation Teams (AMITs). As a pilot, AMITs were established for Water Transmission Mains, Wastewater Forcemains, and Stormwater Cross Culverts.

Transmission Mains – the Transmission Mains AMIT worked to improve data in GIS, reconciling differences between data available in GIS and sources maintained historically by Engineering. The AMIT estimated service lives based on pipe material and other factors to determine a calculated condition and suggested replacement date.

Forcemains – Using pipe material as the primary criteria, the Forcemains AMIT developed an improved methodology to calculate condition and suggested replacement dates.

Cross Culverts – the Cross Culverts AMIT reviewed and updated estimated service lives based on asset material. Work collecting data during site visits increased the inventory by 186 cross culverts.

A summary of the state of good repair by infrastructure service area is provided below.



Asset Management Plan 2018/19 Summary

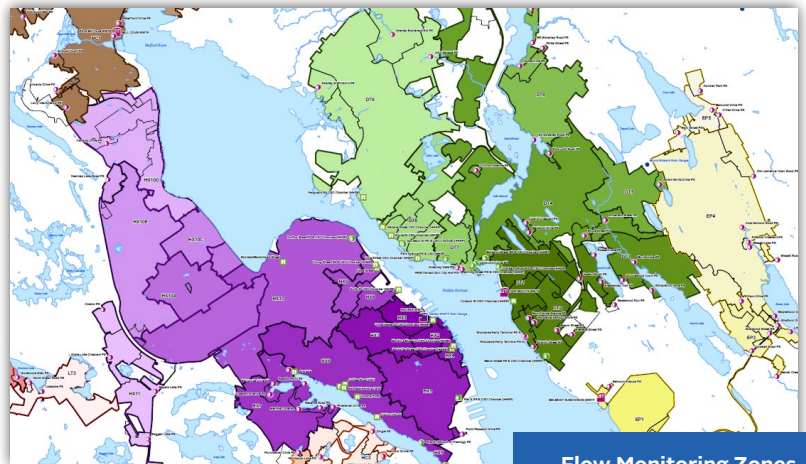
Asset Management Continued...

Corporate Flow Monitoring Program

The Corporate Flow Monitoring Program deployed 40 new flow monitors this year. There are a total of 102 active flow monitors in our system. This program provides valuable information used in advance of specific capital projects, to calibrate the hydraulic models, and enable monitoring before, during and after wet weather related projects.



Typical Field Set Up for Monitor Installations



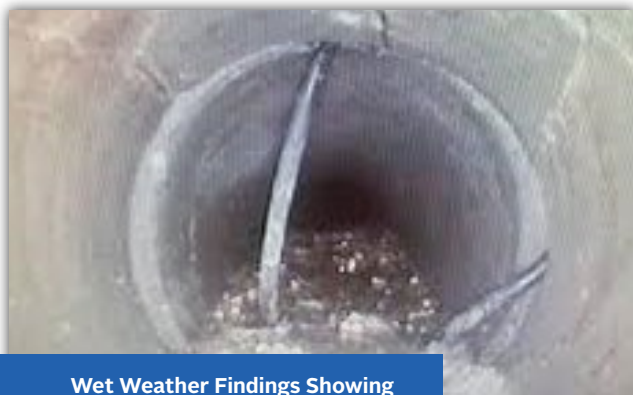
Flow Monitoring Zones

Sewer Inspection Program

Year three of the sewer inspection program saw 60,650 metres of sewers, and 706 structures (307 manholes and 399 catchbasins) were inspected in 2018/19. Staff have worked to integrate the inspection software with Halifax Water's GIS to optimize the process for uploading data into the corporate GIS. Building on the tools developed in earlier years, staff have continued to use a variety of GIS tools to simplify how inspection outcomes and information are shared with the requestor or other users. Initial exploration of the possibility of moving to ESRI's CCTV Manager is underway. CCTV Manager will further enhance visualization of CCTV data and enable simplified



Wet Weather Findings Showing Stormwater Infiltration at Pipe Joints



Wet Weather Findings Showing Stormwater Infiltration at Pipe Joints

updating of key attribute data (pipe material, size, condition) with information collected directly from the inspections.

In 2018/19, the Sewer Inspection Program focused mainly on HRM-HW integrated projects and the Wet Weather Management Program.

Energy Management

Energy use in municipal water and wastewater/stormwater treatment facilities and collection systems typically consume over 30% of Municipal energy usage and over 4% of the total National energy usage (US Data). With this in mind, Halifax Water has continued its efforts to improve its energy footprint.

- The Energy Management Plan was updated to identify specific annual energy reduction targets and activities to be completed in 2018/19.
- Projects and initiatives completed in 2018/19 resulted in over 2,873,000 kWh_e in annual energy savings, over \$324,000 in cost savings, and over 1,850 Tonnes CO_{2e} in direct and indirect green house gas (GHG) reductions. Completed projects and annual initiatives include:

Completed Energy Management Capital Projects & Annual Initiatives					
Service Area	Facility	Project/Initiative	Annual Savings	Energy Reduction (kWh _e)	CO _{2e} Reduction (tonnes/yr)
Capital Project Completions					
Water	J. D. Kline WSP	Boiler Replacement	\$3,800	47,448	12
Wastewater	Herring Cove WWTF	Fan Belt Replacements - V Belt vs. Timing Belt	\$13,486	132,000	86
Wastewater	Halifax WWTF	Fan Belt Replacements - V Belt vs. Timing Belt	\$32,090	315,000	205
Wastewater	Halifax WWTF	New Air Compressors	\$3,300	30,000	20
System Wide	Various Facilities	NSPI Meter Read Improvements (Credits)	\$44,922	-	-
Annual Operations Initiatives					
Wastewater	*HHSPs & EPWWTF	Ultraviolet Shutdown (April & November - March 2019)	\$172,767	1,865,696	1,216
Wastewater	Halifax WWTF	Odour Control System Bypass (April & November - March 2019)	\$43,777	390,866	255
Wastewater	Herring Cove WWTF	Odour Control System Bypass (November - April 2019)	\$10,686	92,524	60
			\$324,828	2,873,534	1,855

*Halifax Harbour Solutions Plants & Eastern Passage Wastewater Treatment Facility

- Access to Nova Scotia Power Inc. (NSPI) meters to improve meter reading activities, along with continued use of the Energy Management Information System, continue to improve the accuracy of energy data for the utility.
- Design stage development of the Cogswell District Energy System (DES) continued. The 100% detailed design of the distribution piping systems (DPS), along with a by-law review of similar Canadian systems, was completed in 2018/19. The DES business case has been updated to reflect changes from the 100% DPS design. With an increase in the size of the proposed buildings in the Cogswell area, the business case shows a marked improvement over earlier preliminary stage versions. Next steps include completing the stakeholder information package to facilitate the promotion of the project to the local community and stakeholders, DES by-law development in conjunction with HRM, and completing detailed designs for the energy centre, energy transfer stations, and the development of the required building specifications.
- A continued focus on early stage involvement in infrastructure projects has also brought a focus on energy efficiency and sustainability at the design stage, resulting in efficiency improvements implemented during construction. Current projects include the Mill Cove WWTF upgrade project.

Energy Management Continued...

- When appropriate, Halifax Water has also taken advantage of provincial energy efficiency rebate programs offered by Efficiency Nova Scotia, which help to reduce capital costs and improve project payback.

2018/19 saw an overall utility annual energy increase of +1.6%, an aggregate increase in water and wastewater flows of +2.4%, and an aggregate increase in GHG emissions of +1.2%. Direct GHG emissions (i.e. fossil fuels used for heating) were 1,976 tonnes CO_{2e}, while indirect emissions (i.e. emissions from electricity use via NSPI) were 38,703 tonnes CO_{2e}. A focus on further energy efficiency and operational improvements to existing infrastructure and on completing energy audits in the rest of our facilities in the coming years will allow Halifax Water to continue to build on these results.



New, efficient air compressors installed at the Halifax WWTF

Engineering Information

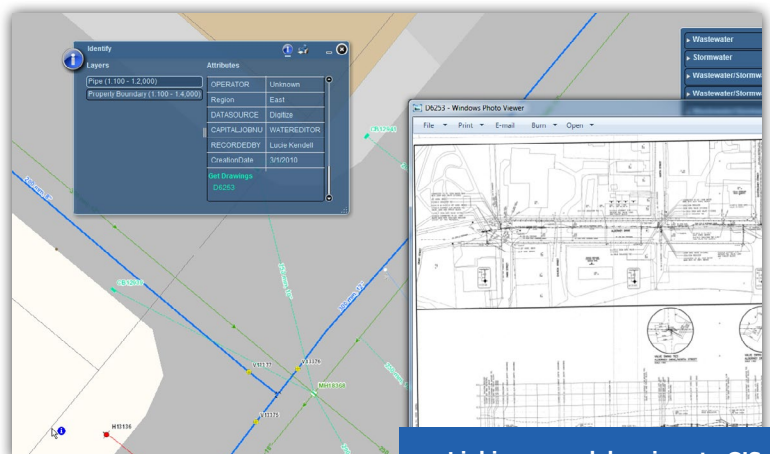
This past year saw many key achievements in the Engineering Information area that provide critical support to a variety of corporate solutions relating to infrastructure data and related services including:

- Completion of the first year of hosting and administering GIS and Cityworks including responding to approximately 1000 service and incident requests
- Completion of approximately 850 drawing, data and mapping requests for internal and external customers
- Enhancement of FORMS application to support Water Quality Lead replacement program
- Completion of CMMS Phase 3: onboarding of Facilities to the Cityworks platform
- Numerous data gap improvements to support corporate initiatives such as Asset Management Plan development
- Initiation of a service lateral record data entry project
- Improvements to record drawing links in GIS and drawing management processes
- Growth in Web GIS capabilities with the development and release of several additional Web GIS apps
- Conversion of GIS data's geodetic datum from ATS77 to NAD83 (CSRS)2010 for horizontal / CGVD2013 for vertical

Drawings, Data & Datum

Along with data improvement by completing both spatial (pipe network) and attribute gaps, the EI team has also been working to improve drawing access. The ultimate goal is to have all record drawings linked to corresponding infrastructure through GIS. The database model and tables to accommodate drawing linking. Initial research has been done on high priority infrastructure like transmission mains, force mains and facilities. Future projects will see all record drawings linked to GIS. A new index application is also in the works.

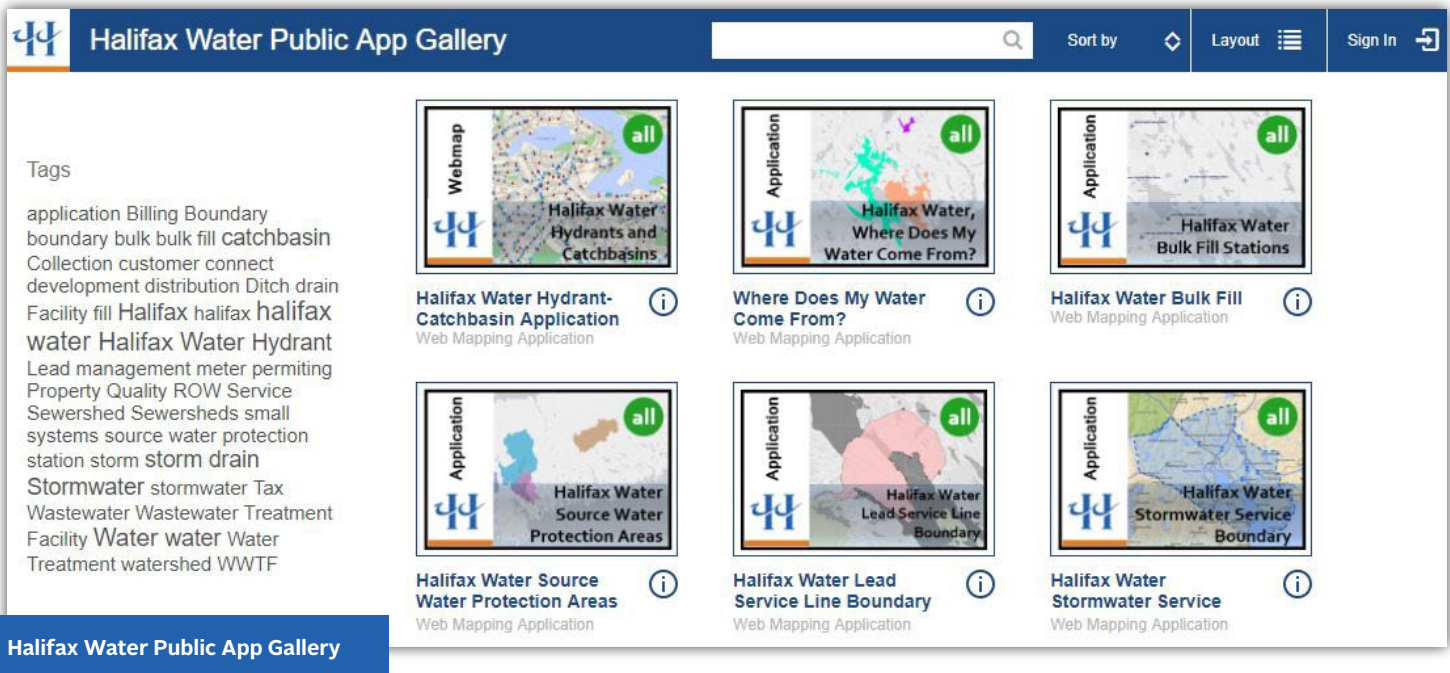
Another significant data improvement in 2018/19 was the conversion of our GIS data from the ATS77 datum to NAD83 datum as recommended by province of NS.



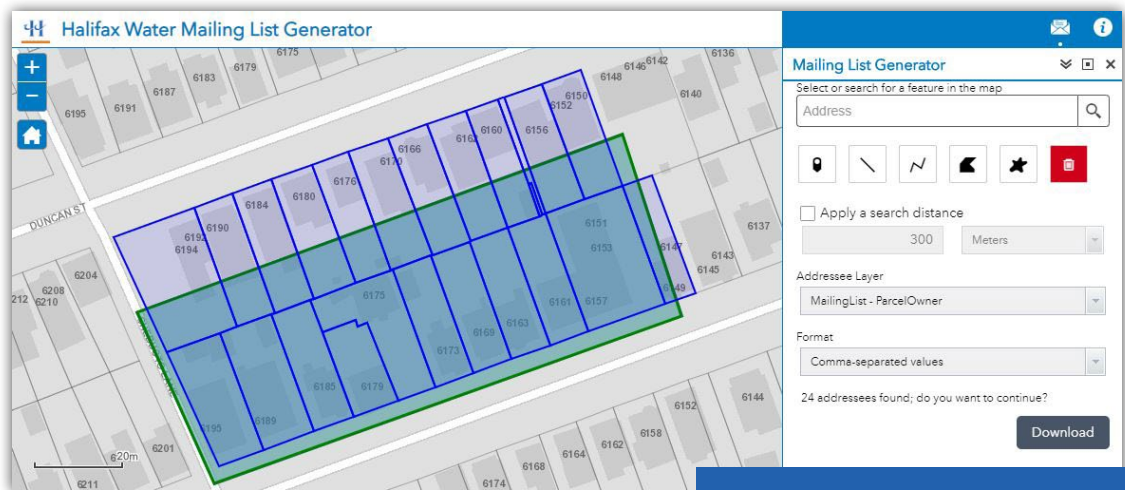
Linking record drawings to GIS

Web GIS Growth

Web GIS mapping applications continued to grow within the organization both for internal business unit use and also for use by our communication team when providing project specific information to the public.



An internal application developed and deployed in 2018/19 is the Halifax Water Mailing List Generator. Staff use this application to generate a mailing list for selected properties when service notification communication is required.



Looking Ahead for GIS

The 2018/19 year saw the initiation of a GIS/Cityworks Upgrade Project including the development of a new Web GIS application to replace the legacy GIS Dashboard. The upgrades will include improvements to the GIS and Cityworks environments. The installation and configuration of the Portal for ArcGIS will allow for greater flexibility in the areas of Web GIS application deployment, data security and named user flexibility.

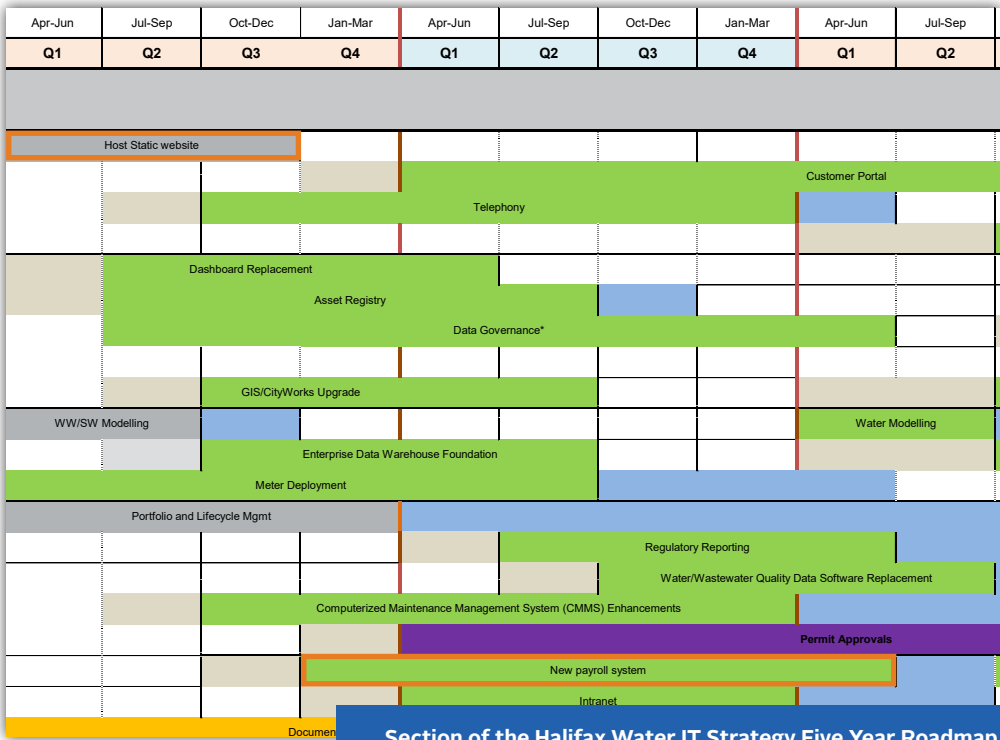
Data improvements will continue to be a theme for 2019/20 with sewer service record data entry continuing, the build of our large customer laterals ongoing and improvements to record drawing linking in GIS.

Information Technology

In 2019, the Information Services and Engineering Information sections worked to update the Information Technology Strategic Roadmap. The IT Strategy and Roadmap guide activities related to Information Technology over the next five years. It is based on a clear strategic vision for how Halifax Water wants to position and use information technology within the context of its business and utility operations.

The Roadmap, a portion of which is shown here, shows a schedule of projects aligned over the organization's strategic and tactical goals.

In the 2018/19 fiscal year seven projects were completed. Two projects of particular note are:



Section of the Halifax Water IT Strategy Five Year Roadmap

New Halifax Water Website

902-420-9287

CLICK BEFORE YOU DIG

MENU

STRAIGHT from

the SOURCE

Welcome to Halifax Water

Halifax Water Website

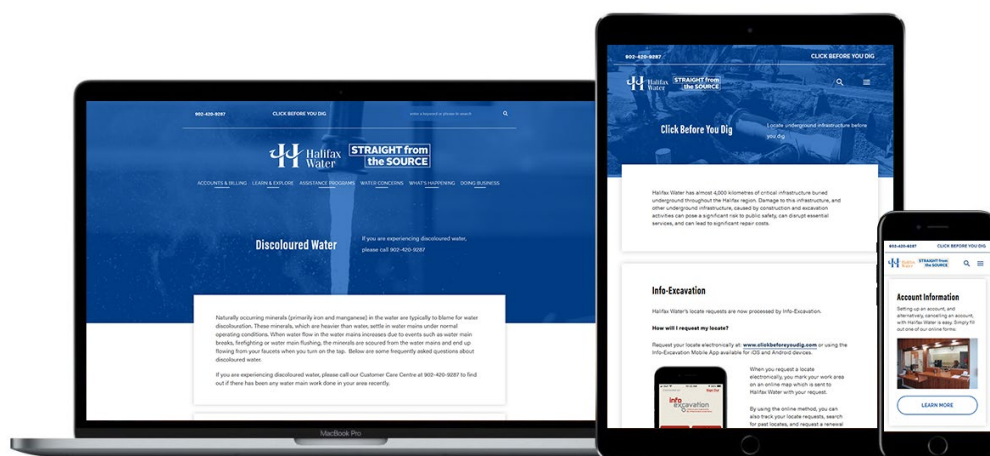
ades we have been focused on improving our operations so we can continue to manage

A new Halifax Water website was rolled out (www.halifaxwater.ca) with a new design, layout and easy to use navigation. The website was created to be very customer centric with a design that will help keep customers informed and up-to-date with what is going on at Halifax Water.

The new design came from feedback provided by Halifax Water customers. Halifax Water distributed an online survey and held several in-person focus groups.

Through the survey and focus group sessions customers made it clear what they wanted and needed:

Focus Group Wants/Needs	
Customer Want/Need	How it was Achieved
An easy, clear way to contact Halifax Water	<ul style="list-style-type: none"> Halifax Water's Customer Care Centre phone number is displayed in the header at all times. Future introduction of Contact Us forms at the bottom of every page.
Easy, fillable online forms	<ul style="list-style-type: none"> Currently there are five new online forms with more being rolled out in the next two years.
Timely and up-to-date information on what's happening (water main breaks, hydrant flushing, road closures, etc)	<ul style="list-style-type: none"> A new 'What's Happening' page has been added to the site. Home page has been updated to include a section for 'Notices', 'What you need to know' and Twitter feed.
Alerts on major news items like water restrictions	<ul style="list-style-type: none"> New Alert functionality has been added to the site.
Information on major infrastructure projects and the impact on customers	<ul style="list-style-type: none"> A new section on 'Major Projects' has been added to the site.
Easy, intuitive navigation	<ul style="list-style-type: none"> Navigation is no longer based on internal business unit functionality, but rather customer focused wants and needs.
Mobile-friendly site	<ul style="list-style-type: none"> The new site was designed using the Mobile-First Approach. The result is a website that automatically adjusts based on the size of the user's screen.



The new Halifax Water website is managed and updated by Halifax Water staff.

The next release of the website, expected in 2021, will provide customers more control over their water accounts, and more self-service access to items such as consumption information, basic billing information and monthly billing.

New Payroll System

A Payroll Project was initiated when it became apparent that the current system is labour intensive and outdated.

The project team issued a request for proposal, assessed the responses, and selected Telus to provide the new payroll system. Telus was chosen based on a combination of specific Halifax Water requirements, available features and price.

REGULATORY COMPLIANCE





Engineering Approvals

The Engineering Approvals group is focused on adherence to the Halifax Water Design Specifications, the Supplementary Standard Specification and the Schedule of Rates, Rules and Regulations with respect to connections to, and expansions of Halifax Water Systems. The administration of the new service connections includes the administration of Regional Development Charge.

In 2018/19, the Engineering Approvals group processed:

Results by Activity		
Application Type	2018/19	2017/18
Building Permit Applications	747	655
New Service & Renewal Applications	408	287
Subdivision Applications	198	249
Metres of New Water Main	9,328	6,768
Metres of New Wastewater Main	1,865	6,395
Metres of New Stormwater Main	4,854	6,769
Demolition Permits	113	104
Clearance Letters	23	17
Tender Reviews	100	86
New Backflow Prevention Applications	140	93
Backflow Prevention Devices Are Active	7,050	6,780

Regional Development Charge

The Regional Development Charge (RDC), is collected from new developments or redevelopments to fund growth's share of regional water and wastewater infrastructure costs. In developing the RDC, staff reviewed the projected population growth and identified the upgrades, and associated costs. To accommodate growth over the next 20 years.

Using this information, a charge per new residential dwelling unit or non-residential floor area was created. Halifax Water committed to regular five-year reviews of the Regional Development Charge and to identify interim changes and impacts based on new and best information that may result in a 15% +/- change to the RDC. Halifax Water is completing the infrastructure master plans for the east and central regions in the summer of 2019 to compliment the previously completed west region infrastructure plan.

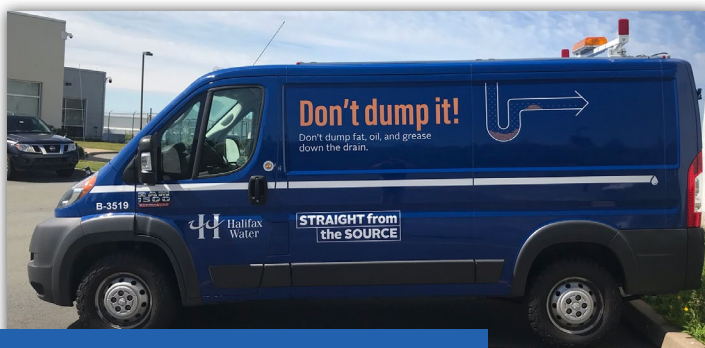
The regional infrastructure required to facilitate growth identified from these three plans will feed into the development of an updated RDC. Stakeholder consultation will commence in June of 2019, with a target of having a proposed charge to the Nova Scotia Utility and Review Board for a hearing in February 2020.

Environmental Engineering

The Environmental Engineering group oversees the Pollution Prevention (P2) Program and Inflow & Infiltration (I&I) Reduction Program. The purpose of these two programs is to regulate the quantity and quality of discharge from customer connections to the wastewater and stormwater system. Non-compliant discharges can impact the health and safety of Halifax Water workers, the public and the environment, and create operational and compliance issues with Halifax Water infrastructure and treatment plants.

The disposal of “flushable wipes” and fat, oil and grease (FOG) into the wastewater system causes blockages in pipes, failure of pumps and impairs the treatment process. The result is wastewater back-ups and pump failures with possible overflows. The P2 Program began using operational data from CityWorks to identify chronic problem locations and focus education and enforcement efforts on those areas first. Staff have developed a systematic approach to completing inspections in areas that are predominantly commercial/ industrial.

Pollution Prevention is also responsible for regulating the resolution of situations where a private wastewater system was inadvertently connected to a stormwater system. Four of these wastewater to stormwater cross connections we resolved over the past year. Staff also investigates the origin of spills or contaminants into the wastewater and stormwater systems.



Halifax Water P2 Van used for Inspections



Illegal disposal of paint into the stormwater system

The I&I Reduction Program identifies and resolves private property connections where stormwater is entering the wastewater system. Staff work closely with the Wet Weather Management Program to reduce the amount of stormwater entering the wastewater system.



Smoke test showing that a downspout is illegally connected to the Halifax Water wastewater system



Manhole Surcharge (Overflowing)

The I&I team inspected over 121 single family residential properties and smoke tested 2,600 m of wastewater mains in Uplands Park, Beaver Crescent, Wanda Lane, Downey Road and Fairview/Clayton Park area last year. A number of new approaches to communicating with residential customers about I&I Reduction, such as open houses and more reader friendly written communication have been well received by customers.



Smoke test showing that a driveway drain is illegally connected to the Halifax Water wastewater system

Environmental Management Systems

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 engage 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 has recently changed from 2004 version to a 2015 version. A greater focus has been placed on organizational leadership and identification of internal and external risks and associated influences.

Staff have successfully obtained certification for the following facilities: J. D. Kline WSP, Lake Major WSP, Bennery Lake WSP and the Herring Cove WWTF under the new audit. An external audit for the Dartmouth WWTF took place in May 2019 to bring it into the ISO 14001 standard.

This coming year staff will be developing a plan to implement an EMS system corporately.



Wastewater Treatment Facility Compliance

Wastewater treatment facilities in Nova Scotia are regulated by Nova Scotia Environment. They set effluent discharge limits for all wastewater facilities. The limits define maximum concentrations of parameters such as Carbonaceous Biochemical Oxygen Demand (CBOD), Total Suspended Solids (TSS), and Fecal Coliform. For some facilities, parameters such as nutrients (nitrogen and phosphorus which cause excess growth of algae

and plants) or pH are also regulated. Halifax Water oversees five large harbour facilities and nine smaller, community-based facilities.

Halifax Water continues to complete a number of optimization projects that involve reduction of wet weather influences, equipment upgrades and process enhancements, which have resulted in improved compliance results.

Compliance for the harbour wastewater treatment facilities are measured on monthly averages. There has been a significant improvement with the compliance at the five harbour facilities with three, Herring Cove, Eastern Passage and Mill Cove, being fully compliant for the year and Halifax having only one non-compliant result for the year.

Wastewater Treatment Facility Compliance Summary											
April 2018 - March 2019											
Wastewater Treatment Facility	CBOD ₅	TSS	E. Coli.	Phosphorus		Ammonia		pH	Dissolved Oxygen	Total Chlorine	Toxicity
				S	W	S	W				
Halifax	42	26	4662	N/A		N/A		7	N/A	N/A	Toxic
Herring Cove	27	16	55	N/A		N/A		7	N/A	N/A	Non-Toxic
Dartmouth	41	35	7745	N/A		N/A		7	N/A	N/A	Toxic
Eastern Passage	7	7	55	N/A		N/A		7	N/A	N/A	Non-Toxic
Mill Cove	12	16	16	N/A		N/A		6.6	N/A	N/A	Non-Toxic
Aerotech	5	2	12	0.6		0.4	3.9	7	7.8	N/A	Non-Toxic
Frame	6	1	13	N/A		N/A		7	N/A	N/A	N/A
Lakeside - Timberlea	6	15	16	1	2	1	4	7	N/A	0.10	Non-Toxic
Lockview - MacPherson	5	8	37	0.4		1		7	N/A	N/A	N/A
Middle Musquodoboit	8	7	45	N/A		N/A		8	N/A	N/A	N/A
North Preston	7	13	42	0.4		0.7		7	N/A	N/A	N/A
Springfield	8	23	47	N/A		N/A		7	N/A	N/A	Non-Toxic
Steeves (Wellington)	4	3	10	0.13		0.05		7.3	N/A	N/A	N/A
Uplands Park	9	10	99	N/A		N/A		7	N/A	N/A	N/A
Weighted Average	13	13	918	N/A		N/A		7.0	8	0.1	

Legend	
	Specific parameter limit achieved
	Specific parameter limit not achieved

Definitions:

CBOD₅: Carbonaceous Biochemical Oxygen Demand – a measure of the amount of organic material.

TSS: Total Suspended Solids – a measure of the number of particles in the wastewater.

Fecal Coliform / E. Coli: Bacteria which are present in the treated sewage.

Phosphorus (phosphate): A plant nutrient which can impact water bodies.

Ammonia: A chemical compound containing nitrogen, another plant nutrient.

pH: A measure of the acidity of water.

Dissolved Oxygen: The amount of oxygen in the water, essential for fish and other aquatic organisms.

Aluminum: A metal dissolved in water

N/A: Not Applicable

Performance assessments for the nine smaller wastewater treatment facilities are based upon quarterly averages. Results for April 2018 to March 2019 are presented below:

Small/Community Wastewater Treatment Facility Compliance Summary									
Q1: April 2018 - June 2018									
Wastewater Treatment Facility	CBOD ₅	TSS	E. Coli.	Phosphorus	Ammonia	pH	Dissolved Oxygen	Total Chlorine	Toxicity
Aerotech	5	3	18	2.2	4.9	7.0	6.8	N/A	YES
Frame	5	1	10	N/A	N/A	6.8	N/A	N/A	N/A
Lakeside - Timberlea	5	18	12	1	3	7.1	N/A	0.10	YES
Lockview - MacPherson	4	4	67	0.4	2	7.2	N/A	N/A	N/A
Middle Musquodoboit	9	11	58	N/A	N/A	7.7	N/A	N/A	N/A
North Preston	7	25	136	0.5	0.3	6.7	N/A	N/A	N/A
Springfeild	5	19	14	N/A	N/A	6.8	N/A	N/A	N/A
Steeves (Wellington)	2	1	10	0.1	0.06	7.5	N/A	N/A	N/A
Uplands Park	6	9	10	N/A	N/A	6.3	N/A	N/A	N/A
Q2: July 2018 - September 2018									
Wastewater Treatment Facility	CBOD ₅	TSS	E. Coli.	Phosphorus	Ammonia	pH	Dissolved Oxygen	Total Chlorine	Toxicity
Aerotech	5	1	10	0.1	0.1	7.4	8.2	N/A	YES
Frame	4	1	10	N/A	N/A	7.3	N/A	N/A	N/A
Lakeside - Timberlea	5	12	14	1	1	7.3	N/A	0.10	YES
Lockview - MacPherson	5	2	10	0.3	0.3	6.8	N/A	N/A	N/A
Middle Musquodoboit	4	5	10	N/A	N/A	7.6	N/A	N/A	N/A
North Preston	5	3	10	0.2	0.1	6.7	N/A	N/A	N/A
Springfeild	4	5	10	N/A	N/A	7.2	N/A	N/A	N/A
Steeves (Wellington)	5	2	10	0.1	0.05	7.3	N/A	N/A	N/A
Uplands Park	10	11	63	N/A	N/A	6.9	N/A	N/A	N/A
Q3: October 2018 - December 2018									
Wastewater Treatment Facility	CBOD ₅	TSS	E. Coli.	Phosphorus	Ammonia	pH	Dissolved Oxygen	Total Chlorine	Toxicity
Aerotech	6	1	10	0.1	0.68	7.1	8.0	N/A	YES
Frame	8	1	10	N/A	N/A	7.2	N/A	N/A	N/A
Lakeside - Timberlea	7	14	24	2	2	7.0	N/A	0.08	YES
Lockview - MacPherson	5	7	32	0.4	1	6.9	N/A	N/A	N/A
Middle Musquodoboit	8	3	49	N/A	N/A	7.5	N/A	N/A	N/A
North Preston	8	4	13	0.3	1.2	6.9	N/A	N/A	N/A
Springfeild	10	10	10	N/A	N/A	6.8	N/A	N/A	N/A
Steeves (Wellington)	5	10	10	0.3	0.1	7.5	N/A	N/A	N/A
Uplands Park	8	9	13	N/A	N/A	7.1	N/A	N/A	N/A
Q4: January 2019 - March 2019									
Wastewater Treatment Facility	CBOD ₅	TSS	E. Coli.	Phosphorus	Ammonia	pH	Dissolved Oxygen	Total Chlorine	Toxicity
Aerotech	3	1	10	0.1	1.7	7.2	8.3	N/A	YES
Frame	6	1	21	N/A	N/A	6.9	N/A	N/A	N/A
Lakeside - Timberlea	7	16	14	2	5	7.1	N/A	0.10	YES
Lockview - MacPherson	8	20	40	0.5	11	7.1	N/A	N/A	N/A
Middle Musquodoboit	10	7	62	N/A	N/A	7.4	N/A	N/A	N/A
North Preston	8	16	10	0.4	1.1	7.0	N/A	N/A	N/A
Springfeild	12	57	155	N/A	N/A	6.6	N/A	N/A	N/A
Steeves (Wellington)	5	1	10	0.1	4.1	6.9	N/A	N/A	N/A
Uplands Park	14	12	309	N/A	N/A	6.9	N/A	N/A	N/A

Water Quality

Providing our customers with safe, reliable, affordable high-quality drinking water requires investment in infrastructure, research, and robust quality assurance/quality control programs. Halifax Water has made considerable investments in all of these areas.

In order to ensure quality control is optimized, we maintain ISO 14001 Environmental Management System Registration at the J. D. Kline (Halifax), Lake Major (Dartmouth), and Bennery Lake (Halifax Airport) Water Supply Plants.

Halifax Water undertakes a comprehensive water testing program. Bacteriological testing is done weekly at 51 locations within the urban core, and at each of the small systems.

Results by Activity			
April 2018 - March 2019			
System	No. of Samples	No. of Exceedances	% Absent
Pockwock	828	0	100%
Pockwock Central	520	0	100%
Lake Major	1197	1	99.92%
Bennery	153	0	100%
Five Islands	106	0	100%
Silver Sands	104	0	100%
Middle Musquodoboit	102	0	100%
Collins Park	104	0	100%
Miller Lake	104	0	100%
Bomont	104	0	100%
Total	3322	0	99.97%
Absent (A)	3321		99.97%
Present (P)		1	0.03%

Approximately 3,300 tests for total coliform bacteria are conducted each year. Results of 99.9% of samples with bacteria absent are consistently achieved, as shown on this page.

Additional testing of drinking water includes:

- Chlorine residual, pH, and turbidity of treated water leaving each plant as well as multiple locations within the plant to monitor and optimize the treatment process.
- Quarterly sampling of treated water at 2-3 locations within the distribution system for approximately 40 chemical parameters.
- Quarterly sampling of raw lake water and water from contributing streams for approximately 40 chemical parameters.
- Bi-annual sampling of Lake Major and Pockwock Lake raw and treated water for all parameters in the Guidelines for Canadian Drinking Water Quality (Health Canada).
- Bi-annual testing and sampling for giardia and cryptosporidium for treated and raw water for all surface water systems.

Water test results are reported to Nova Scotia Environment and the Nova Scotia Medical Officer of Health on a regular basis. Protocols have been established between Halifax Water and the provincial Health and Environment departments to clearly delineate roles and responsibilities, in the unlikely event of a disruption in water quality.



Samples being tested

STEWARDSHIP OF THE ENVIRONMENT



Wet Weather Management Program

Like many municipalities and utilities across North America, sections of Halifax Water's sanitary sewer system are subject to dramatic flow increases in response to precipitation events. Wet weather flows can lead to sanitary sewer overflows, capacity reduction, sewer backups/basement flooding, treatment process upsets and increased operation and maintenance costs.

To address this issue, Halifax Water has developed a proactive approach to address the negative impacts of wet weather events on the sanitary sewer system. Since its inception in 2013, the goal of Halifax Water's Wet Weather Management Program (WWMP) has been to develop a long-term strategy to cost effectively address wet weather generated flows. The first phase of the work was a comprehensive pilot program to study the effectiveness and cost of various rehabilitation activities. Currently, there are six sewersheds that have undergone pilot activities with an additional pilot to study the effectiveness of "private-only" interventions.

Wet Weather Management Program Continued...

The table below summarizes the rehabilitation activities in the pilot areas and cumulative results to date.

WWMP Pilot Project Summary							
Sewershed	Rehabilitation Activity				Private Side Inspections	Peak Flow Reduction (L/sec)	Peak RDII Reduction (%)
	Mainline Lining	Lateral Lining	Manhole Lining	Deep Storm			
Stuart Harris Drive	✓	✓	✓		✓	45	45%
Leiblin Park	✓	✓				19	19%
North Preston	✓					27	24%
Cow Bay Road				✓	✓	86	4%
Crescent Avenue (MH182)	✓	✓	✓		✓	43	74%
Crescent Avenue (MH174)	✓	✓	✓		✓	41	92%

2018 saw the transition from pilot activities to the full scale implementation in the Fairview sewershed.

Fairview, Clayton Park, Bridgeview: Project Summary

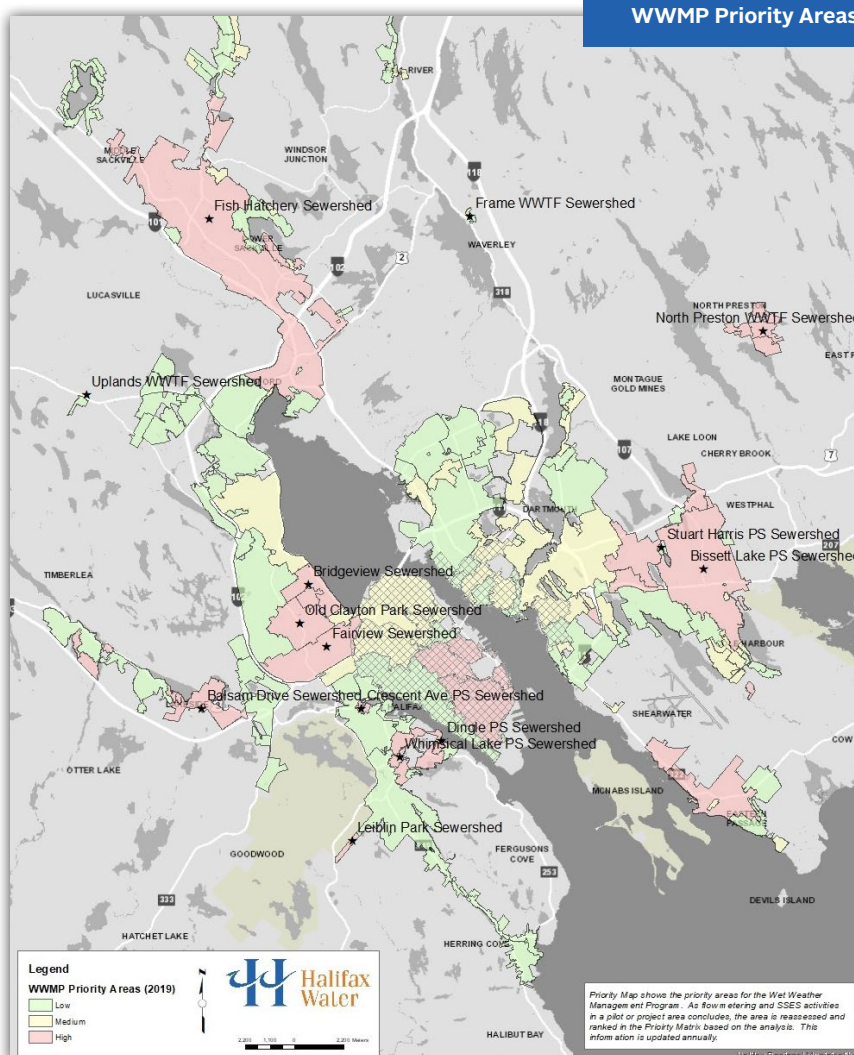
An analysis of flow monitoring data identified the potential for a significant reduction in Rainfall Derived Inflow and Infiltration (RDII) in the Fairview, Old Clayton Park and Bridgeview areas. With the goal of reducing peak flows by approximately 200 litres/second (L/s), a multi-year program was initiated in 2017 involving a sewershed evaluation survey and engineering design activities. In 2018/19, cured-in-place pipe (CIPP) lining of approximately 9.8 km of pipe will be completed as part of Phase 1 of this project. It will include the Fairview area and part of the Bridgeview area. For 2019/20, Phase 2 of the lining project will see approximately 9.5 km completed in the Old Clayton Park area.

Private side inspections will also be performed in 2018/19/20 to identify and potentially eliminate private-property illegal stormwater connections.

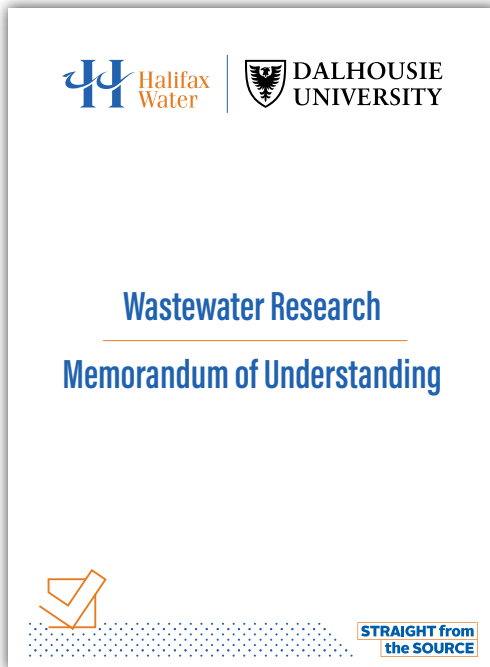
Flow monitoring and data analysis will be performed to quantify RDII reductions and assess the effectiveness of the asset renewal during all phases of the project.

Moving forward, the WWMP team continues to identify areas for future study and I/I reduction activities. The map identifies the current priority areas for the Wet Weather Management Program and the location of the pilot sewersheds.

WWMP Priority Areas



Wastewater Research Program



We are proud to announce that Dalhousie University and Halifax Water have completed 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 Halifax, Dartmouth and Herring Cove WWTFs to align with the Federal Wastewater Systems Effluent Regulations. This will be accomplished through bench, pilot, and full scale studies and tests of a wide variety of wastewater treatment parameters, including contaminants of emerging concern such as microplastics. The project will engage highly qualified personnel over three years to address research needs surrounding the increasing complexity of Canada's wastewater.

The outcome of the research program will establish a long term wastewater research initiative; provide opportunities for continued training and development; and advancements in wastewater treatment beneficial to Halifax Water, the industry and the environment.

In a more global context, this research also helps support United Nations Sustainable Development Goal 6: Ensure availability and sustainable management of water and sanitation for all.

Leveraging the Power of CMMS Data

The Computerized Maintenance Management System (CMMS) system, CityWorks enables Halifax Water staff to effectively manage service requests. The system has been fully implemented in the Operations divisions and further enhancement will occur in 2019-20. Service delivery is customer focused while prioritizing work based on risk to human health and the environment. As part of continual improvement, Halifax Water Operations staff has implemented a planning process to ensure work is delivered in a timeline that is appropriate to the maintenance requirement. Under the planning process, work is categorized into one of three levels of importance. Category 'A' tasks are assignments that require Operations intervention to mitigate an immediate risk to human health or the environment. Category 'A' tasks are always given top priority. Category 'B' maintenance requests require

some Operations intervention within the construction season to prevent escalation into a category 'A'. Category 'C' items are generally more routine and will not pose an immediate risk within the next two or three years.

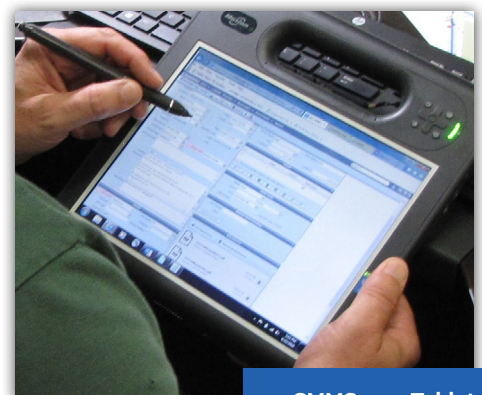
Understanding that the majority of maintenance is category 'B' and 'C', Operations is able to group work based on the type of work and geographic location to increase efficiency. A reserve in work capacity is maintained to address Category 'A' emergencies that may arise and require immediate response.

Adopting this planning process has led to two significant realizations;

1. Only a small percentage of the work is a genuine emergency. Staff are able to complete the bulk of the remaining work in a more efficient manner; and

2. Operations is able to undertake more complex work when it is planned as compared to the reactive approach historically used in municipal operations throughout Canada and North America.

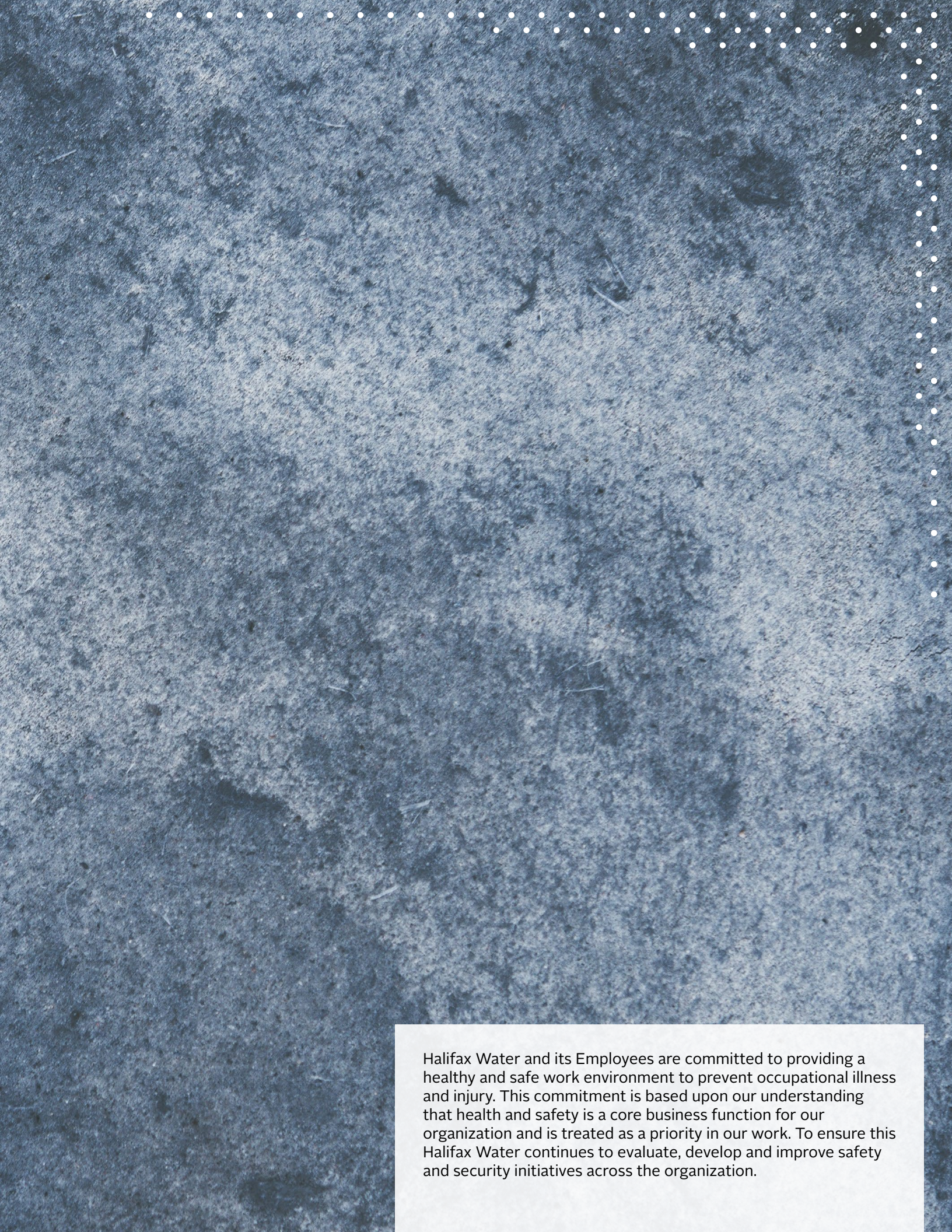
CMMS facilitates effective workflow and monitoring to ensure efficient delivery of our services thereby reducing the occurrence of emergency work.



CMMS on a Tablet

SAFETY & SECURITY





Halifax Water and its Employees are committed to providing a healthy and safe work environment to prevent occupational illness and injury. This commitment is based upon our understanding that health and safety is a core business function for our organization and is treated as a priority in our work. To ensure this Halifax Water continues to evaluate, develop and improve safety and security initiatives across the organization.

Young Workers

Recognizing the importance of young workers entering the work force, along with the annual hiring of summer students, Halifax Water collaborated with the Nova Scotia Department of Labour and Advanced Education as part of their “Young Workers Blitz”. The goal of this educational initiative is to engage young workers in the subject of Occupational Health and Safety at their workplaces. The focus is on providing young workers with information on their Rights and Responsibilities under the Occupational Health and Safety Act.



Young Workers Blitz at Halifax Water

Safety Audits & Training

With a busy 2018/19 Capital Project season, Halifax Water continues to have a third party safety auditor engaged to conduct random field safety audits at our many project sites.



Safety Audit Photo



Safety Audit Photo

Stemming from recommendations from an external safety audit of our programs, Halifax Water delivered mandatory training in the Internal Responsibility System (IRS) to all Employees. The training served as a reminder to all staff of their responsibility to work safely and be mindful that their coworkers are doing the same.

Incident Command System

The Incident Command System (ICS) is a standardized approach to the command, control, and coordination of emergency response providing a common hierarchy within which responders from multiple agencies can be effective. Halifax Water continues to utilize ICS when managing water main and forcemain breaks, and as a planning tool for larger multi-faceted projects like the North End Feeder repairs.

The North End Feeder (NEF) is a water transmission main critical to the supply of water to peninsular Halifax. In the Fall of 2017, it was determined that there was a leak in this line which would need to be repaired.

Repair of this line was a significant challenge due to its critical nature and difficulty in accessing it. The leak was located in a 1 km stretch that connects the bottom of Evans Avenue in Fairview with the intersection of Lady Hammond Road and Commission Street. This section is located in a rock tunnel that crosses below the Bedford Highway, Fairview Cove container terminal and the Windsor Street/Bedford Highway intersection at depths of between 20 and 40 m.

After a year of planning, a team of approximately 50 Halifax Water staff with, contractor support, executed the operations to shut down, drain, repair and recommission the water transmission main over a four day period in mid-October. Due to the critical nature of the main, it was necessary to operate several manual backup systems in order to maintain water supply to the peninsula. The repair was successfully completed with no measurable disruption in service to customers. In addition to repairing this critical main, the repair provided an opportunity to test and operate Halifax Water's emergency systems.

The Internal Command System was used to complete this operation.



**MOTIVATED
& SATISFIED
EMPLOYEES**



Halifax Water employs 475 people full time, and tries hard to ensure we are an organization people want to work for. This is critically important as approximately 30% may retire in the next five years.

As mentioned in the Effective Asset Management section of this report, in 2018-19, an internal audit was conducted on the current payroll system. Results showed that there was significant risk due to the number of manual processes. Therefore, a recommendation was approved to conduct a needs assessment and requirements to implement a new Human Capital Management (HCM) System. As a result, Telus ViP was selected as the best system to meet Halifax Water's emerging needs. A project team was deployed and is currently on schedule to go live in March 2020.

The health and safety of our Employees and the general public is Halifax Water's highest priority. Therefore, in 2019, Halifax Water rolled out a new Fit for Duty Policy. The purpose of the policy is to provide a working environment that is free of the effects of Drug and Alcohol use, and to ensure that all employees are treated fairly and consistently, with dignity and respect. Awareness and Education sessions were held with all employees in early 2019 for an effective date of May 1, 2019.

Collective Bargaining activities commenced in the fall of 2018 for both the CUPE Local 227 and CUPE Local 1431 collective agreements. The Collective Bargaining committees worked diligently and were well on track to sign five year agreements for both Locals in spring 2019.

Service Award Banquet

30 Year Award

Administration

Carl Yates

Corporate Services

Peggy MacDonald

Wastewater & Stormwater Services

Chris McSweeney

Water Services

Robert Goguen



Carl Yates receiving his 30 Year Award

25 Year Award

Corporate Services

Michelle Comeau

Sharon Harding

Peter Johnson

Engineering & Information Services

Derek McElmon

Stephen Skinner

Wastewater & Stormwater Services

Dereck Avery

Colette Cleary

Joseph Hazelden

Derrick Langille

Murray Pictou

Phillip Pynn

Cedric Williams

Water Services

Garry Oxner

Michael Vardy

20 Year Award

Corporate Services

Corey Whalen

Wastewater & Stormwater Services

Sherry Parsons

Administration

Reid Campbell

Water Services

Wendell Coveyduc

Dave Swim

10 Year Award

Corporate Services

Allan Campbell

Corey Ellis

Cindy MacLean

Engineering & Information Services

Edward Jeffrey

Kirk Mills

Krista Whynot

April Tucker

Regulatory Services

Kenda MacKenzie

Erinn O'Toole

Wastewater & Stormwater Services

Martin Austin

Marcel Cornect

Gerald Doucette

Don Greer

David Hamelin

Brad Jordan

Emmett Leahy

Donald MacDonald

Glenn MacDonald

Justin MacKinnon

Andrew MacNab

Alan O'Leary

Greg Prime

Joshua Purcell

Angela Rayne

Sergei Shirokov

Kristopher Shrum

Josh Slaunwhite

Peter White

Paul Harder

Steve MacRae

Anthony Riley

Blake Wright

Carolyn Bruce Customer Service Excellence Award

The Carolyn Bruce Customer Service Excellence Award was established in 2012 in memory of, and to honour Carolyn's unforgotten legacy. Each year Halifax Water recognizes an employee who has shown exemplary customer service. We are pleased to advise that in 2018 we received numerous nominations. This year's award was presented to Allan Ossinger for his continued commitment and high level service provided to Halifax Water's customers.



Allan Ossinger receiving the Carolyn Bruce Customer Service Excellence Award

Corporate Social Responsibility

Halifax Water is in the homes and businesses of its customers everyday providing world-class water, wastewater and stormwater services. We are also proud to be in the community throughout the year helping to support a wide variety of events and causes.

Halifax Water Employee Fundraising Initiatives

The community we work in is important to Halifax Water employees. Employees take that responsibility to heart with many fundraising initiatives such as United Way Halifax. In 2018 Halifax Water employees raised \$4,112.00 for United Way Halifax through fundraising events.

Halifax Water's H₂O (Help to Others) Fund raised a total of \$3,334.00 to assist customers who truly need help with their water/wastewater/stormwater bill. This internal staff fundraising is in addition to the \$25,000.00 Halifax Water provides in funding. Halifax Water also matches funds donated by Halifax Water employees.

Halifax Water employees also donated \$9,022.00 to Water for People to support the digging of wells to provide clean drinking water in 9 different countries for 4 million people.

The Christmas Families Fundraising initiatives raised \$1,659.70. The funds were split equally between Bryony House, Avalon Sexual Assault Centre, Feed NS, Souls Harbour Rescue, and Hope Cottage.

The Carolyn Bruce Angel Tree program, through the Salvation Army donated gifts for 100 children in Halifax Regional Municipality who need it the most. This past year saw a small sponsorship competition between Fleet/Stores, the Eastern Passage Wastewater



Employee Gift Donations

Treatment Facility (WWTF) and AeroTech WWTF. The efforts of this competition resulted in 18 children receiving gifts with Fleet/Stores winning by 10.

As part of the Bluenose Marathon, employees raised \$1992 for Special Olympics Nova Scotia through barbecues, 50/50 draws and other activities.

Corporate Social Responsibility Continued...

Supporting Events in the Community



The Shed on the Halifax Waterfront

Halifax Water is active in the community supporting a wide variety of groups through our portable water station program. The program runs from early spring until late fall. Events range from large venues such as the Jazzfest and Bluenose Marathon, to community block parties. This support helps groups reduce or eliminate their use of bottled water and the associated waste generated by plastic water bottles, promotes conservation and the use of tap water. In the 2018 season Halifax Water provided water stations to 31 events.

The Shed, Halifax Water's educational and promotional vehicle spent July and August on the Halifax waterfront. An estimated 9,000 visitors took part in trivia challenges,

water taste tests, viewed informational videos and brochures, and of course had access to tap water at The Shed.

Halifax Water also supports Special Olympics Nova Scotia at a number of events throughout the year including "The Truck Convoy". Last year 7 Halifax Water employees volunteered their time to prepare their rigs and take part in this great fundraising cause. For the second year in row, the Halifax Water crew brought home the award for "Best in Fleet." While winning is great, the real reward is the smiles and excitement the event brings to all the Special Olympians at the Truck Convoy.



Halifax Water Employees taking part in "The Truck Convoy" in support of Special Olympics Nova Scotia

Scholarships

Since 2008 Halifax Water has supported the educational growth of our community through scholarships provided to the Nova Scotia Community College. There are 4 scholarships provided annually:

- Robert T. Peacock Achievement Award 1 @ \$2,000 awarded each Fall
- Jipuktuk etli apatua'timk Award 1 @ \$4,000 awarded each Spring; 1 @ \$4,000 awarded each Fall
- Halifax Water Achievement Award 1 @ \$2,000 awarded each Fall
- Arnold D. Johnson Sr. Award for Water Resources 1 @ \$3,600 awarded each Spring

2018/19 marked 10 years of support through this program and has provided \$101,400 in scholarship funding to students. These scholarships help support students now, and the community well into the future.



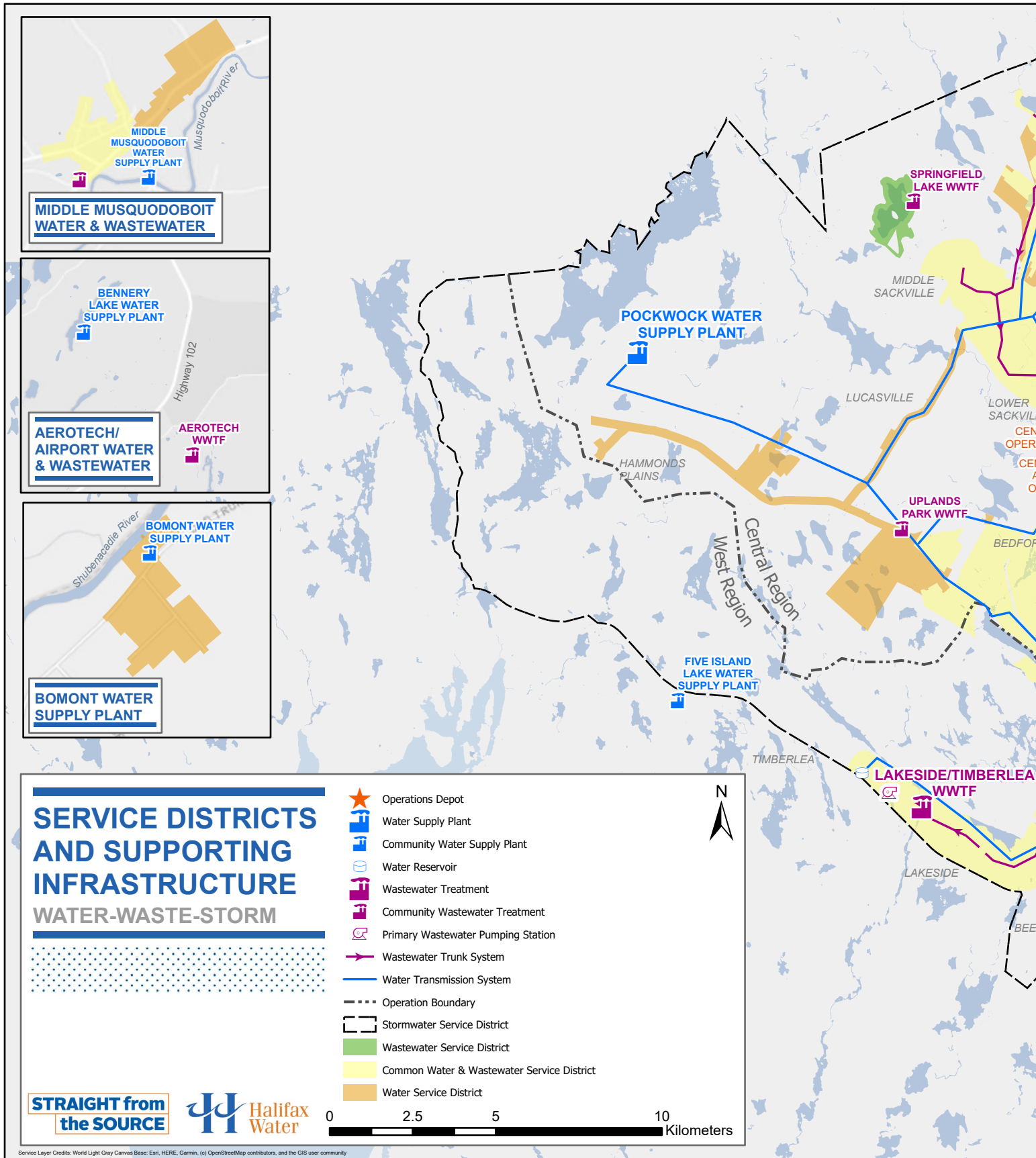
Halifax Water NSCC Alumni Event

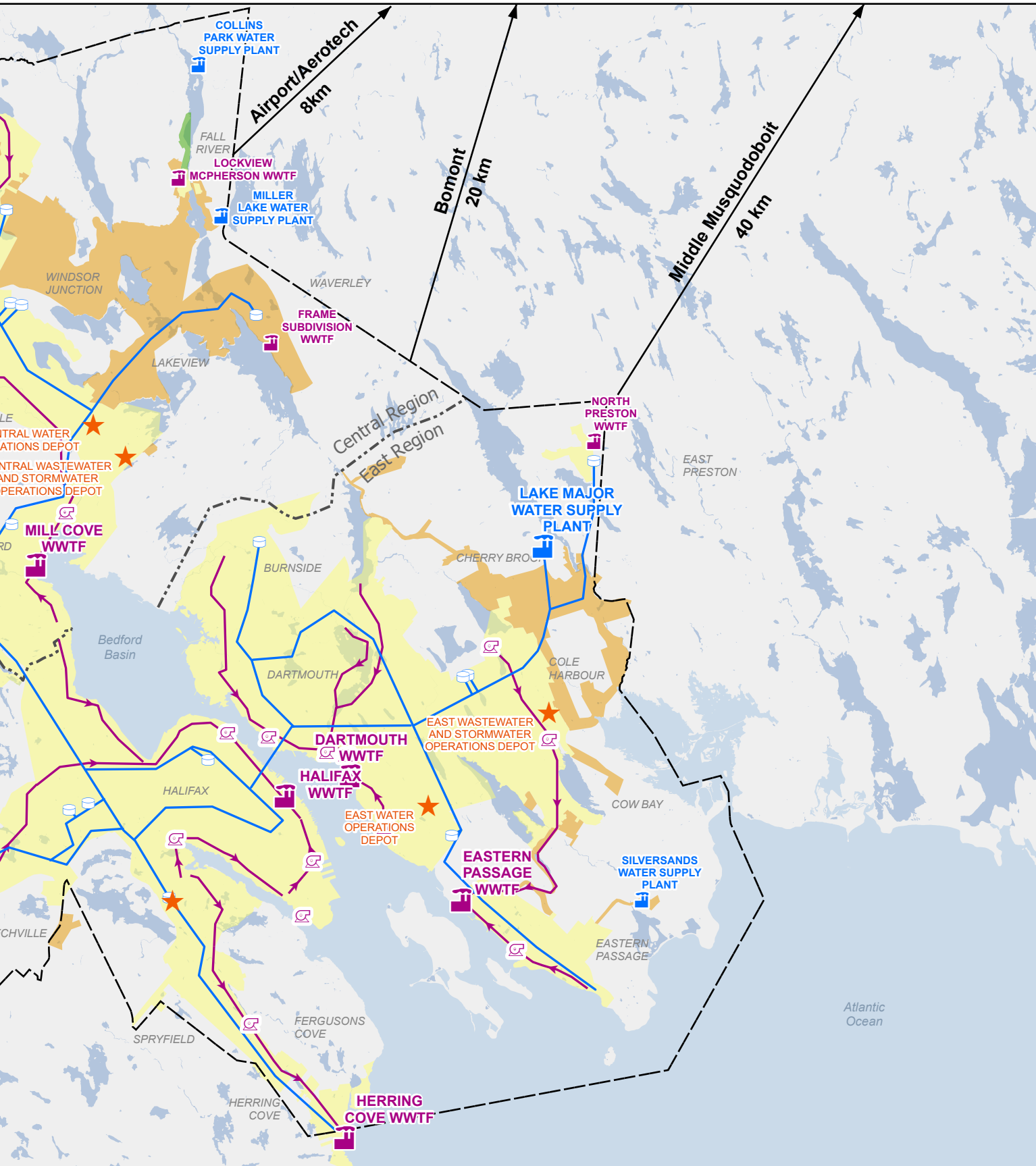
First Nations Water Authority

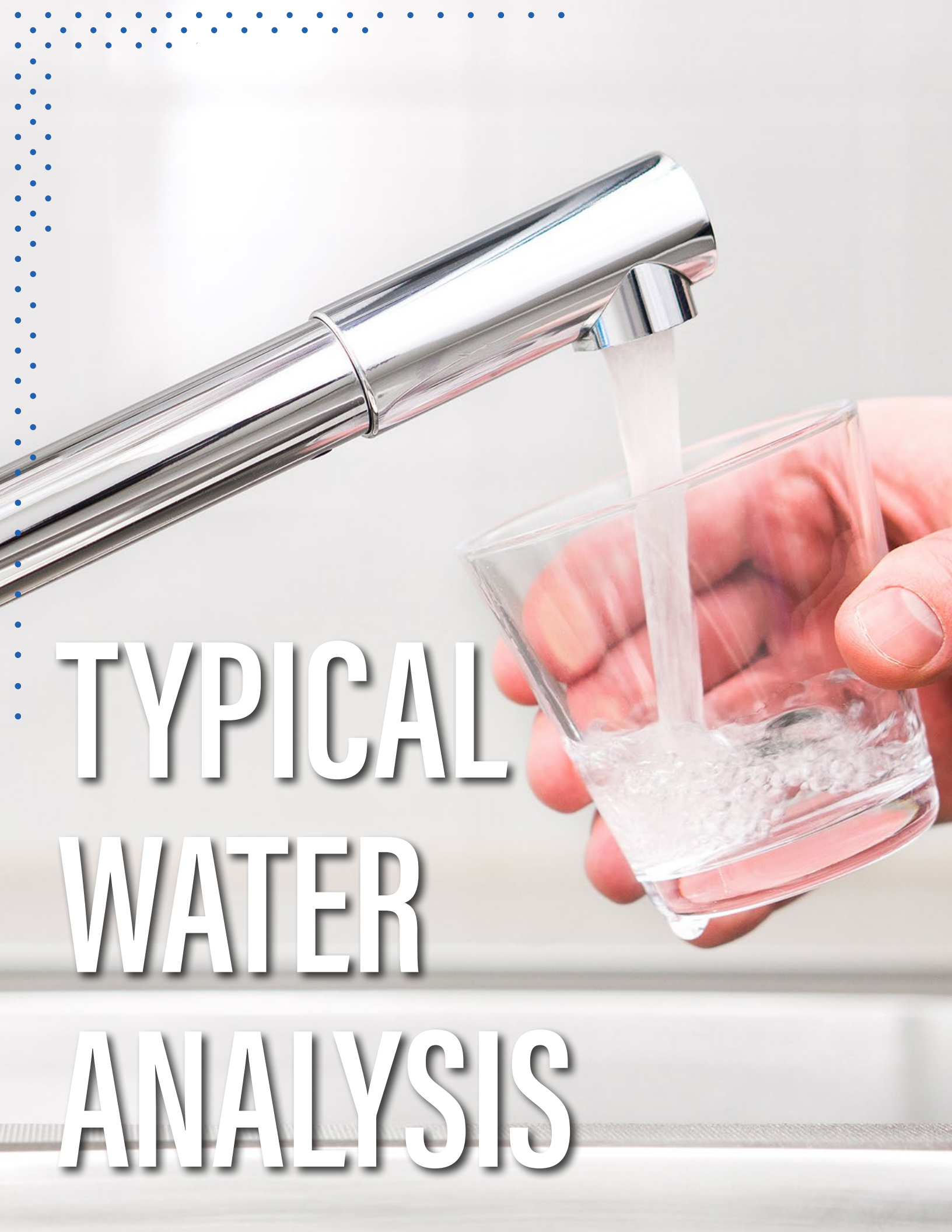
Access to safe, clean drinking water and wastewater service is a public health issue and one of the fundamental building blocks of community economic development. For many First Nations in our region and across the country, there is no access to safe drinking water or wastewater service.

Since 2017, Halifax Water, in conjunction with industry professionals and researchers, has been working with the Atlantic Policy Congress of First Nations Chiefs Secretariat (APC) to address the issue of water and wastewater services on member communities in Atlantic Canada. The goal, create a regional water authority owned and operated by First Nations people that will not only improve public health and safety, but support economic growth and protect the environment.

In 2018, the Atlantic First Nations Water Authority (AFNWA) was incorporated. The AFNWA is groundbreaking and lays the foundation for short term economic growth with the construction of the required infrastructure, and long term opportunities including well-paying careers for First Nations communities in the water industry.







TYPICAL WATER ANALYSIS

TYPICAL ANALYSIS OF POCKWOCK LAKE & LAKE MAJOR WATER

2018 - 2019

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	(Halifax) POCKWOCK		(Dartmouth) LAKE MAJOR		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water	Raw Water	Treated Water	Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	<5.0	21.0	<5.0	24.0	-	-
Aluminum	0.102	0.105	0.180	0.015	-	^A 0.20/0.10
Ammonia (N)	<0.050	<0.050	<0.050	<0.050	-	-
Arsenic	<0.001	<0.001	<0.001	<0.001	0.010	-
Calcium	1.0	4.2	1.1	16.0	-	-
Chloride	7.2	8.9	6.3	8.5	-	≤250
Chlorate	<0.1	<0.1	<0.1	<0.1	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Colour (True Colour Units)	14.5	<5.0	32.0	<5.0	-	≤15.0
Conductivity (µS/cm)	38.0	97.0	35.0	150.0	-	-
Copper (Total)	0.042	<0.002	0.083	<0.002	-	≤1.0
Fluoride	<0.10	0.68	<0.10	0.46	1.5	0.7
Hardness (as CaCO ₃)	4.3	12.0	4.4	41.0	-	-
HAA5 (avg.)	-	0.020	-	0.026	0.080	-
Iron (Total)	<0.05	<0.05	0.09	<0.05	-	<0.3
Langelier Index @ 4°C	-	-2.43	-	-1.66	-	-
Langelier Index @ 20°C	-	-2.18	-	-1.41	-	-
Lead (Total) (µg/l)	<0.50	<0.50	<0.50	<0.50	5.0	-
Magnesium	0.410	0.410	0.410	0.430	-	-
Manganese (Total)	0.024	0.011	0.048	<0.002	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate & Nitrite (as N)	0.034	<0.050	<0.050	<0.050	10.0	-
pH (pH Units)	6.5	7.5	6.1	7.3	-	7.0 - 10.5
Potassium	0.260	0.310	0.270	0.290	-	-
Sodium	4.5	12.0	4.0	10.3	-	≤200
Solids (Total Dissolved)	25.5	63.5	28.0	77.0	-	≤500
Sulphate	2.7	8.0	<2.0	29.0	-	≤500
Turbidity (NTU)	0.40	^B 0.11	0.41	^B 0.04	^B 0.2/1.0	-
Total Organic Carbon (TOC)	3.90	2.70	5.50	2.30	-	-
THM's (avg.)	-	0.034	-	0.040	0.100	-
Uranium (µg/l)	<0.10	<0.10	<0.10	<0.10	20.0	-
Zinc (Total)	<0.005	0.092	<0.005	0.084	-	≤5.0
PCB (µg/l)	<0.05	<0.05	<0.05	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	0.5/1.0	-

^AAluminum objective is related to type of plant filtration; the aluminum objective for direct filtration (i.e. Pockwock) is <0.20 mg/l and conventional filtration (i.e. Lake Major) is <0.10 mg/l.

^BThe Pockwock and Lake Major plants analyze turbidity immediately post-filtration. Each filter must produce water with a turbidity of <0.20 NTU 95% of the time and <1.00 NTU 100% of the time, as required by Provincial Permit.

TYPICAL ANALYSIS – SMALL SYSTEMS

2018 - 2019

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	BENNERY LAKE		FIVE ISLAND LAKE		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water	Raw Water	Treated Water	Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	<5.0	34.0	32.0	36.0	-	-
Aluminum	0.104	0.011	<0.005	<0.005	-	0.2
Ammonia (N)	<0.050	<0.050	<0.050	<0.050	-	-
Arsenic	<0.001	<0.001	0.004	0.004	0.010	-
Calcium	2.7	17.2	9.2	9.3	-	-
Chloride	8.2	11.0	6.1	7.2	-	≤250
Chlorate	0.12	0.28	<0.1	<0.1	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Colour (True Colour Units)	25.0	<5.0	<5.0	<5.0	-	≤15.0
Conductivity (µS/cm)	45.0	155.0	82.0	87.0	-	-
Copper (Total)	0.055	0.020	0.003	0.013	-	≤1.0
Fluoride	<0.10	<0.10	0.36	0.41	1.5	-
Hardness (as CaCO ₃)	9.1	46.0	28.0	28.0	-	-
HAA5 (avg.)	-	0.024	-	<0.005	0.080	-
Iron (Total)	0.44	<0.05	<0.05	<0.05	-	≤0.3
Langelier Index @ 4°C	-	-1.57	-2.17	-1.47	-	-
Langelier Index @ 20°C	-	-1.32	-1.92	-1.22	-	-
Lead (Total) (µg/l)	<0.50	<0.50	<0.50	<0.50	5.0	-
Magnesium	0.568	0.650	1.1	1.2	-	-
Manganese (Total)	0.277	0.041	<0.002	<0.002	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate & Nitrite (as N)	0.050	0.053	<0.050	<0.050	10.0	-
pH (pH Units)	6.5	7.6	7.1	7.6	-	7.0 - 10.5
Potassium	0.220	0.240	0.51	0.62	-	-
Sodium	4.5	13.0	5.8	6.5	-	≤200
Solids (Total Dissolved)	28.5	109.5	51.0	62.0	-	≤500
Sulphate	3.2	27.0	<2.0	<2.0	-	≤500
Turbidity (NTU)	1.60	^A 0.04	0.18	^B 0.04	^A 0.2/1.0 ^B 1.0	-
Total Organic Carbon (TOC)	4.90	2.00	<0.50	0.50	-	-
THM's (avg.)	-	0.037	-	<0.001	0.100	-
Uranium (µg/l)	<0.10	<0.10	9.60	9.90	20.0	-
Zinc (Total)	<0.005	0.036	<0.005	0.005	-	≤5.0
PCB (µg/l)	<0.05	<0.05	<0.05	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10	0.27/0.34	0.29/0.12	0.5 / 1.0	-
Lead -210 (Bq/L)	-	-	-	<0.10	0.2	-

^AThe Bennery Lake plant analyzes turbidity immediately post-filtration and must produce water with a turbidity of <0.20 NTU 95% of the time and <1.00 NTU 100% of the time.

^BThe Five Island Lake plant must produce water with turbidity of <1.00 NTU 95% of the time, as required by Provincial Permit. Treated water turbidity is calculated from clearwell monitoring.

TYPICAL ANALYSIS - SMALL SYSTEMS

2018 - 2019

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	COLLINS PARK		MIDDLE MUSQUODOBOIT		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water	Raw Water	Treated Water	Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	13.0	12.0	47.0	140.0	-	-
Aluminum	0.052	<0.005	<0.005	<0.005	-	0.2
Ammonia (N)	<0.050	<0.050	<0.050	<0.050	-	-
Arsenic	0.003	<0.001	<0.001	<0.001	0.010	-
Calcium	6.4	0.3	14.0	3.9	-	-
Chloride	37.0	12.2	12.0	8.1	-	≤250
Chlorate	<0.1	0.24	<0.1	0.15	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Colour (True Color Units)	14.4	<5.0	<5.0	<5.0	-	≤15.0
Conductivity (µS/cm)	160.0	44.0	150.0	280.0	-	-
Copper (Total)	<0.002	<0.002	<0.002	0.003	-	≤1.0
Fluoride	<0.10	<0.10	<0.10	<0.10	1.5	-
Hardness (as CaCO ₃)	20.0	<1.0	57.0	15.0	-	-
HAA5 (avg.)	-	<0.005	-	<0.005	0.080	-
Iron (Total)	0.09	<0.05	<0.05	<0.05	-	≤0.3
Langelier Index @ 4°C	-2.70	-3.99	-2.19	-1.34	-	-
Langelier Index @ 20°C	-2.45	-3.74	-1.94	-1.09	-	-
Lead (Total) (µg/l)	<0.50	0.94	<0.50	<0.50	5.0	-
Magnesium	0.90	<0.10	5.00	1.30	-	-
Manganese (Total)	0.052	<0.002	<0.002	<0.002	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate & Nitrite (as N)	0.113	0.073	0.390	0.360	10.0	-
pH (pH Units)	7.1	7.2	6.7	7.7	-	7.0 - 10.5
Potassium	0.94	0.25	1.10	0.62	-	-
Sodium	22.0	10.0	6.2	44.0	-	≤200
Solids (Total Dissolved)	100.0	48.0	120.0	95.0	-	≤500
Sulphate	7.0	<2.0	20.9	<2.0	-	≤500
Turbidity (NTU)	1.75	^A 0.04	0.12	^A 0.03	^A 0.1/0.3	-
Total Organic Carbon (TOC)	4.80	<0.50	0.63	<0.50	-	-
THM's (avg.)	-	0.005	-	0.002	0.100	-
Uranium (µg/l)	<0.10	<0.10	<0.10	<0.10	20.0	-
Zinc (Total)	<0.005	0.072	<0.005	0.068	-	≤5.0
PCB (µg/l)	<0.05	<0.05	<0.05	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	0.5/1.0	-

^AUltra-filtration membrane plants must produce water with turbidity of <0.10 NTU 99% of the time and <0.30 NTU 100% of the time, as required by Provincial Permit. Treated water turbidity is calculated from clearwell monitoring.

TYPICAL ANALYSIS - SMALL SYSTEMS

2018 - 2019

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	SILVER SANDS		MILLER LAKE		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water	^A Raw Water	Treated Water	Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	72.0	68.0	-	24.0	-	-
Aluminum	<0.005	<0.005	-	0.086	-	0.2
Ammonia (N)	0.060	<0.050	-	0.240	-	-
Arsenic	0.002	<0.001	-	<0.001	0.010	-
Calcium	37.0	35.0	-	6.2	-	-
Chloride	67.0	68.0	-	9.7	-	≤250
Chlorate	<0.10	0.36	-	<0.10	1.0	-
Chlorite	<0.10	<0.10	-	<0.10	1.0	-
Colour (True Color Units)	<5.0	<5.0	-	<5.0	-	≤15.0
Conductivity (µS/cm)	370.0	360.0	-	100.0	-	-
Copper (Total)	<0.002	0.005	-	<0.002	-	≤1.0
Fluoride	0.19	0.22	-	0.82	1.5	-
Hardness (as CaCO ₃)	110.0	110.0	-	17.0	-	-
HAA5 (avg.)	-	<0.005	-	0.045	0.080	-
Iron (Total)	0.97	<0.05	-	<0.05	-	≤0.3
Langelier Index @ 4°C	-0.66	-0.72	-	-2.12	-	-
Langelier Index @ 20°C	-0.41	-0.47	-	-1.87	-	-
Lead (Total) (µg/l)	<0.50	<0.50	-	<0.50	5.0	-
Magnesium	5.10	4.70	-	0.440	-	-
Manganese (Total)	1.008	0.006	-	0.008	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	-	<0.013	1.0	-
Nitrate & Nitrite (as N)	<0.050	<0.050	-	<0.050	10.0	-
pH (pH Units)	7.6	7.7	-	7.4	-	7.0 - 10.5
Potassium	0.920	0.820	-	0.330	-	-
Sodium	24.0	27.0	-	14.0	-	≤200
Solids (Total Dissolved)	210.0	220.0	-	62.0	-	≤500
Sulphate	20.0	19.0	-	9.0	-	≤500
Turbidity (NTU)	10.30	^B 0.10	-	^B 0.15	^B 1.0	-
Total Organic Carbon (TOC)	<0.50	<0.50	-	2.10	-	-
THM's (avg.)	-	<0.001	-	0.069	0.100	-
Uranium (µg/l)	<0.10	<0.10	-	<0.10	20.0	-
Zinc (Total)	<0.005	<0.005	-	0.087	-	≤5.0
PCB (µg/l)	<0.05	<0.05	-	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10	-	<0.10/<0.10	0.5/1.0	-

^ARaw water samples were not collected from the Miller Lake wells this past year, since the wells were not in operation. Treated water was supplied from either the Lake Major or Pockwock water systems until the water system is permanently connected to the Pockwock water system.

^BThe Silver Sands and Miller Lake plants must produce water with turbidity of <1.00 NTU 95% of the time, as required by Provincial Permit. Treated water turbidity is calculated from clearwell monitoring.

TYPICAL ANALYSIS OF BOMONT WATER

2018 - 2019

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	BOMONT				GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water			Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	11.0	22.0			-	-
Aluminum	0.091	0.069			-	0.2
Ammonia (N)	<0.050	<0.050			-	-
Arsenic	0.002	<0.001			0.010	-
Calcium	8.1	4.7			-	-
Chloride	23.0	38.7			-	≤250
Chlorate	<0.1	<0.1			1.0	-
Chlorite	<0.1	<0.1			1.0	-
Colour (True Colour Units)	26.0	<5.0			-	≤15.0
Conductivity (µS/cm)	120.0	94.0			-	-
Copper (Total)	0.002	<0.002			-	≤1.0
Fluoride	<0.10	0.34			1.5	-
Hardness (as CaCO ₃)	24.0	14.0			-	-
HAA5 (avg.)	-	0.020			0.080	-
Iron (Total)	0.16	<0.05			-	<0.3
Langelier Index @ 4°C	-2.59	-2.19			-	-
Langelier Index @ 20°C	-2.34	-1.94			-	-
Lead (Total) (µg/l)	<0.50	<0.50			5.0	-
Magnesium	0.890	0.420			-	-
Manganese (Total)	0.028	0.006			-	≤0.05
Mercury (µg/l)	<0.013	<0.013			1.0	-
Nitrate & Nitrite (as N)	0.063	<0.050			10.0	-
pH (pH Units)	7.2	7.4			-	7.0 - 10.5
Potassium	0.650	0.330			-	-
Sodium	13.0	15.0			-	≤200
Solids (Total Dissolved)	200.0	150.0			-	≤500
Sulphate	40.0	5.7			-	≤500
Turbidity (NTU)	1.34	^A 0.29			^A 0.1/0.3	-
Total Organic Carbon (TOC)	6.0	2.3			-	-
THM's (avg.)	-	0.020			0.100	-
Uranium (µg/l)	<0.10	<0.10			20.0	-
Zinc (Total)	<0.005	0.069			-	≤5.0
PCB (µg/l)	<0.05	<0.05			-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10			0.5/1.0	-

^AUltra-filtration membrane plants must produce water with turbidity of <0.10 NTU 99% of the time and <0.30 NTU 100% of the time, as required by Provincial Permit. Treated water turbidity is calculated from clearwell monitoring.

FINANCIAL OVERVIEW & STATEMENTS



Financial Overview

Abbreviated Financial Information

March 31, 2019
(In thousands)

ASSETS

Fixed

Utility Plant in Service at Cost	\$1,739,067
Provision for Depreciation	(463,924)

Net Book Value	1,275,143
-----------------------	------------------

Capital Work In Progress	29,605
---------------------------------	---------------

Regulatory Asset	3,004
-------------------------	--------------

Current	92,873
----------------	---------------

TOTAL ASSETS	\$1,400,625
---------------------	--------------------

LIABILITIES

Long Term Debt	\$207,441
----------------	-----------

Other Than Long Term Debt	101,453
---------------------------	---------

TOTAL LIABILITIES	\$308,894
--------------------------	------------------

EQUITY

Special Purpose Reserves	\$41,752
--------------------------	----------

Contributed Capital Surplus	1,063,145
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Accumulated Other Comprehensive Income	(41,209)
--	----------

Operating Surplus used to Fund Capital, Cumulative	12,380
--	--------

Capital Surplus	1,076,068
-----------------	-----------

Operating Surplus April 1, 2018	20,482
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2018/19 OPERATIONS

Operating Revenue	\$138,201
--------------------------	------------------

Financial Revenue	1,899
--------------------------	--------------

Revenue From all Sources	\$140,100
---------------------------------	------------------

Expenditures

Operating Expenses	\$88,720
--------------------	----------

Depreciation	23,007
--------------	--------

Grant in lieu of taxes HRM	4,999
----------------------------	-------

Financial Expenses	28,193
--------------------	--------

Total Expenditures	\$144,919
---------------------------	------------------

Excess of Expenditures over Revenue	(4,819)
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Accumulated Operating Surplus March 31, 2019	15,663
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TOTAL EQUITY	\$1,091,731
---------------------	--------------------

TOTAL LIABILITIES & EQUITY	\$1,400,625
---------------------------------------	--------------------

Figures in the Financial Overview are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities. The audited financial statements on the following pages are prepared in accordance with International Financial Reporting Standards – IFRS.

Financial Statements

Halifax Regional Water Commission
March 31, 2019

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Independent auditor's report

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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 ("the Commission"), which comprise the statement of financial position as at March 31, 2019, and the statement of comprehensive earnings, statement of changes in equity and statement of 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 the Halifax Regional Water Commission as at March 31, 2019, and its financial performance and its cash flows for the year then ended in accordance with International Financial Reporting Standards (IFRSs).

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 the Commission 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.

Emphasis of matter

Our audit was conducted for the purposes of forming an opinion on the financial statements taken as a whole. The schedules on pages 88-97 are presented for purposes of additional information and are not a required part of the financial statements. Such information has been subjected to the auditing procedures applied to the period ended March 31, 2019, only to the extent necessary to express an opinion, on the audit of the financial statements taken as a whole.

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 International Financial Reporting Standards (IFRSs), 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 the Commission'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 the Commission or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Commission'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 the Commission'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 the Commission'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 the Commission 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 20, 2019

Chartered Professional Accountants
Licensed Public Accountants

Halifax Regional Water Commission

Statement of earnings

Year ended March 31, 2019 (in thousands)

	2019	2018
Operating revenues		
Water	\$ 48,040	\$ 47,220
Wastewater	69,901	69,994
Stormwater	9,741	10,016
Fire protection	7,074	7,074
Private fire protection	869	856
Other operating revenue	<u>2,576</u>	<u>2,985</u>
	<u>138,201</u>	<u>138,145</u>
Operating expenditures (Note 14)		
Water supply and treatment	9,766	8,646
Water transmission and distribution	10,902	9,410
Wastewater collection	13,124	12,642
Stormwater collection	4,949	4,842
Wastewater treatment	19,789	19,647
Engineering and information services	8,990	8,105
Regulatory services	2,319	2,450
Customer service	4,916	4,896
Administration and pension	13,965	12,553
Depreciation and amortization	<u>44,066</u>	<u>41,625</u>
	<u>132,786</u>	<u>124,816</u>
Earnings from operations before financial and other revenues and expenditures	<u>5,415</u>	<u>13,329</u>
Financial and other revenues		
Interest	1,157	694
Contributed capital	18,142	17,372
Other	<u>742</u>	<u>3,792</u>
	<u>20,041</u>	<u>21,858</u>
Financial and other expenditures		
Interest on long term debt	7,430	7,884
Amortization of debt discount	199	202
Grant in lieu of taxes	4,999	4,774
Other	<u>232</u>	<u>354</u>
	<u>12,860</u>	<u>13,214</u>
Earnings for the year before regulatory deferral account balance amortization	12,596	21,973
Regulatory deferral account balance amortization (Note 5)	<u>(192)</u>	<u>(192)</u>
Earnings for the year	<u>\$ 12,404</u>	<u>\$ 21,781</u>

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statement of comprehensive earnings

Year ended March 31 (in thousands)	2019	2018
Earnings for the year	\$ 12,404	\$ 21,781
Other comprehensive income (loss)		
Items that will not be reclassified subsequently to earnings:		
Re-measurement on defined benefit plans	<u>3,734</u>	<u>(1,750)</u>
Total comprehensive earnings for the year	<u>\$ 16,138</u>	<u>\$ 20,031</u>

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statement of financial position

March 31 (in thousands)

2019

2018

Assets

Current

Cash and cash equivalents	\$ 51,603	\$ 51,470
Receivables		
Customer charges and contractual	17,407	17,494
Unbilled service revenues	17,012	16,640
Halifax Regional Municipality	3,728	5,274
Inventory	2,057	1,442
Prepays	1,066	1,013
	<u>92,873</u>	<u>93,333</u>

Intangible assets (Note 11)	15,418	13,877
Capital work in progress	29,605	24,550
Utility plant in service (Note 12)	1,233,440	1,200,430
Total assets	<u>1,371,336</u>	<u>1,332,190</u>

Regulatory deferral account balance (Note 5)	<u>3,004</u>	<u>3,196</u>
--	--------------	--------------

Total assets and regulatory deferral account debit balances	<u>\$ 1,374,340</u>	<u>\$ 1,335,386</u>
--	----------------------------	----------------------------

Liabilities

Current

Payables and accruals		
Trade	\$ 23,493	\$ 22,715
Interest on long term debt	2,051	2,030
Halifax Regional Municipality	2,865	2,439
Contractor and customer deposits	207	186
Current portion of deferred contributed capital	13,846	13,405
Current portion of long term debt (Note 13)	24,709	22,630
Unearned revenue	507	584
	<u>67,678</u>	<u>63,989</u>

Deferred contributed capital	867,802	842,967
Long term debt (Note 13)	182,732	190,871
Employee benefit obligation – pension plan (Note 4)	67,755	65,486
Employee benefit obligation – post-retirement benefits (Note 4)	380	430
Employee benefit obligation – pre-retirement benefits (Note 4)	4,195	3,983
	<u>1,190,542</u>	<u>1,167,726</u>

Equity

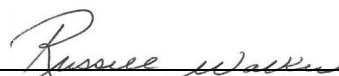
Accumulated other comprehensive loss (page 6)	(41,209)	(44,943)
Accumulated surplus (page 6)	225,007	212,603
	<u>183,798</u>	<u>167,660</u>
	<u>\$ 1,374,340</u>	<u>\$ 1,335,386</u>

Contingent liabilities (Note 3)
Commitments (Note 6)
Subsequent event (Note 15)

Approved by the Board



Commissioner



Commissioner

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statement of changes in equity

Year ended March 31, 2019 (in thousands)

	Accumulated other comprehensive income (loss)	Accumulated surplus	Total
Balance at March 31, 2017	\$ (43,193)	\$ 190,822	\$ 147,629
Earnings for the year	-	21,781	21,781
Other comprehensive loss	(1,750)	-	(1,750)
Comprehensive earnings for the year	(1,750)	21,781	20,031
Balance at March 31, 2018	\$ (44,943)	\$ 212,603	\$ 167,660
Balance at March 31, 2018	\$ (44,943)	\$ 212,603	\$ 167,660
Earnings for the year	-	12,404	12,404
Other comprehensive income	3,734	-	3,734
Comprehensive earnings for the year	3,734	12,404	16,138
Balance at March 31, 2019	\$ (41,209)	\$ 225,007	\$ 183,798

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statement of cash flows

Year ended March 31 (in thousands)

2019

2018

(Decrease) increase in cash and cash equivalents

Operating

Comprehensive earnings for the year	\$ 16,138	\$ 20,031
Depreciation and amortization	27,787	25,926
Employee benefit obligations	2,431	7,254
Gain (loss) on disposal of plant in service	188	(127)
	<u>46,544</u>	<u>53,084</u>

Change in non-cash operating working capital items (Note 7)

<u>1,762</u>	<u>754</u>
<u>48,306</u>	<u>53,838</u>

Financing

Proceeds from issuance of long term debt	16,500	10,000
Contributed capital	13,691	11,162
Debt issue costs, net	70	121
Principal repayment on Harbour Solutions long term debt	(6,500)	(6,500)
Principal repayments on long term debt	<u>(16,130)</u>	<u>(15,089)</u>
	<u>7,631</u>	<u>(306)</u>

Investing

Deferred capital contributions	790	3,701
Proceeds from sale of plant in service	189	120
Purchase of capital work in progress	(18,519)	(14,405)
Purchase of utility plant in service	<u>(38,264)</u>	<u>(47,357)</u>
	<u>(55,804)</u>	<u>(57,941)</u>

Net increase (decrease) in cash and cash equivalents

133 (4,409)

Cash and cash equivalents, beginning of year

51,470 55,879

Cash and cash equivalents, end of year

\$ 51,603 \$ 51,470

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2019 (in thousands)

1. Nature of operations

The Halifax Regional Water Commission (the Commission) is a public utility owned and controlled by the Halifax Regional Municipality (HRM). The Commission is responsible for the supply of municipal water, wastewater and stormwater services to the residents of the HRM. The Commission's principal place of business is P.O. Box 8388 Station A, 450 Cowie Hill Road, Halifax, Nova Scotia. The Commission 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 on June 20, 2019.

(b) Basis of measurement

The Commission'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, capital expenditures, depreciation rates and accounting matters, the Commission is subject to the jurisdiction of the Nova Scotia Utility and Review Board (NSUARB). Rates charged to and collected from customers are designed to recover costs of providing the regulated services. Halifax Water is required to prepare submissions in accordance with the 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, and gains and losses on the disposal of 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. The Commission's regulatory asset is disclosed in Note 5.

(d) Utility plant in service

Utility plant in service (Note 12) is recorded at cost, being the purchase price and directly attributable cost of acquisition or construction, including interest capitalized during construction. 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. Structures and land taken out of service are removed from utility plant in service and placed in plant not in service at cost less accumulated depreciation. Losses or gains related to assets retired, demolished or sold are charged or credited to the statement of earnings.

(e) Cash and cash equivalents

Cash and cash equivalents consists of cash on hand and balances with banks.

(f) Depreciation

Depreciation is provided 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:

Culverts	25 to 50 years
Hydrants	50 to 80 years
Meters	20 to 25 years
Office equipment and furniture and transportation equipment	3 to 10 years
Pumping equipment	5 to 30 years
Purification and treatment equipment	20 to 50 years
SCADA equipment	5 to 25 years
Services and laterals	50 to 60 years
Structures and improvements	50 to 100 years
Tools and work equipment	5 to 30 years
Water, wastewater and stormwater mains	60 to 100 years

Depreciation commences in the year an asset is put in 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. The Commission does not maintain a depreciation fund. The Commission has received NSUARB approval for exemption from setting up a depreciation fund as long as net depreciable additions to plant exceed the depreciation charged.

(g) Inventory

Cost of inventory is comprised of direct materials and supplies. Inventories are valued at the lower of cost and net realizable value with cost being determined on a weighted average moving cost method.

(h) Revenues and expenditures

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.

(i) Long term debt

Debt issue costs are deferred and amortized over the term of the debt to which it relates.

(j) Use of estimates and critical accounting judgments

In preparing the Commission'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, revenue from water, stormwater and wastewater services has been earned, but not yet billed due to the timing of the billing cycles. Management estimates the unbilled revenue 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.

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2019 (in thousands)

(k) Financial instruments

Recognition and derecognition

Financial assets and financial liabilities are recognized when the Commission 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 expires.

Classification and initial measurement of financial assets

All financial assets are initially measured at fair value and adjusted for transaction costs, where applicable. Financial assets are classified into the following categories: measured at amortized cost, fair value through other comprehensive income ("FVTOCI") and fair value through profit and loss ("FVTPL").

The Commission has classified its financial instruments as follows:

Asset/Liability	Classification
Cash and cash equivalents	Amortized cost
Receivables	Amortized cost
Receivable from HRM	Amortized cost
Payables and accruals	Amortized cost
Long term debt	Amortized cost
Deposits	Amortized cost

The classification is determined by both the Commission business model for managing the financial asset and the contractual cash flow characteristics of the financial asset.

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
- 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, these are measured at amortized cost using the effective interest method. Discounting is omitted where the effect of discounting is immaterial. The Commission's financial assets and liabilities fall into this category. Under IAS 39 cash and receivables were classified as loans and receivables and subsequently measured at amortized cost. Payables, long term debt, and deposits were classified as other financial liabilities and subsequently measured at amortized cost.

Impairment of financial assets

IFRS 9's impairment requirements use more forward-looking information to recognize expected credit losses – the 'expected credit loss (ECL) model'. This replaces IAS 39's 'incurred loss model'. Financial assets that are subject to the expected credit loss model include cash and cash equivalents, receivables, and receivables from HRM. While cash and cash equivalents, and receivables from HRM are subject to the impairment requirements of IFRS 9, the identified impairment loss was immaterial.

Receivables

The Commission makes use of a simplified approach in accounting for receivables and records the loss allowance as lifetime expected credit losses. 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, the Commission uses its historical experience, external indicators and forward-looking information to calculate the expected credit losses using a provision matrix. The Commission assesses impairment of receivables on a collective basis. As they possess shared credit risk characteristics, they have been grouped based on the days past due.

(l) Provisions

A provision is recognized in the statement of financial position when the Commission 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.

(m) Impairments

At the end of each reporting period, the Commission 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. The Commission has three CGU's (water, wastewater and stormwater) for which impairment testing is performed.

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.

(n) Intangibles

Intangible assets include land access easements, water removal rights, studies, and capital master plans and 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
-------------------	----------------

(o) Employee benefits obligations

The Commission accrues in its accounts, annually, the estimated liabilities for pensions and other employee benefits.

Pension benefits

The Commission provides employment, post-retirement and pre-retirement benefits through defined benefit plans and defined contribution plans.

The cost of pension benefits for defined contribution pension plans are expensed at the time active employees are compensated.

The defined benefit plans sponsored by the Commission determine the amount of pension benefits employees will receive on retirement by reference to length of service and salary levels. Obligations associated with defined benefit plans reside with the Commission, even if plan assets for funding the plan are set aside.

The liability recognized in the statement of financial position for defined benefit plans 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.

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 render the related service are measured on an undiscounted basis and are expensed as the related service is provided.

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2019 (in thousands)

(p) Regulatory deferral account balance

The Commission early adopted IFRS 14 Regulatory Deferral Accounts and has continued to apply the accounting policies it applied in accordance with the Handbook for the recognition, measurement and impairment of assets and liabilities arising from rate regulation. These are referred to as regulatory deferral account balances.

Explanation of recognized amounts

Regulatory deferral account balances are recognized and measured at cost less amortization. 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.

(q) Future accounting standards

At the date of authorization of these financial statements, certain new IFRS standards, amendments and interpretations to existing standards have been published by the IASB, but are not yet effective and have not been adopted early by the Commission.

Management anticipates that the relevant pronouncements will be adopted in the Commission's accounting policies for the first period beginning after the effective date of the pronouncement. Information on new standards, amendments and interpretations that may be relevant to the Commission's financial statements is provided below.

IFRS 15 Revenue from Contracts with Customers

The IASB released a new standard IFRS 15 Revenue from Contracts with Customers which replaces IAS 18 Revenue, IAS 11 Construction Contracts and certain revenue-related interpretations. The new standard provides a single, principle based five-step model to be applied to all contracts with customers requiring an entity to recognize revenue 1) in a manner that depicts the transfer of goods or services to customers and 2) at an amount that reflects the consideration the entity expects to be entitled to in exchange for those goods or services. IFRS 15 is effective for annual periods beginning on or after January 1, 2018. The Commission has adopted and assessed the impact of the new standard and concluded it is not material to the financial statements.

IFRS 9 Financial Instruments

The IASB has replaced IAS 39 Financial Instruments: Recognition and Measurement in its entirety with a new standard IFRS 9 Financial Instruments. The final version of the standard introduces a new approach to financial asset classification, replaces the "incurred loss" impairment model with a more forward-looking expected loss model and substantially revises hedge accounting.

Management completed their assessment and the Commission has elected to apply the modified retrospective method on transition, which means that comparative periods have not been restated. The Commission adopted IFRS 9 in its financial statements for the annual period beginning April 1, 2018. The adoption of this standard had no financial impact to the Commission.

IFRS 16 Leases

The IASB issued IFRS 16, Leases, which replaces IAS 17, Leases. IFRS 16 provides a single lessee accounting model, requiring the recognition of assets and liabilities for all leases, unless the lease term is twelve months or less or the underlying asset has a low value. Lessor accounting remains largely unchanged from IAS 17. The new standard IFRS 16 is effective for annual periods beginning on or after January 1, 2019. The Commission is currently assessing the impact of this new standard.

3. Contingent liabilities

As a condition of a prior year sale of a property, the Commission 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.

The Commission has been named along with the contractor for a flooding incident that occurred as a result of an overflow of wastewater at a pumping station associated with the Halifax Harbour Solutions Project (HHSP). The claim is being defended by the Commission's insurer and management believes exposure in this regard is minimal.

There are active claims against the Commission; however, the likelihood of actual liability is not determinable at this time. If the Commission's defense 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

The Commission is responsible for funding the employer share of the 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 the Commission reimburses HRM for the pension costs related to the Commission's proportionate share of the employees covered under the plan. Due to the nature of the plan, the Commission does not have sufficient information to account for the plan as a defined benefit; therefore, the multiemployer defined benefit plan is accounted for in the same manner as a defined contribution plan. An expense is recorded in the period when the Commission is obligated to make contributions for services rendered by the employee. During 2019, the Commission funded \$599 (2018 - \$635) in contributions to the plan.

Defined benefit plans and other long term employment benefits

For all other employees, the Commission maintains a defined benefit pension plan and offers post-retirement health and insurance benefits. The pension plan provides pensions based upon length of service and best seven years' earnings. This defined benefit pension plan is funded by employer and employee contributions with employees contributing 10.65% of regular employee earnings. The Commission contributes 13.29% of payroll which includes 9.85% toward current service cost and 3.44% toward going concern special payments.

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 (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.

The Commission also has a non-funded pre-retirement benefit that is accrued annually, but is payable on retirement, termination or death if the employee has at least 10 years of continuous service. The benefit is equal to three days' pay for each completed year of service, up to a maximum of six month's salary and can be taken as a lump sum payment at the date of retirement in lieu of pre-retirement leave.

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2019 (in thousands)

4. Employee benefit obligations (continued)

Information about the Commission's plans, based on an actuarial extrapolation as at March 31, 2019, is as follows:

	Pension Plan		Post-retirement benefits		Pre-retirement benefits	
	2019	2018	2019	2018	2019	2018
Change in accrued benefit obligation						
Balance, beginning of year	\$ 187,181	\$ 168,363	\$ 430	\$ 341	\$ 3,983	\$ 3,824
Current service cost	7,107	6,112	-	-	344	339
Interest cost	6,837	6,484	13	8	141	132
Contributions by plan participants	2,885	2,725	-	-	-	-
Benefit payments	(4,534)	(4,265)	(60)	(63)	(460)	(227)
Re-measurements – actuarial (gains)/ losses from changes in demographic assumptions	-	-	-	(42)	-	-
Re-measurements – actuarial (gains)/ losses from changes in financial/experience assumptions	(514)	7,762	(3)	186	187	(85)
Balance, end of year	<u>198,962</u>	<u>187,181</u>	<u>380</u>	<u>430</u>	<u>4,195</u>	<u>3,983</u>
Change in fair value of plan assets						
Balance, beginning of year	121,695	109,883	-	-	-	-
Interest income	4,412	4,206	-	-	-	-
Administrative expenses	(94)	(69)	-	-	-	-
Actual return on plan assets	3,414	5,952	-	-	-	-
Benefit payments	(4,534)	(4,265)	(60)	(63)	(460)	(227)
Contributions: Employee	2,885	2,725	-	-	-	-
Employer	<u>3,429</u>	<u>3,263</u>	<u>60</u>	<u>63</u>	<u>460</u>	<u>227</u>
Balance, end of year	<u>131,207</u>	<u>121,695</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Accrued benefit liability at March 31	<u>\$ 67,755</u>	<u>\$ 65,486</u>	<u>\$ 380</u>	<u>\$ 430</u>	<u>\$ 4,195</u>	<u>\$ 3,983</u>

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2019 (in thousands)

4. Employee benefit obligations (continued)

Included in the statement of earnings is pension expense of \$9,388 (2018 - \$8,461).

The significant actuarial assumptions adopted in measuring the Commission's accrued benefit obligations are as follows:

	2019	2018	2019	2018	2019	2018
	Pension	Pension	Post-	Post-	Pre-	Pre-
	Plan	Plan	Retirement	Retirement	Retirement	Retirement
			Benefits	Benefits	Benefit	Benefit
Discount rate	3.40%	3.60%	3.00%	3.20%	3.20%	3.60%
Expected return on plan assets	3.40%	3.60%	N/A	N/A	N/A	N/A
Rate of compensation increase	3.75%	3.75%	N/A	N/A	3.75%	3.75%
Expenses for life benefits as a % of claims	N/A	N/A	10.00%	10.00%	N/A	N/A
Health benefit inflation per year	N/A	N/A	6.60%	6.92%	N/A	N/A
Dental benefit inflation per year	N/A	N/A	4.00%	4.50%	N/A	N/A

The measurement date used to determine the Plan assets and the accrued benefit obligation was March 31, 2019. 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 into the defined benefit plan and supplemental plan for the next fiscal year are \$2,894.

5. Regulatory deferral account balance

In 2011, the NSUARB granted the Commission 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, the Commission recognized a \$4,156 regulatory deferral account. In absence of rate regulation, this regulatory deferral account balance would have been expensed as depreciation in fiscal 2011 and 2012. In 2012, the NSUARB granted approval of the amortization of this deferral account over the remaining useful lives of the underlying assets, beginning in 2014. The expense recognized in 2019 is \$192 (2018 - \$192).

	2019	2018
Beginning balance	\$ 3,196	\$ 3,388
Amortization	(192)	(192)
Ending balance	\$ 3,004	\$ 3,196

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2019 (in thousands)

6. Commitments

There is an agreement with HRM for renewal of the dividend/grant in lieu of taxes for fiscal years 2015/16 to 2019/20 for water services. Dividend payments are approved as part of revenue requirements by the NSUARB. There is no dividend/grant in lieu of taxes approved for wastewater/stormwater. The Commission is committed to a payment of \$5,078 for the 2020 fiscal year.

At March 31, 2019, the Commission had \$118,025 (2018 - \$85,728) in expenditures from current and past approved capital budgets not yet expended.

7. Supplemental cash flow information

	2019	2018
Changes in non-cash operating working capital items		
Receivables, customer charges and unbilled	\$ (285)	\$ (3,655)
Payable to/receivable from HRM, net	1,972	(1,250)
Inventory	(615)	159
Prepays	(53)	(146)
Payables and accruals, trade	778	5,925
Accrued interest on long term debt	21	(71)
Contractor and customer deposits	21	(5)
Unearned revenue	(77)	(203)
	<u>\$ 1,762</u>	<u>\$ 754</u>

Interest paid during the year was \$7,430 (2018 - \$7,884).

8. Capital management

The Commission's objective when managing capital is to ensure sufficient liquidity to support its financial obligations and execute its operating and capital plans. The Commission monitors and makes adjustments to its capital structure through additional borrowings of long term debt which are used to finance capital projects.

The Commission considers its total capitalization to include all long term debt and total equity. The calculation is set out as follows:

	2019	2018
Long term debt (current portion)	\$ 24,709	\$ 22,630
Long term debt	<u>182,732</u>	<u>190,871</u>
Funded debt	207,441	213,501
Equity	<u>183,798</u>	<u>167,660</u>
Capital under management	<u>\$ 391,239</u>	<u>\$ 381,161</u>

The Commission is a regulated utility and is subject to the regulations of the NSUARB. As part of this regulation, the Commission must obtain approval by the NSUARB for all borrowings. The Commission has obtained regulatory approval for all borrowings during the fiscal year. The Commission is not subject to financial borrowing covenants other than as outlined in Note 10.

9. Financial instruments and risk management

The Commission 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. Loans and receivables are carried at amortized cost. The fair value of variable rate long term debt is assumed to approximate its carrying value. Fair value has been estimated by discounting future cash flows at a rate offered for borrowings of similar maturities and credit quality at year end.

There were no transfers between classes of the fair value hierarchy during the year.

The Commission 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.

Credit risk

Credit risk arises from the possibility that the Commission's customers may experience financial difficulty and be unable to fulfill their obligations. The Commission's maximum exposure to credit risk corresponds to the cash and customer charges and contractual receivables. However, the Commission's customers are numerous and diverse, which reduces the concentration of credit risk.

An analysis of the Commission's receivables and continuity of the Commission's provision for impairment losses on receivables is as follows:

	2019	2018
Receivables		
Customer charges, contractual and unbilled	\$ 36,921	\$ 36,552
Less: allowance for doubtful accounts	<u>(2,502)</u>	<u>(2,418)</u>
	<u>\$ 34,419</u>	<u>\$ 34,134</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 patterns / history.

Interest risk

Interest risk arises from the possibility that changes in interest rates will cause the Commission a potential loss. All of the Commission's long term debt is at varying fixed rates and has staggered maturity dates which reduce 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 the Commission's employees' pension plan and consequently the plan's deficit. 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 the Commission not being able to meet its cash requirements in a timely and cost effective manner. The Commission manages this risk by closely monitoring the cash on hand in comparison to upcoming cash commitments.

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2019 (in thousands)

10. Related party transactions

The immediate parent and ultimate controlling party of the Commission is the HRM.

The Commission is obligated to make payments on debt, held in the name of HRM, associated with wastewater and stormwater assets which were transferred to the Commission in 2007 and subsequent years.

Amounts receivable from and payable to HRM have normal credit terms.

The Commission had the following related party transactions with HRM:

- The Commission recorded revenue for provision of water, wastewater and stormwater services to HRM in the amount of \$5,209 (2018 - \$5,097).
- The Commission recorded fire protection revenue from HRM of \$7,074 (2018 - \$7,074).
- The Commission paid a grant in lieu of tax of \$4,999 (2018 - \$4,774).
- The debt issued by the Commission was covered by a blanket guarantee from HRM subject to the Commission maintaining a debt service ratio of less than 35%.

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 the Commission.

The following is compensation expense for key management personnel:

	<u>2019</u>	<u>2018</u>
Short term benefits	\$ 1,421	\$ 1,388
Post-employment benefits	<u>313</u>	<u>219</u>
Total compensation	<u>\$ 1,734</u>	<u>\$ 1,607</u>

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2019 (in thousands)

11. Intangible assets	2019	2018
Cost		
Beginning balance, April 1	\$ 17,888	\$ 13,213
Additions	<u>2,910</u>	<u>4,675</u>
Total cost, March 31	<u>20,798</u>	<u>17,888</u>
Accumulated amortization		
Beginning balance, April 1	4,011	2,938
Amortization	<u>1,369</u>	<u>1,073</u>
Total accumulated amortization, March 31	<u>5,380</u>	<u>4,011</u>
Net book value	<u>\$ 15,418</u>	<u>\$ 13,877</u>

12. Utility plant in service

	<u>Land</u>	<u>Structures and improvements</u>	<u>Treatment and network equipment</u>	<u>Distribution and collection network</u>	<u>Tools and work equipment</u>	<u>Total</u>
Cost						
Beginning balance, April 1, 2018	\$ 21,372	\$ 218,876	\$ 229,808	\$ 862,357	\$ 26,080	\$ 1,358,493
Additions	231	16,739	23,459	33,708	3,610	77,747
Disposals	-	-	(2,325)	-	(855)	(3,180)
Total cost, March 31, 2019	<u>21,603</u>	<u>235,615</u>	<u>250,942</u>	<u>896,065</u>	<u>28,835</u>	<u>1,433,060</u>
Accumulated depreciation						
Beginning balance, April 1, 2018	\$ -	\$ 43,185	\$ 47,080	\$ 59,968	\$ 7,830	\$ 158,063
Depreciation	-	9,552	11,725	17,078	3,202	41,557
Total accumulated depreciation March 31, 2019	<u>-</u>	<u>52,737</u>	<u>58,805</u>	<u>77,046</u>	<u>11,032</u>	<u>199,620</u>
Net book value, March 31, 2019	<u>\$ 21,603</u>	<u>\$ 182,878</u>	<u>\$ 192,137</u>	<u>\$ 819,019</u>	<u>\$ 17,803</u>	<u>\$ 1,233,440</u>

	<u>Land</u>	<u>Structures and improvements</u>	<u>Treatment and network equipment</u>	<u>Distribution and collection network</u>	<u>Tools and work equipment</u>	<u>Total</u>
Cost						
Beginning balance, April 1, 2017	\$ 20,780	\$ 214,875	\$ 218,773	\$ 787,646	\$ 18,322	\$ 1,260,396
Additions	592	4,011	11,464	74,724	7,758	98,549
Disposals	-	(10)	(429)	(13)	-	(452)
Total cost, March 31, 2018	<u>21,372</u>	<u>218,876</u>	<u>229,808</u>	<u>862,357</u>	<u>26,080</u>	<u>1,358,493</u>
Accumulated depreciation						
Beginning balance, April 1, 2017	\$ -	\$ 33,807	\$ 34,671	\$ 43,744	\$ 4,022	\$ 116,244
Depreciation	-	9,378	12,409	16,224	3,808	41,819
Total accumulated depreciation March 31, 2018	<u>-</u>	<u>43,185</u>	<u>47,080</u>	<u>59,968</u>	<u>7,830</u>	<u>158,063</u>
Net book value, March 31, 2018	<u>\$ 21,372</u>	<u>\$ 175,691</u>	<u>\$ 182,728</u>	<u>\$ 802,389</u>	<u>\$ 18,250</u>	<u>\$ 1,200,430</u>

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2019 (in thousands)

13. Long-term debt	<u>Interest rates</u>	<u>2019</u>	<u>2018</u>
Payable to Municipal Finance Corporation (MFC)			
Water	1.040% to 6.750%	\$ 61,197	\$ 63,181
Halifax Harbour Solutions	0.900% to 4.329%	7,150	7,800
Wastewater/stormwater	1.040% to 4.500%	87,293	86,209
Stormwater	1.040% to 4.114%	13,643	11,723
		<u>169,283</u>	<u>168,913</u>
Payable to Halifax Regional Municipality			
MFC Wastewater/stormwater	1.200% to 4.940%	<u>39,000</u>	<u>45,500</u>
		208,283	214,413
Less: debt issue costs		<u>(842)</u>	<u>(912)</u>
		207,441	213,501
Less: amount payable within one year		<u>(24,709)</u>	<u>(22,630)</u>
		\$ 182,732	\$ 190,871

The debentures are repayable in fixed annual or semi-annual principal instalments plus interest payable semi-annually. Principal instalments for the next five years are as follows:

2020	\$ 24,709
2021	\$ 19,034
2022	\$ 16,989
2023	\$ 41,702
2024	\$ 38,381

14. Operating expenditures by nature	<u>2019</u>	<u>2018</u>
Salaries and benefits	\$ 44,916	\$ 41,948
Training	728	618
Contract services	14,920	13,619
Electricity	6,601	6,323
Operating supplies	10,979	9,945
Professional services	3,945	4,559
Chemicals	4,961	4,698
Depreciation and amortization	<u>45,736</u>	<u>43,106</u>
	\$ 132,786	\$ 124,816

15. Subsequent event

On May 22, 2019 the Collective Agreements that will govern the next five years for Locals 227 and 1431 were approved by the Board. Retroactive payments required have been reflected in the accruals at year end.

Halifax Regional Water Commission

Schedule of utility plant in service

Year ended March 31, 2019 (in thousands)

Schedule A

Water

	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
Cost											
Beginning balance, April 1, 2018	\$ 16,009	\$ 95,326	\$ 10,303	\$ 25,222	\$ 5,171	\$ 37,241	\$ 15,582	\$ 19,917	\$ 9,834	\$ 28,124	\$ 635,523
Cost	231	1,634	200	1,673	436	2,658	3,530	721	220	1,903	26,732
Additions	-	-	-	-	-	-	(2,325)	-	-	(406)	(2,731)
Disposals	16,240	96,960	10,503	26,895	5,607	39,899	16,787	20,638	10,054	29,621	659,524
Total cost, March 31, 2019											
Accumulated depreciation											
Beginning balance, April 1, 2018	-	29,560	7,291	16,491	3,860	6,989	6,075	4,207	3,250	17,395	180,037
Depreciation	-	102	285	1,080	193	657	(988)	317	38	1,620	8,169
Total accumulated depreciation, March 31, 2019	-	29,662	7,576	17,571	4,053	7,646	5,087	4,524	3,288	19,015	188,206
Net book value, March 31, 2019	<u>\$ 16,240</u>	<u>\$ 67,298</u>	<u>\$ 2,927</u>	<u>\$ 9,324</u>	<u>\$ 1,554</u>	<u>\$ 32,253</u>	<u>\$ 11,700</u>	<u>\$ 16,114</u>	<u>\$ 6,766</u>	<u>\$ 10,606</u>	<u>\$ 471,318</u>
Cost											
Beginning balance, April 1, 2017	\$ 15,417	\$ 92,334	\$ 9,720	\$ 23,771	\$ 5,046	\$ 35,633	\$ 14,920	\$ 19,332	\$ 9,564	\$ 26,871	\$ 602,709
Cost	592	2,997	593	1,451	125	1,608	1,501	585	270	4,001	36,429
Additions	-	(5)	(10)	-	-	-	(839)	-	-	(2,748)	(3,615)
Disposals	16,009	95,326	10,303	25,222	5,171	37,241	15,582	19,917	9,834	28,124	635,523
Total cost, March 31, 2018											
Accumulated depreciation											
Beginning balance, April 1, 2017	-	28,034	7,028	15,478	3,689	6,377	5,950	3,902	2,922	18,309	171,933
Depreciation	-	1,526	263	1,013	171	612	125	305	328	(914)	8,104
Total accumulated depreciation, March 31, 2018	-	29,560	7,291	16,491	3,860	6,989	6,075	4,207	3,250	17,395	180,037
Net book value, March 31, 2018	<u>\$ 16,009</u>	<u>\$ 65,766</u>	<u>\$ 3,012</u>	<u>\$ 8,731</u>	<u>\$ 1,311</u>	<u>\$ 30,252</u>	<u>\$ 9,507</u>	<u>\$ 15,710</u>	<u>\$ 6,584</u>	<u>\$ 10,729</u>	<u>\$ 455,486</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Utility plant in service under IFRS differs from the Handbook due to exclusion of intangible assets, componentization of certain assets and useful lives for depreciation.

Halifax Regional Water Commission

Schedule of utility plant in service

Year ended March 31, 2019 (in thousands)

Schedule A

Wastewater

	Land	Structures and improvements	Pumping equipment	Treatment equipment	SCADA equipment	Collection system	Laterals	Meters	Tools and work equipment	Aerotech and small systems	Total
Cost											
Beginning balance, April 1, 2018	\$ 5,329	\$ 176,206	\$ 20,966	\$ 162,499	\$ 8,407	\$ 319,809	\$ 21,898	\$ 1,501	\$ 32,929	\$ 12,564	\$ 762,108
Cost	-	14,641	501	10,270	2,158	6,525	4,637	3,530	3,898	220	46,380
Additions	-	-	-	-	-	-	-	-	(450)	-	(450)
Disposals	5,329	190,847	21,467	172,769	10,565	326,334	26,535	5,031	36,377	12,784	808,038
Total cost, March 31, 2019											
Accumulated depreciation											
Beginning balance, April 1, 2018	-	58,016	7,289	55,290	1,869	61,604	1,912	38	13,994	3,893	203,905
Depreciation	-	1,822	815	8,413	619	4,485	488	163	2,412	80	19,297
Total accumulated depreciation, March 31, 2019	-	59,838	8,104	63,703	2,488	66,089	2,400	201	16,406	3,973	223,202
Net book value, March 31, 2019	\$ 5,329	\$ 131,009	\$ 13,363	\$ 109,066	\$ 8,077	\$ 260,245	\$ 24,135	\$ 4,830	\$ 19,971	\$ 8,811	\$ 584,836
Cost											
Beginning balance, April 1, 2017	\$ 5,329	\$ 175,208	\$ 17,579	\$ 161,122	\$ 8,210	\$ 290,169	\$ 19,108	\$ -	\$ 25,407	\$ 12,089	\$ 714,221
Cost	-	1,003	3,387	1,377	197	29,640	2,790	1,501	7,665	475	48,035
Additions	-	(5)	-	-	-	-	-	-	(143)	-	(148)
Disposals	5,329	176,206	20,966	162,499	8,407	319,809	21,898	1,501	32,929	12,564	762,108
Total cost, March 31, 2018											
Accumulated depreciation											
Beginning balance, April 1, 2017	-	53,697	6,577	47,255	1,366	57,418	1,502	-	11,573	3,450	182,838
Depreciation	-	4,319	712	8,035	503	4,186	410	38	2,421	443	21,067
Total accumulated depreciation, March 31, 2018	-	58,016	7,289	55,290	1,869	61,604	1,912	38	13,994	3,893	203,905
Net book value, March 31, 2018	\$ 5,329	\$ 118,190	\$ 13,677	\$ 107,209	\$ 6,538	\$ 258,205	\$ 19,986	\$ 1,463	\$ 18,935	\$ 8,671	\$ 558,203

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Utility plant in service under IFRS differs from the Handbook due to exclusion of intangible assets, componentization of certain assets and useful lives for depreciation.

Halifax Regional Water Commission

Schedule of utility plant in service

Year ended March 31, 2019 (in thousands)

Schedule A

Stormwater

	Structures and improvements	Collection system	Laterals	Tools and work equipment	Total
Cost					
Beginning balance, April 1, 2018					
Cost	\$ 9,796	\$ 245,447	\$ 4,896	\$ 3,812	\$ 263,951
Additions	464	6,212	150	720	7,546
Disposals	-	-	-	-	-
Total cost, March 31, 2019	<u>10,260</u>	<u>251,659</u>	<u>5,046</u>	<u>4,532</u>	<u>271,497</u>
Accumulated depreciation					
Beginning balance, April 1, 2018	1,579	42,269	396	1,347	45,591
Depreciation	182	6,104	99	540	6,925
Total accumulated depreciation, March 31, 2019	<u>1,761</u>	<u>48,373</u>	<u>495</u>	<u>1,887</u>	<u>52,516</u>
Net book value, March 31, 2019	<u>\$ 8,499</u>	<u>\$ 203,286</u>	<u>\$ 4,551</u>	<u>\$ 2,645</u>	<u>\$ 218,981</u>
Cost					
Beginning balance, April 1, 2017					
Cost	\$ 9,785	\$ 227,751	\$ 4,611	\$ 3,045	\$ 245,192
Additions	11	17,696	285	767	18,759
Disposals	-	-	-	-	-
Total cost, March 31, 2018	<u>9,796</u>	<u>245,447</u>	<u>4,896</u>	<u>3,812</u>	<u>263,951</u>
Accumulated depreciation					
Beginning balance, April 1, 2017	1,402	36,380	301	870	38,953
Depreciation	177	5,889	95	477	6,638
Total accumulated depreciation, March 31, 2018	<u>1,579</u>	<u>42,269</u>	<u>396</u>	<u>1,347</u>	<u>45,591</u>
Net book value, March 31, 2018	<u>\$ 8,217</u>	<u>\$ 203,178</u>	<u>\$ 4,500</u>	<u>\$ 2,465</u>	<u>\$ 218,360</u>

During the year, \$0 of interest was capitalized to Utility Plant in Service (2018 - \$267).

	Water	Wastewater	Stormwater	Total
Cumulative utility plant in service				
Net book value, March 31, 2019	\$ 471,318	\$ 584,836	\$ 218,981	\$ 1,275,135
Net book value, March 31, 2018	\$ 455,486	\$ 558,203	\$ 218,360	\$ 1,232,049

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Utility plant in service under IFRS differs from the Handbook due to exclusion of intangible assets, componentization of certain assets and useful lives for depreciation.

Schedule B

Halifax Regional Water Commission Schedule of long term debt Year ended March 31, 2019 (in thousands)

	Interest rate	Final Maturity	Balance Remaining	
			2019	2018
Payable to Municipal Finance Corporation				
Water				
Debenture 23 A 1	4.250% to 6.125%	2018	\$ -	\$ 600
Debenture 28 A 1	6.500% to 6.750%	2018	-	1,100
Debenture 98 A 1	3.750% to 5.088%	2019	-	3,671
Debenture 29 A 1	0.900% to 4.329%	2019	225	450
Debenture 30 A 1	1.550% to 3.870%	2020	350	525
Debenture 31 A 1	1.630% to 4.221%	2021	450	600
Debenture 32 A 1	1.636% to 3.480%	2022	800	1,000
Debenture 32 C 1	1.510% to 3.160%	2022	7,514	8,051
Debenture 33 A 1	1.330% to 3.489%	2023	7,584	8,090
Debenture 33 B 1	1.285% to 4.114%	2023	5,559	5,930
Debenture 34 B 1	1.200% to 3.190%	2024	10,938	11,622
Debenture 35 B 1	1.040% to 2.894%	2025	11,447	12,120
Debenture 36 A 1	1.150% to 2.925%	2026	1,600	1,800
Debenture 36 B 1	1.150% to 2.506%	2026	3,905	4,122
Debenture 37 A 1	1.734% to 3.073%	2027	3,325	3,500
Debenture 38 A 1	2.060% to 3.300%	2028	1,500	-
Debenture 38 B 1	2.490% to 3.389%	2028	6,000	-
Halifax Harbour Solutions				
Debenture 29 A 1	0.900% to 4.329%	2019	7,150	7,800
Wastewater/stormwater				
Debenture 30 A 1	1.510% to 4.500%	2020	2,040	2,210
Debenture 32 A 1	1.636% to 3.480%	2022	1,678	1,797
Debenture 32 B 1	1.380% to 3.156%	2022	22,400	24,000
Debenture 32 C 1	1.510% to 3.160%	2022	3,217	3,447
Debenture 33 A 1	1.330% to 3.489%	2023	12,645	13,488
Debenture 33 B 1	1.285% to 4.114%	2023	8,170	8,714
Debenture 34 A 1	1.245% to 3.347%	2024	4,455	4,734
Debenture 34 B 1	1.200% to 3.190%	2024	6,869	7,298
Debenture 35 B 1	1.040% to 2.894%	2025	11,993	12,699
Debenture 36 B 1	1.150% to 2.506%	2026	1,631	1,722
Debenture 37 A 1	1.735% to 3.073%	2027	5,795	6,100
Debenture 38 B 1	2.490% to 3.389%	2028	6,400	-
Stormwater				
Debenture 33 A 1	1.330% to 3.489%	2023	405	432
Debenture 33 B 1	1.285% to 4.114%	2023	1,979	2,111
Debenture 34 B 1	1.200% to 3.190%	2024	4,722	5,017
Debenture 35 B 1	1.040% to 2.894%	2025	2,746	2,907
Debenture 36 B 1	1.150% to 2.506%	2026	811	856
Debenture 37 A 1	1.734% to 3.073%	2027	380	400
Debenture 38 B 1	2.490% to 3.389%	2028	2,600	-
			<u>169,283</u>	<u>168,913</u>
Payable to Halifax Regional Municipality				
Municipal Finance Corporation – Wastewater/stormwater				
Debenture 24 B 1	2.840% to 5.940%	2024	33,000	38,500
Debenture 34 B 1	1.200% to 3.190%	2024	6,000	7,000
			<u>39,000</u>	<u>45,500</u>
			208,283	214,413
Less: debt issue costs			(842)	(912)
			<u>207,441</u>	<u>213,501</u>
Less: amount payable within one year			(24,709)	(22,630)
			<u>\$ 182,732</u>	<u>\$ 190,871</u>

The debentures are repayable in fixed annual or semi-annual principal instalments plus interest payable semi-annually. Principal instalments for the next five years are as follows:

2020	\$ 24,709
2021	\$ 19,034
2022	\$ 16,989
2023	\$ 41,702
2024	\$ 38,381

Halifax Regional Water Commission

Schedule of operations for water service

Schedule C

Year ended March 31, 2019 (in thousands)

	<u>2019</u>	<u>2018</u>
Operating revenues		
Water service	\$ 48,040	\$ 47,220
Fire protection	7,074	7,074
Private fire protection services	869	856
Other operating revenue		
Bulk water stations	227	304
Customer late payment fees	244	220
Miscellaneous	98	176
	<u>56,552</u>	<u>55,850</u>
Operating expenditures		
Water supply and treatment	9,767	8,645
Water transmission and distribution	10,903	9,410
Engineering and information services	3,749	3,850
Regulatory services	679	496
Customer service	2,524	2,348
Administration and pension	7,153	6,910
Depreciation	9,046	8,550
	<u>43,821</u>	<u>40,209</u>
Earnings from operations before financial and other revenues and expenditures	<u>12,731</u>	<u>15,641</u>
Financial and other revenues		
Interest	521	313
Other	559	485
	<u>1,080</u>	<u>798</u>
Financial and other expenditures		
Interest on long term debt	1,924	2,131
Repayment of long term debt	7,181	8,247
Amortization of debt discount	85	94
Grant in lieu of taxes	4,999	4,774
Other	24	149
	<u>14,213</u>	<u>15,395</u>
(Loss) earnings for the year	<u>\$ (402)</u>	<u>\$ 1,044</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Schedule D**Halifax Regional Water Commission**
Schedule of operations for wastewater service

Year ended March 31, 2019 (in thousands)

	<u>2019</u>	<u>2018</u>
Operating revenues		
Wastewater service	\$ 69,901	\$ 69,994
Other operating revenue		
Leachate and other contract revenue	417	417
Septage tipping fees	764	812
Over strength surcharge	75	219
Customer late payment fees	186	169
Miscellaneous	538	471
	<u>71,881</u>	<u>72,082</u>
Operating expenditures		
Wastewater collection	13,125	12,644
Wastewater treatment	19,999	19,647
Engineering and information services	3,783	3,419
Regulatory services	886	929
Customer service	2,057	2,270
Administration and pension	5,859	4,853
Depreciation	12,986	11,905
	<u>58,695</u>	<u>55,667</u>
Earnings from operations before financial and other revenues and expenditures	<u>13,186</u>	<u>16,415</u>
Financial and other revenues		
Interest	520	311
Other	183	3,307
	<u>703</u>	<u>3,618</u>
Financial and other expenditures		
Interest on long term debt	4,939	5,185
Repayment of long term debt	12,015	11,747
Amortization of debt discount	103	98
Other	21	120
	<u>17,078</u>	<u>17,150</u>
(Loss) earnings for the year	<u>\$ (3,189)</u>	<u>\$ 2,883</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Halifax Regional Water Commission

Schedule of operations for stormwater service

Schedule E

Year ended March 31, 2019 (in thousands)

	<u>2019</u>	<u>2018</u>
Operating revenues		
Stormwater site generated service	\$ 5,906	\$ 6,169
Stormwater right-of-way service	3,835	3,847
Other operating revenue		
Customer late payment fees	118	93
Miscellaneous	<u>120</u>	<u>105</u>
	<u>9,979</u>	<u>10,214</u>
Operating expenditures		
Stormwater collection	4,950	4,842
Engineering and information services	624	556
Regulatory services	1,587	1,304
Customer service	335	278
Administration and pension	953	789
Depreciation	<u>974</u>	<u>807</u>
	<u>9,423</u>	<u>8,576</u>
Earnings from operations before financial and other revenue and expenditures	<u>556</u>	<u>1,638</u>
Financial and other revenues		
Investment income	<u>116</u>	<u>70</u>
Financial and other expenditures		
Interest on long term debt	567	568
Repayment of long term debt	1,320	1,253
Amortization of debt discount	<u>11</u>	<u>10</u>
	<u>1,898</u>	<u>1,831</u>
Loss for the year	<u>\$ (1,226)</u>	<u>\$ (123)</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Schedule F**Halifax Regional Water Commission****Schedule of regulated activities**

Year ended March 31, 2019 (in thousands)

	<u>2019</u>	<u>2018</u>
Operating revenues		
Water service	\$ 48,040	\$ 47,220
Wastewater service	69,901	69,994
Stormwater service	9,741	10,016
Public fire protection	7,074	7,074
Private fire protection services	869	856
Other operating revenue	<u>1,216</u>	<u>1,230</u>
	<u>136,841</u>	<u>136,390</u>
Operating expenditures		
Water supply and treatment	11,009	9,802
Water transmission and distribution	12,402	10,810
Wastewater collection	11,643	11,252
Stormwater collection	4,901	4,793
Wastewater treatment	18,197	18,054
Engineering and information services	8,156	7,265
Regulatory services	3,152	3,291
Customer service	4,881	4,861
Administration and pension	13,921	12,501
Depreciation	<u>22,989</u>	<u>21,241</u>
	<u>111,251</u>	<u>103,870</u>
Earnings from operations before financial and other revenues and expenditures	<u>25,590</u>	<u>32,520</u>
Financial and other revenues		
Interest	1,157	694
Other	<u>213</u>	<u>3,096</u>
	<u>1,370</u>	<u>3,790</u>
Financial and other expenditures		
Interest on long term debt	7,430	7,884
Repayment of long term debt	20,516	21,247
Amortization of debt discount	199	202
Grant in lieu of taxes	<u>4,999</u>	<u>4,774</u>
	<u>33,144</u>	<u>34,107</u>
(Loss) earnings for the year	<u>\$ (6,184)</u>	<u>\$ 2,203</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Halifax Regional Water Commission

Schedule of unregulated activities

Schedule F

Year ended March 31, 2019 (in thousands)

	<u>2019</u>	<u>2018</u>
Operating revenues		
Dewatering	\$ 210	\$ 210
Septage tipping fees	764	812
Leachate treatment and contract revenue	417	417
Airplane effluent	143	121
Other operating revenue	<u>203</u>	<u>196</u>
	<u>1,737</u>	<u>1,756</u>
Operating expenditures		
Water supply and treatment	21	18
Wastewater treatment	572	456
Other	78	87
Depreciation	<u>18</u>	<u>21</u>
	<u>689</u>	<u>582</u>
Earnings from operations before financial and other revenues and expenditures	<u>1,048</u>	<u>1,174</u>
Financial and other revenues		
Other	<u>364</u>	<u>696</u>
Financial and other expenditures		
Other	<u>45</u>	<u>269</u>
Earnings for the year	<u>\$ 1,367</u>	<u>\$ 1,601</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Schedule G

Halifax Regional Water Commission Nova Scotia Utility and Review Board

Year ended March 31, 2019 (in thousands)

Return on rate base	2019	2018
Rate of return on rate base for water service	2.38%	3.39%
Rate of return on rate base for wastewater service	4.29%	5.65%
Rate of return on rate base for stormwater service	1.38%	3.45%

Special purpose reserves

	<u>Wastewater & Stormwater Reserves</u>	<u>RDC Water Reserve</u>	<u>RDC Wastewater Reserve</u>	<u>Other Capital Reserves</u>	2019 Total	2018 Total
Reserve, beginning of year	\$ 3,606	\$ 2,332	\$ 21,917	\$ 6	\$ 27,861	\$ 16,912
Contributions and interest	-	888	12,801	-	13,689	11,162
Expenditures	-	-	-	202	202	(213)
Reserve, end of year	<u>\$ 3,606</u>	<u>\$ 3,220</u>	<u>\$ 34,718</u>	<u>\$ 208</u>	<u>\$ 41,752</u>	<u>\$ 27,861</u>

Summarized consolidated operating results

	Actual 2019	Actual 2018
Operating revenues	\$ 138,413	\$ 138,145
Operating expenditures	<u>106,731</u>	<u>99,437</u>
Earnings from operations before financial and other revenues and expenditures	31,682	38,708
Non-operating revenues	1,898	4,486
Non-operating expenditures	<u>33,190</u>	<u>34,376</u>
Earnings for the year	<u>\$ 390</u>	<u>\$ 8,818</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

**STRAIGHT from
the SOURCE**

